

Séminaire International

International Seminar

Pauvreté Hydraulique et crises sociales

Perspectives de recherche
et d'action

Water poverty and social crisis

Perspectives for research
and action

Agadir - Maroc
11-15 Décembre 2005

Documents de travail - Working documents

Vol. 1

ateliers / workshops

Eaux et pauvreté - Water and poverty
ONG, société civile - NGO, civil society



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Ur 044 Dynamiques sociales de l'irrigation



Innovations Sociales et
Institutionnelles
dans la Gestion de l'Irrigation
en Méditerranée

Comité d'organisation : Habib Ayebe, Pr. Ait Hssaine, Kamal Mellakh, Thierry Ruf

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A la mémoire de - to the memory of

Jose NEGRAO

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Réfléchir aux problèmes de gestion de l'eau en partant des questions de sociétés est une démarche originale à laquelle sont conviés des spécialistes des cinq continents réunis à Agadir du 11 au 15 décembre 2005 à l'initiative de l'IRD et de la Faculté des Lettres et des Sciences Humaines d'Agadir, avec le soutien du CRDI Canada et de la Fondation Ford.

Chercheurs, universitaires, doctorants, professionnels du secteur de l'eau ou responsables d'organisations non gouvernementales, tous travaillent sur les difficultés d'accès à la ressource à partir d'observations ou d'actions sur le terrain.

La pauvreté sera abordée sous toutes ses dimensions :

- Economique, elle limite les possibilités matérielles d'accès à l'eau potable comme à l'eau d'irrigation en milieu rural ;
- Hydraulique, elle frappe un grand nombre de foyers touchés par la rareté des ressources ;
- Sociale et institutionnelle, elle empêche les populations de participer réellement à la gestion des eaux et à la résolution des crises.

En confrontant leurs expériences et leurs analyses, en abordant les méthodes pour comprendre les relations entre pauvreté, précarité, exclusion et ressources en eau, en comparant les processus actuels et les réponses possibles, les participants tenteront de dresser des pistes de recherche et d'action en faveur d'un accès plus équitable à l'eau.

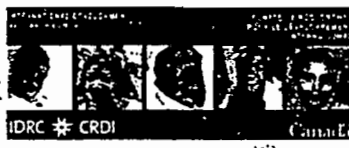
Lieu du séminaire : « Village de l'électricien », ONE, Bd Cheikh Saadi, Agadir



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Innovations Sociales et
Institutionnelles
dans la Gestion de l'Irrigation
en Méditerranée

Comité d'organisation : Habib Ayebe, Kamal Mellakh, Mohammed Bouchelkha, Thierry Ruf

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Le contenu des communications est sous la responsabilité des auteurs.

The content of the communications are under the responsibility of their authors

En effet, avec environ 900 m³ d'eau par personne et par an, tous secteurs de consommation confondus, le pays n'a pas encore atteint le seuil de crise hydraulique extrême qu'on situe habituellement à environ 500 m³ par personne et par an. Par contre, plus de la moitié des 3,2 millions de paysans que compte le pays, se situe sous le seuil de pauvreté et environ le quart sous le seuil de pauvreté absolue, définie par l'impossibilité d'acquérir des biens durables.

Les dimensions de la pauvreté paysanne

La pauvreté se décline en deux dimensions, certes distinctes mais complémentaires. Il y a la pauvreté comme privation physiologique, particulièrement la non-satisfaction des besoins matériels ou biologiques incluant la nutrition inadéquate, les divers problèmes de santé, la scolarisation inexistante ou insuffisante, et l'insécurité etc. Et il y a la pauvreté comme privation sociale, qui correspond à une conception beaucoup plus large, laquelle inclut, en plus de la privation physiologique, la vulnérabilité individuelle, le manque d'autonomie, l'incapacité, le manque de dignité et du respect de soi.

La perte de la dignité, qui ne peut être quantifiée d'aucune manière mais qui constitue le stade ultime de la pauvreté, provoque et renforce l'exclusion des personnes et des groupes sociaux touchés de l'ensemble des espaces économiques et sociaux ainsi que des espaces et instances de participation.

L'articulation entre pauvreté, capacité et participation a été démontrée par le Nobel de l'économie Amartya Sen². Selon lui, la pauvreté se caractérise par « l'absence des capacités fondamentales pour fonctionner », pour « être et faire ». Ainsi, l'approche de Sen, partant de la notion de « capacité », est-elle une sorte de fusion entre les méthodes quantitatives et qualitatives et établit une relation entre pauvreté absolue et pauvreté relative, pauvreté économique et pauvreté sociale : un manque relatif de revenus et de biens peut conduire à un manque absolu des capacités minimales.

Par ailleurs, l'importance de la pauvreté dans les zones rurales crée ou renforce le déséquilibre entre les villes et la campagne. Les estimations considèrent qu'en moyenne nationale, les zones rurales hébergent environ 58 % des pauvres³. Les chiffres élaborés par L'IFPRI sont encore plus inquiétants : 63 % des pauvres et 74 % des ultra-pauvres vivent en milieu rural⁴. Enfin, environ 57 % des pauvres travaillent dans l'agriculture, qui ne fournit pourtant que 30 % du total des emplois⁵.

Les estimations font aussi apparaître de fortes inégalités entre les ruraux agriculteurs et les autres, le sort de ces derniers étant relativement moins dramatique que celui des paysans. Les chiffres du tableau 1 sont extrêmement saisissants et suffiraient à expliquer, du moins partiellement, les causes de la crise qui secoue le secteur agricole et la paysannerie depuis plusieurs années. Ils dévoilent aussi clairement comment la pauvreté peut se dresser comme une contrainte pour toute évolution rapide, malgré les réformes et les contre-réformes. Ils offrent un angle

2 Amartya Sen, 1990. *Poverty and famines, an essay on entitlement and deprivation*- Oxford University press.

3 Institute of National Planning; Egypt Human Development Report 1996. Cairo 1996, pages 26 et 27

4 IFPRI, International Food Policy Research Institute, 1997, *A profile of poverty in Egypt*. Page 68

5 WORLD BANK & ARAB REPUBLIC OF EGYPT, 2002, *Poverty Reduction in Egypt ; Diagnostics and Strategy*. Page 26 et 27

privilegié pour une lecture raisonnée de la situation de l'agriculture, de l'eau et des paysans en Égypte.

Tableau 1 : Différentiel urbain/rural des niveaux de vie et de la pauvreté⁶

Indicateurs <i>per capita</i>	RURAL %			URBAIN %
	Agriculteurs	Non agriculteurs	Total	
Niveaux de vie des				
20 % les plus faibles	34,1	25,1	29,1	10,5
20 % les plus élevés	4,9	11,8	8,8	31,6
Revenus des				
20 % les plus faibles	35,1	25,2	29,5	9,9
20 % les plus élevés	5,9	12,0	9,3	31,3
Dépenses des				
20 % les plus faibles	36,9	26,1	30,7	8,8
20 % les plus élevés	4,8	11,2	8,4	32,2
Conditions logement				
20 % les plus faibles	46,2	30,2	37,3	2,4
20 % les plus élevés	1,4	5,5	3,7	36,7

D'après le recensement de la population de 1996, les agriculteurs vivant principalement du produit de leurs exploitations représentent environ la moitié des habitants des zones rurales : 49,8 % des actifs ruraux sont agriculteurs⁷. Plus généralement, on considère par ailleurs que 39 % des ménages égyptiens ont une activité agricole⁸.

Les inégalités se retrouvent aussi à l'intérieur même de la communauté des fellahs. Il existe, en effet, une corrélation négative entre l'indice de pauvreté et la taille de la terre cultivable passant de 35,28 % pour les petits exploitants (soit moins de 0,07 feddan *per capita*) à 23,82 % pour les moyens exploitants (entre 0,07 et 0,24 feddans *per capita*) et 7,08 % pour les exploitants plus grands (plus de 0,25 feddans *per capita*)⁹. Si l'on calculait ces indices en considérant le total de la terre cultivée au niveau du ménage, et non *per capita*, les résultats seraient les suivants : 32,63 % des petits, 22,81 % des moyens et 13,97 % des grands agriculteurs sont pauvres¹⁰.

L'émiettement de la propriété et de l'exploitation agricole empêche la plus grande partie des paysans égyptiens de dégager des revenus d'exploitation suffisants pour subvenir à leurs besoins et à ceux de leurs familles. Leurs niveaux de revenus issus de la production agricole (animale et végétale) ne dépassent pas 35 % des revenus

6 ZAGHLOUL SAAD Nagi, 2001, *Poverty in Egypt : human needs and institutional capacities*, New York, Lexington Books. Page 54,

7 FARGUES Philippe, 2000, *Généralités arabes. L'alchimie du nombre*, Paris, Fayard. Page 63

8 Toutefois d'autres sources faisant apparaître des chiffres différents indiquent une pauvreté plus élevée chez les ruraux non agriculteurs que chez les agriculteurs. Selon ces sources environ 35 % des non-cultivateurs vivent en dessous de la ligne basse de pauvreté, alors que seulement 22,88 % des cultivateurs entrent dans cette catégorie. Encore une fois, on voit bien la difficulté d'utiliser des chiffres qui peuvent paraître contradictoires. Alors que dans le tableau, les agriculteurs apparaissent très clairement comme les plus démunis, l'IFPRI avance des chiffres opposés. Rappelons que les deux sources ne partent pas forcément des mêmes définitions et méthodes d'estimations de la pauvreté. IFPRI, International Food Policy Research Institute, 1997, *A profile of poverty in Egypt*. page 62

9 IFPRI, International Food Policy Research Institute, 1997, *A profile of poverty in Egypt*. Page 62 et 63

10 IFPRI, International Food Policy Research Institute, 1997, *A profile of poverty in Egypt*. page 64

PAUVRETE HYDRAULIQUE EN EGYPTE : LES FELLAHS ENTRE PAUVRETE ET ACCES AUX RESSOURCES

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Depuis quelques années les petits paysans égyptiens, exploitant moins de 5 feddans (1 feddan = 0,42 ha; soit 5 acres ou 2,10 hectares), sont soumis à de très fortes pressions juridiques et économiques qui les poussent de plus en plus fortement vers l'abandon de leurs activités d'agriculteurs et de leurs terres. Le processus de déplacement des petits paysans vers d'autres secteurs et d'autres espaces que la quasi-totalité des pays industrialisés avaient connu, il y a déjà plusieurs décennies, et qui a frappé plus récemment les pays de l'Europe de l'est, touche aujourd'hui de plein fouet les fellahs des rives égyptiennes du Nil.

Cependant des facteurs historiques et structurels constituent des différences déterminantes entre l'Egypte et l'Europe. L'Egypte ne dispose pas d'un secteur industriel performant et capable d'absorber les paysans « expulsés » du secteur agricole et ne bénéficie pas des aides généreuses d'une structure similaire à l'Europe qui a assuré un atterrissage relativement en douceur aux pays de l'Europe de l'est. Ainsi ce processus aggrave la pauvreté globale qui touche une grande partie de la population.

Cette communication essaie de décrire le processus à l'origine de la situation actuelle dont il faut appréhender les différentes dimensions et faire apparaître les facteurs les plus déterminants. Dans mon analyse de la situation et la démonstration, je fais appel ici au concept de *pauvreté hydraulique*¹ qui me paraît à la fois pertinent et particulièrement envisageable pour le cas spécifique de l'Egypte.

Il s'agit d'un concept qui traduit l'articulation complexe entre les différents facteurs agissants ou déterminants à la fois sur la gestion des ressources hydrauliques et sur les processus et les dynamiques de la pauvreté. Il permet d'appréhender ainsi la nature et la force des corrélations entre la gestion de la ressource et la pauvreté.

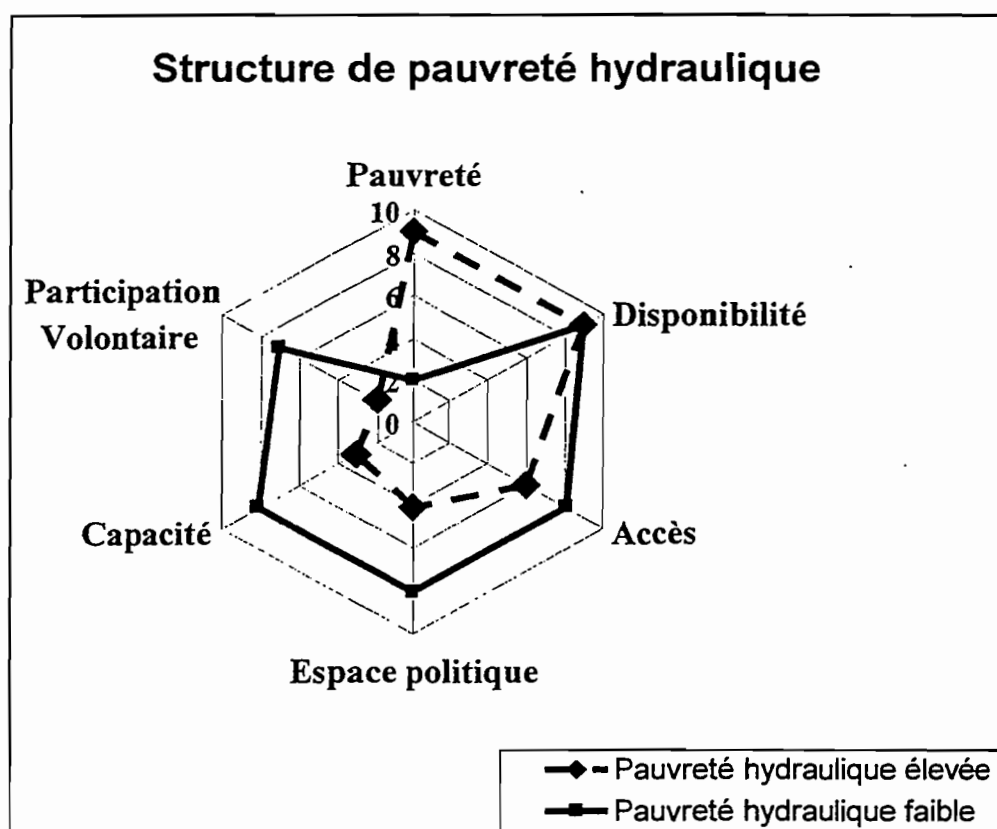
1 Si le concept, vraisemblablement « élaboré » par Ahmad Qazi (chercheur et directeur du Bangladesh Unnayan Parishad, Dhaka – Bangladesh. Email : bup@citechco.net), nous vient d'Asie et précisément du Bangladesh et de l'Inde, la « paternité » de l'Indice de pauvreté hydraulique revient à Peter Lawrence (Department of Economics, Keele, Staffordshire), Jeremy Meigh et Caroline Sullivan (Centre for Ecology and Hydrology, Wallingford). Lire notamment Q. K. AHMAD, « Towards Poverty Alleviation: The Water Sector Perspectives ». In *Water Resources Development*, Vol. 19, N° 2, 263-277, June 2003., et P. Lawrence, J. Meigh et C. Sullivan, « The Water Poverty Index: an International Comparison ». In *Keele Economics Research Paper*. KERP 2002/19.

Le concept de pauvreté hydraulique est bâti sur les relations croisées entre plusieurs variables quantitatives et qualitatives. Six indicateurs particuliers me semblent incontournables :

- La disponibilité volumétrique de la ressource ;
- La pauvreté globale réelle (mesurée selon les rapports entre revenus et dépenses minimales) ;
- L'accès des consommateurs et des usagers à des volumes suffisants d'eau propre et potable et aux sphères de prises de décision ;
- La capacité des usagers et des consommateurs. La capacité est évaluée ici en fonction de la gravité de la pauvreté ;
- Les libertés politiques individuelles et collectives : droit d'organisation, de contestation et d'expression ;
- La participation volontaire et effective des usagers et consommateurs à la gestion de la ressource et à l'élaboration et l'exécution des choix et des politiques hydrauliques globales, sectorielles et locales.

Ces six facteurs déterminants de la pauvreté hydraulique peuvent être appréhendés notamment à travers la construction schématique suivante.

Graphique 1 : Une structure de la pauvreté hydraulique



Qu'elles soient plus ou moins faciles à établir statistiquement ou non, les corrélations qualitatives entre ces différents éléments me semblent être capitales comme entrées, ou angles d'attaque, dans l'étude et l'appréhension des problématiques de l'eau. Le cas égyptien démontre, s'il en ait besoin, qu'il ne suffit pas d'une grande disponibilité volumétrique de la ressource. Encore faut-il que les usagers puissent y avoir accès dans les meilleures conditions et participer librement à sa gestion.

correspondants au seuil de pauvreté¹¹. Cette pauvreté, liée à la faiblesse des revenus, est d'autant plus difficile à vaincre qu'elle se couple avec la pauvreté collective de la quasi-totalité des villages égyptiens qui manquent de l'essentiel des services de base : éducation, santé, hygiène, services publics, infrastructures et assistance agricole.

En Egypte, la pauvreté globale et celle des paysans, en particulier, sont d'abord l'expression des difficultés d'accès à l'eau et à la terre agricole. L'analyse de ces contraintes et inégalités d'accès aux ressources nous renseigne très utilement sur l'ampleur de la pauvreté hydraulique de la société égyptienne.

L'accès à la terre : structures agraires et crises sociales

Alors que la disponibilité moyenne de terres agricoles est d'environ 4,9 quirats (857,5 m²) par personne (en considérant évidemment l'ensemble de la population égyptienne) la taille de 43,5 % des exploitations ne dépasse pas le feddan, 67,5 sont en dessous de 2 feddans et 93 % des exploitations sont en dessous de 5 feddans et couvrent environ la moitié de la terre agricole. Les 7 % restants exploitent l'autre moitié des terres. Enfin, 3 % des agriculteurs contrôlent environ 33,5 % des terres agricoles avec en moyenne plus de 10 feddans par exploitation.

Ce n'est pas tant l'écart arithmétique qui est ici le plus choquant, pour être un peu cynique, mais le fait que cet écart sépare une minorité riche de paysans aisés (les 10 %) ou très riches (3 %) d'une masse de paysans pauvres, regroupant 90 % de la totalité des 3,2 millions d'agriculteurs en 2000, dont plus de la moitié vit sous le seuil de pauvreté. Avec une telle masse paysanne, et des problèmes structurels aussi profonds et complexes, l'économie égyptienne ne peut espérer sortir de la crise sa « partie » agricole. C'est aussi pour cela que cette crise complexe que connaît l'économie égyptienne est d'abord une crise sociale. Par sa propre dynamique intrinsèque, la pauvreté produit la pauvreté et mine tous les efforts consentis.

En fait le processus d'appauvrissement de la paysannerie fonctionne depuis les années 1960, alors même que la réforme agraire réalisée par le régime de Nasser avait permis à presque un million de personnes d'accéder à la terre agricole pour la première fois de leur vie.

Résultat pervers de la réforme agraire "nassérienne", l'émiettement de la terre agricole, qui a pris des proportions jamais égalées, a fini, 50 ans plus tard, par pénaliser la production agricole. Cet émiettement est aujourd'hui utilisé comme un argument fort pour justifier une politique libérale dont les plus petits paysans commencent, déjà, à payer les frais, qui s'annoncent de plus en plus élevés¹².

Pendant la période 1961-82, le nombre d'exploitations passa à 2,47 millions, soit une augmentation de 50 %, alors que la surface agricole totale passa de 6,22 à 6,63 millions de feddans, soit une augmentation limitée à 6,5 %¹³. Ainsi, la surface moyenne des exploitations agricoles chuta d'un tiers en 20 ans, pour attendre 2,7

11 Keshk Hassanein, 1996, *The Agrarian Workers in Egypt* (Ommal al-Ziraa fi Masr) 1953-1995. *Economic and social situation of the agrarian workers*, Le Caire, Kitab al-Mahrousa. P 17

12 Sauf indications particulière, l'ensemble des données apparaissant dans ce passage sur le morcellement agricole, provient de IRETON François, 1998, « The evolution of Agrarian Structures in Egypt: Regional Patterns of Change of Farm Size » in HOPKINS Nicholas et WESTERGAARD Kirsten, 1998, *Directions of change in Rural Egypt*, Le Caire, The American University in Cairo Press. P 43 à 47

13 Ceci représente une croissance annuelle moyenne plus faible que celui de la décade précédente (2 % contre 4,5 %).

feddans en 1982¹⁴. En 1990, le nombre d'exploitations atteignait les 2,9 millions, mais le taux d'accroissement annuel moyen restait le même que pour la décennie précédente. Grâce à un redémarrage de la bonification du désert, la surface moyenne globale des exploitations s'est maintenue à 2,7 feddans, alors que sur les anciennes terres le processus d'émiettement s'accélérait davantage.

Les importantes modifications apportées par les différentes lois successives adoptées pendant les années 1970 sont progressivement revenues sur la plupart des acquis de la frange la plus vulnérable de la paysannerie égyptienne : augmentation du fermage, fin de possibilité de transformer un contrat de fermage en contrat de métayage, qui peut être fixé avec un partage inégal des charges et des produits, et possibilité de renvoyer un fermier qui ne paye pas son loyer deux mois après la date précisée dans le contrat.

C'est dans le cadre de la libéralisation économique du pays, entreprise depuis le milieu des années 1970, que furent lancées les politiques de contre-réformes agraires et dont l'étape décisive et ouvertement libérale fut franchie avec l'adoption de la loi agraire n° 96 de 1992 et son application effective en octobre 1997. Les conséquences de cette loi sont déjà visibles et risquent de provoquer un bouleversement radical de la carte agricole et sociale de la campagne égyptienne et de l'ensemble de l'Égypte.

La contre-réforme agraire : la loi 96 de 1992

Les dispositions de la nouvelle loi stipulent que les prix des fermages passeront de sept à vingt-deux fois la taxe foncière entre 1992 et 1997, ne laissant aucun répit aux locataires. Elle établit également que le fermage, le métayage et le marché de la terre seront complètement libéralisés au plus tard au mois d'octobre 1997. Le 6 octobre 1997, tous les contrats de locations deviennent immédiatement caducs et toutes les terres en location reviennent de droit aux propriétaires, désormais libres de les récupérer, de les vendre ou de les relouer aux conditions, au prix et à la personne de leur choix. Plus rien, à l'exception du marché, ne peut limiter la liberté de la gestion de leurs terres.

Jusqu'en 1992, le loyer des fermages réglementés était resté un multiple fixe (sept) de la taxe foncière, changeant une fois tous les dix ans, après chaque recensement agricole¹⁵, pour permettre à l'État de moduler la part de la rente foncière. Mais pendant les années 1970 et 1980, les autorités ont toléré le développement des fermages non réglementés, motivé par l'apparition de cultures plus rentables et par la libéralisation progressive des prix agricoles. L'écart entre les loyers des deux types de fermages s'est accru accentuant les frustrations des propriétaires « lésés ». En 1992, sous la pression de ces derniers et dans la ligne politique libérale, le gouvernement a multiplié par plus de trois le coefficient multiplicateur de la taxe foncière, le faisant donc passer de sept à vingt deux¹⁶.

La nouvelle loi met définitivement fin aux baux à vie et à leur transmission par héritage. La validité des nouveaux contrats est fixée à cinq années maximum, sans

14 IRETON François, 1998, « The evolution of Agrarian Structures in Egypt: Regional Patterns of Change of Farm Size » in HOPKINS Nicholas et WESTERGAARD Kirsten, 1998, *Directions of change in Rural Egypt*, Le Caire, The American University in Cairo Press.

15 Un recensement agricole est organisé en Egypte tous les 10 ans. Le plus ancien a eu lieu 1929 et le plus récent en 1999/2000.

16 ABDEL NASSER Gamal, 1997, « Contre-réforme agraire en Égypte », Document de travail non publié. P 3

limitation du minimum. Ainsi, le propriétaire est totalement libre de limiter le contrat à quelques mois. C'est déjà une pratique courante et, actuellement, les contrats sont souvent établis pour une période maximale d'une année agricole voire pour une seule récolte.

L'ancien cadre juridique interdisait la résiliation du bail par le propriétaire, sauf par voie de justice et pour le seul motif de non-paiement. Même dans ce cas, les tribunaux pouvaient suspendre leur décision pendant plusieurs années, en fonction de la conjoncture économique et sociale. En effet, la durée du contrat était permanente puisque son bénéfice s'étendait indéfiniment aux héritiers du fermier contractant. Lorsque les héritiers du fermier signataire du bail n'étaient pas eux-mêmes exploitants agricoles, ils bénéficiaient, alors, de l'usufruit de la terre. Pour récupérer son bien, le propriétaire devait verser au locataire la moitié de la valeur marchande du terrain.

La nouvelle loi limite le bénéfice du bail à la durée du contrat, déterminée par un commun accord au moment de la signature, et aux héritiers agriculteurs du premier degré (enfants, conjoint, parents)¹⁷. La même loi abolit explicitement toute forme de contrôle administratif sur les prix des contrats de fermage et de métayage, les soumettant ainsi aux seuls mécanismes de marché.

Depuis 1997, plus de 800 000 fellahs ont perdu leurs titres d'exploitants acquis grâce aux contrats de location permanente¹⁸. Au cours de la même période, les loyers annuels du feddan de terre agricole sont passés de 500 LE à plus de 2 000 LE et ont dépassé dans certaines régions du Delta 3 000 ou 3 500 LE. Les loyers de 4 000 LE, voire 4 500, ne sont pas rares, notamment dans les environs immédiats des grandes villes du pays.

Exclusion des plus petits, concentration progressive de la terre

Les conséquences de ces nouvelles politiques agraires sont déjà clairement inscrites dans les résultats des deux derniers recensements agricoles réalisés en Égypte en 1990 (deux ans avant l'adoption de la loi de 1992) et 2000 (trois années après sa mise en application en 1997).

1) L'émiettement des terres continue dans la catégorie des moins de deux et surtout dans celle de moins d'un feddan. Il s'agit d'exploitations, « jardins familiaux », destinées à produire quelques aliments de premières nécessités vivrières. Ce sont donc des exploitations qui sont « transmises » par petites « pièces » aux héritiers. D'où l'aggravation du phénomène de l'émiettement. Mais en même temps, la surface totale des exploitations de moins de deux feddans se réduit au profit des catégories supérieures à cinq feddans.

2) Par contre, toutes les catégories des exploitations qui produisent pour le marché et dont les superficies se situent entre deux et cinq feddans se réduisent en nombre et en surface au profit de la catégorie des plus de cinq et surtout de celle des dix feddans et plus.

17 ABDEL NASSER Gamal, 1997, « Contre-réforme agraire en Égypte », Document de travail non publié. P 3

18 DELTEPH MÜLLER-MAHN, 1998, « Spaces of Poverty : The Geography of Social Change in Rural Egypt » in HOPKINS N. S. et WESTERGAARD K. (dir.) *Directions of change in rural Egypt*, Le Caire, The American University in Cairo Press. Page 256.

3) En contrepartie, les superficies moyennes des exploitations de plus de cinq et dix feddans s'accroissent sans que leur nombre n'augmente proportionnellement.

4) La réduction du nombre et, plus lentement, des surfaces des exploitations en faire valoir indirect pour cause de la très forte augmentation du loyer de la terre agricole, de 500 LE en moyenne en 1997 à plus de 3500 LE aujourd'hui. C'est en réalité la catégorie des petits exploitants locataires qui se réduit drastiquement à cause des prix et donc du coût de production mais aussi à cause de l'insécurité due aux durées trop courtes des contrats de location.

Il s'agit, en fait d'un processus progressif de regroupement de la terre agricole qui finira par une exclusion de la grande majorité des paysans actuels. Cela constituera en même temps un glissement de la pauvreté de la campagne vers les espaces plus urbanisés.

Dans le cadre de ce processus, les difficultés d'accès à l'eau ne sont pas de nature à limiter ou à ralentir l'évolution du secteur agricole vers une agriculture d'investissements tenue par un nombre réduit de grands agriculteurs.

Accès à l'eau ou le paradoxe du manque dans l'abondance

Quand on connaît l'importance de l'accès à l'eau potable sur l'hygiène, la santé, la mortalité – et plus indirectement sur l'assiduité à l'école et l'analphabétisme – et quand on mesure la corrélation directe entre l'accès à l'eau et la pauvreté et le mécanisme relationnel de cause à effet entre les deux phénomènes, on réalise combien cet indicateur est important.

Si les pourcentages officiels d'accès à l'eau potable sont relativement élevés et certainement enviables par rapport à nombre d'autres pays voisins, ils cachent une situation réelle beaucoup moins glorieuse. Alors que le taux officiel d'accès à l'eau potable était en 1996 de 91,30 %, seuls 56,09 % des Égyptiens disposaient d'un robinet d'eau à domicile! Certes, la situation a dû légèrement s'améliorer depuis, mais on reste certainement très éloignés de l'image idyllique que laissent apparaître les chiffres de l'accès. Le tableau 2, qui donne les pourcentages de connections à l'eau potable à domicile, sont très révélateurs.

Tableau 3 : Pourcentage des ménages accédant à l'eau potable et au tout à l'égout¹⁹.

Population	Accès à l'eau potable 96	Robinet à Domicile 96	Accès à l'eau potable 2001	Tout-à-l'égout 2001
Totale	81,7	56,09	91,3	93,6
Urbaine	96,3	87,15	97,5	99,6
Rurale	69,5	38,10	82,1	78,2

19 Recensement de la population égyptienne. Le Caire 1996. La définition du rural pose ici un très gros problème parce que les seuils entre urbain et rural sont généralement administratifs et non statistiques. Plusieurs agglomérations comptant plusieurs dizaines de milliers d'habitants sont toujours considérées « rurales ». Il est clair que si on limitait l'adjectif « rural » strictement aux villages on arriverait à des taux de connexions à l'eau potable franchement plus faible. Pour les chiffres de 2001: UNDP, 2003, *Egypt Human Development Report 2003*, Égypte, UNDP and INP (Institute of National Planning).

Par ailleurs, il existe un écart d'accès à l'eau potable (à domicile) entre les pauvres et les non-pauvres à l'intérieur du pays : 81,8 % des non-pauvres ont un accès à l'eau potable contre seulement 60,5 des pauvres, soit une différence de l'ordre de 20 points. Pour le système d'égouts, l'écart est encore plus important avec 28 points de différence²⁰. Plus généralement, l'accès des ménages pauvres à l'hygiène est très faible : seulement 21,1 % des pauvres vivent dans des maisons reliées au système d'égouts, et la proportion de ménages pauvres connectés à un réseau public de tout-à-l'égout en Haute Égypte²¹ est d'environ la moitié de celle des non-pauvres.

De même, la présence d'un robinet à domicile ne signifie pas forcément la présence de l'eau. La facture non payée, la faiblesse du débit pour cause d'absence de pression, les longues ruptures quasi systématiques dans les quartiers pauvres et les agglomérations rurales, sont autant de limitation de l'accès et de la réduction de l'utilité du robinet. Détail technique d'une très grande importance : du fait de l'absence de reliefs dans la Vallée et le Delta, les réservoirs publics d'eau ne sont pas à une hauteur suffisante pour permettre une circulation de l'eau par gravité. Par conséquent, chaque bâtiment de plus d'un niveau doit être équipé d'une motopompe pour "envoyer" de l'eau dans les étages. Ainsi, une double concurrence est établie : les quartiers les plus aisés disposent de capacités de pompages et de stockages qui dépassent largement celles des quartiers pauvres. Autrement dit, dans les quartiers pauvres et les agglomérations rurales, la présence d'une pompe individuelle n'est pas forcément une garantie pour accéder à l'eau. Encore faut-il que l'eau soit disponible en quantités et en qualités suffisantes dans les canalisations principales.

Par ailleurs, certains habitants des quartiers urbains n'ont pas accès au réseau d'eau potable parce qu'ils ne peuvent pas payer l'installation ou parce qu'ils réduisent volontairement leur consommation pour ne pas « gonfler » la facture. Seulement, ces économies se font au détriment de l'hygiène, ce qui induit des situations sanitaires assez proches de celles que connaissent les populations rurales n'ayant pas un accès à l'eau potable.

L'autre point limitatif des chiffres sur l'accès à l'eau est la très médiocre qualité chimique et bactériologique. Dans les grandes « agglomérations » rurales, l'eau du réseau est à peine filtrée mais pas, ou très peu, traitée. Par conséquent, on fournit au consommateur une eau faiblement traitée mais avec le « label » officiel de potabilité.

Bien évidemment, on doit rappeler que la majorité de la population rurale utilise directement les eaux des canaux pour une partie ou la totalité de leurs besoins domestiques : lessives, vaisselles, « douches » et « baignades ». Même les femmes, qui pour les raisons connues ne peuvent pas se laver directement dans les canaux, certaines le font à l'intérieur en utilisant une eau récupérée directement dans le canal. Ces différentes pratiques sont systématiques en l'absence de toutes connections au réseau d'eau potable (robinet à domicile ou fontaine publique) et assez régulièrement pour des raisons sociales, le canal étant aussi un espace de sociabilité, et pour des raisons économiques : faire une vaisselle sur le bord du canal coûte moins cher que sous le robinet de la cuisine.

20 WORLD BANK & ARAB REPUBLIC OF EGYPT, 2002, *Poverty Reduction in Egypt ; Diagnostics and Strategy*.. Page 27,

21 WORLD BANK & ARAB REPUBLIC OF EGYPT, 2002, *Poverty Reduction in Egypt ; Diagnostics and Strategy*.. 2002. Page X,

Enfin, les usagers de l'eau souffrent le plus souvent d'un manque d'accès à un système de tout-à-l'égout. En 2001, les taux officiels de connexions seraient de 99,6 % des ménages pour les populations urbaines et 78,2 % pour les populations rurales²². Par conséquent, celles-ci sont obligées de laisser les eaux usées se répandre à proximité immédiate de leurs logements, créant ainsi des foyers de parasites particulièrement actifs, en sus de l'inconfort et des nuisances que de telles accumulations d'eaux usées ne manquent pas de produire.

Dans la ville, le problème vient de l'absence des infrastructures dans les quartiers périphériques pauvres et/ou « spontanés » ou de la faiblesse de leur capacité volumétrique. En milieu rural, l'absence du tout à l'égout est une source principale de pollution de la nappe et des canaux, puisqu'il n'existe généralement aucune infrastructure qui permet d'évacuer les eaux domestiques usées loin des zones cultivées. Ainsi ces eaux rejoignent-elles systématiquement les canaux et la nappe, participant directement à l'aggravation de la pollution d'une eau qui est, comme nous l'avons vu, directement utilisée par les consommateurs sur place ou plus en aval.

Par conséquent, tout le système hydraulique (fleuve, canaux et nappes phréatiques) est contaminé à des degrés divers. Les eaux de surfaces cumulent pollutions chimiques et bactériologiques et les nappes surtout les pollutions chimiques. Les conséquences sur la santé publique sont catastrophiques : bilharziose (onchocercose), diarrhées, malaria (des foyers), différentes contaminations virales, et malformations diverses touchent une très large partie de la population.

Pollution des eaux et Exposition aux maladies

Le système hydraulique égyptien, qui est un système fermé, présente le grand avantage de limiter les pertes d'eau. Mais il présente un énorme inconvénient devenu, après la pauvreté des paysans, le véritable problème de l'eau en Égypte : en traversant les parcelles irriguées, les eaux se chargent de déchets organiques, de sels et de tout un ensemble complexe de produits chimiques utilisés comme engrais ou traitements pour les cultures (insecticides, pesticides, etc.). Par conséquent, plus on avance vers l'aval, plus l'eau est polluée. Déjà à la fin des années 1980, un rapport confidentiel du ministère de la Santé publique considérait que l'eau entre le sud du Caire et l'extrémité nord du Delta n'était pas valable pour la consommation humaine !

Il semblerait qu'environ 25 % de la population en Égypte consomme directement une eau jamais traitée. Certains se servent directement dans le canal d'irrigation chargé de polluants de toutes sortes et, plus grave encore, de tout un stock bactériologique à l'origine de plusieurs maladies endémiques comme la bilharziose. Une maladie terriblement invalidante provoquée par le schistosome qui toucherait au moins 60 % de la population rurale égyptienne et un nombre vraisemblablement moins important dans les villes. Dans un village où une recherche sur l'exposition

22 INP (Institute of National Planning) 2004, *Egypt Human Development Report 2003*, Le Caire, INP & UNDP. Comme pour les connexions à l'eau potable, les chiffres concernant le tout à l'égout sont gonflés par la définition du « rural ». En dehors des grandes agglomérations « rurales », le taux de connexion à un système d'évacuation des eaux usées dans la campagne égyptienne est extrêmement faible. C'est incontestablement l'un des problèmes les plus complexes dont souffre la grande majorité de la population « réellement » rurale.

des populations rurales à la bilharziose a été réalisée, les chercheurs ont trouvé que 55 % des hommes paysans à temps plein étaient infectés²³.

L'introduction des motopompes mobiles pour l'irrigation n'a pas manqué d'aggraver relativement l'exposition des irrigants à cette grave maladie hydrique. Le haut débit fourni par la machine impose au paysan un rythme de travail plus soutenu. Il doit passer une grande partie de son temps dans les canaux pour installer et désinstaller les tuyaux, faciliter l'écoulement de l'eau vers les parcelles à irriguer et éviter les débordements.

Gestion sociale et étatique de la ressource : les contraintes et les limites de la participation

Les modes de gestion sociale et collective de l'eau en Egypte ont beaucoup évolué ces derniers temps. Trois étapes importantes se distinguent à travers l'histoire « récente » de l'irrigation en Egypte. Chacune de ces trois étapes est globalement liée au système d'exhaure dominant et un modèle d'organisation différent :

- *Séquia* : communautés d'irrigants ;
- *Pompe individuelle* : période transitoire non organisée ;
- *Pompe collective* : les AUEs : Associations des Usagers de l'Eau.

Le tableau qui suit, met en relief les plus importantes évolutions techniques, institutionnelles, sociales et politiques du système d'irrigation en Egypte et surtout les changements intervenus pendant les trois dernières décennies. Dans le présent article je me limiterai à la toute dernière étape marquée par la création des AUEs.

Les évolutions techniques, institutionnelles, sociales et politiques

<i>Séquia</i> (communautés d'irrigants)	<i>Pompe individuelle</i> (période transitoire non organisée)	<i>Pompe collective (les OUEs : Organisations des Usagers de l'Eau)</i>
Jusqu'au milieu des années 1980. Et arrêt brutal	Introduction massive au début des années 1980 par les Égyptiens émigrés dans les pays du Golfe	En cours d'installation notamment dans certaines régions du Delta, à Minya et au Fayoum avec la création des AUE (Association des Usagers de l'Eau)

23 EL KATSHA Samiha and WATTS Susan 2002, *Gender, behaviour and health. Schistosomiasis transmission and control in rural Egypt*, The American University in Cairo Press. p 121

Une organisation sociale de base autour de l'outil avec une dimension sociale. Au niveau de la <i>mesqua</i>, les irrigants organisés regroupés intervenaient dans la gestion de la ressource et s'organisaient pour trouver les solutions aux conflits qui intervenaient entre eux.	L'individualisation brutale a provoqué une rupture du tissu « hydrosocial ». L'individualisation de l'outil d'exhaure rendait très difficile la pérennité du groupe. Les tours n'avaient plus de sens et les conflits sortaient du strict cadre du village.	En général, les usagers ne sont pas consultés et certains membres ne sont même pas au courant qu'ils font partie d'une AUE. Dans les faits, le pouvoir est accaparé par le gardien de la motopompe qui n'est pas toujours membre de l'AUE. Par cet artifice, le véritable pouvoir revient à l'ingénieur d'irrigation. En l'absence d'un véritable transfert de pouvoir de décision, ces associations ne sont qu'un moyen de renforcement du contrôle de l'État sur l'eau, la terre et les paysans.
L'ingénieur de l'eau, représentant de l'État, était accepté par les paysans et intégré dans leur organisation hydrosociale par une forme de corruption positive qui en fait un partenaire « complice ». D'un simple contrôleur, l'ingénieur devenait, d'une manière totalement informelle, un médiateur.	Désorganisation totale de l'irrigation et aggravation des inégalités face à l'accès à l'eau et de la corruption. Certains se sont enrichis en devenant des loueurs de pompes. Ainsi avaient-ils un « pouvoir » financier, en plus de leurs pouvoirs administratifs. Ainsi ont-ils favorisé l'augmentation de la consommation et du gaspillage d'eau.	Les ingénieurs gardent un grand pouvoir de décision et de nuisance. En limitant la participation des usagers au fonctionnement de l'association et en mettant l'essentiel du pouvoir réel dans les mains des pompistes, les ingénieurs ont, de fait, gardé la haute main sur le marché de l'eau. En complicité directe avec les pompistes, ils sont en mesure de détourner une grande partie de ce que les paysans paient. Le retour à l'outil unique n'est pas suffisant pour assurer une véritable gestion sociale de l'eau. Mais l'État égyptien exige plus de contrôle et toujours moins de participation des usagers.
Participation effective à la gestion de l'eau dans l'espace de la <i>Séquia</i>. Des mécanismes sociaux de résolution de conflits. Une corruption « positive » de l'ingénieur de l'eau qui ne nuit pas aux intérêts de l'État et profite aux usagers et	Individualisation totale, corruption maximale des ingénieurs, aggravation des inégalités et désorganisation totale des systèmes d'irrigation dont les frais sont d'abord supportés par les paysans les plus vulnérables.	Une corruption favorisée par une structure imposée par le haut et matériellement mise en place par l'ingénieur concerné qui a pu ainsi choisir les personnes les plus proches pour la direction de l'association, l'entretien et le gardiennage de la station de pompage.

à l'ingénieur.		

Les nouvelles associations viennent sur les ruines des anciennes *communautés d'irrigants* disparues sous l'effet de la mécanisation incontrôlée de l'irrigation²⁴. Les petites pompes ont non seulement fait disparaître les belles *séquias*, les *communautés d'irrigants* qui leur étaient liées, et tout un corpus juridique communautaire de *gestion sociale* de l'eau, mais aggravé la corruption des fonctionnaires en charge de la gestion de l'eau, provoqué de profondes déchirures sociales et exclus, davantage, des paysans pauvres incapables de suivre les conséquences financières de la mécanisation.

La création et le fonctionnement des associations formelles (officielles en opposition aux associations traditionnelles) d'usagers de l'eau pour les besoins de l'irrigation sont régis par un cadre juridique assez complexe. La loi numéro 12 de 1984, qui règle le fonctionnement de l'irrigation et du drainage, insiste sur la permanence et la suprématie du pouvoir central sur le Nil et ses branches ainsi que sur la distribution de l'eau dans tous les secteurs : irrigation, eau potable et industrie. La loi de l'administration locale, numéro 43 de 1979, précise clairement que l'eau d'irrigation et les différentes *mesqua* relèvent du service public national et non pas de l'administration locale.

De même, l'Assemblée populaire locale ne peut jouer aucun rôle dans la gestion de l'eau, sauf dans le cadre des politiques générales et des règles établies par le ministère de l'Irrigation et des Ressources hydrauliques. Par conséquent, la gestion de l'eau est assurée exclusivement par le gouvernement central et sous sa seule autorité. Ceci constitue un sérieux obstacle à toute tentative de participation individuelle ou collective réelle.

Enfin, le droit civil organise les relations entre les terres riveraines mais pas entre les hommes car la majorité des terres irriguées par les eaux du Nil, ses branches et les *mesqua* relèvent de la propriété privée. Il n'existe pas, en droit civil, ce qui autoriserait la formation d'un regroupement coopératif entre bénéficiaires des eaux du fleuve.

Pour la mise en place des nouvelles AUEs en Égypte, les autorités ont suivi la démarche générale suivante :

- Le gouvernement a choisi la formule et la structure de l'association et a défini par un décret loi son cadre juridique et ses modes de fonctionnement. Aucune consultation ou discussion pendant toute l'étape de la conception, définition et formulation du projet ou du programme ;
- Le gouvernement a choisi les canaux d'irrigations, les lieux et les moments précis pour mettre en place les premières « associations » d'usagers de l'eau. Aucune consultation des intéressés pour le choix de l'ampleur, du moment et du lieu d'implantation du projet ;
- Aucune liberté n'est laissée aux individus pour qu'ils déterminent librement le moment, la nature ou la période de leur engagement dans le projet. Les paysans dont les terres se trouvent sur les sites choisis par

24 Voir AYEB Habib 2004, « La gestion de l'eau d'irrigation en Égypte à l'épreuve de la libéralisation » et « L'État égyptien entre menace de crise hydraulique et pauvreté paysanne : Les risques d'une gestion libérale de l'eau », *Territoires en mutation* n° 12, printemps..

l'administration n'ont pas le choix d'intégrer ou non l'organisation proposée;

- Les paysans, membres obligés de l'association, ne sont pas habilités à changer les modes de fonctionnement interne de l'organisation ;

- Les organisations ne participent pas à la définition de la politique hydraulique globale et sont obligées de l'appliquer intégralement sur leurs territoires.

Dans tous les cas, en Égypte le mot participation a, aux yeux du pouvoir politique et des fonctionnaires des différentes administrations un sens très précis, celui de la collaboration « volontaire » ou « obligée » des usagers à la réalisation des objectifs définis exclusivement par l'État.

Ainsi n'est-il pas rare de rencontrer des personnes désignées à leur insu membres de la direction d'une association. Les réunions, quand elles ont lieu, ne sont que des rencontres d'enregistrement des décisions imposées par l'administration et de toute manière une activité formelle visant à légitimer les choix administratifs et donner un gage de démocratie et de gouvernance participative locale.

Au moins trois raisons expliquent l'écart entre l'idée des AUEs et leur réalité sur le terrain :

- L'incapacité des paysans et autres usagers à s'engager dans l'activité collective et l'action politique. La pauvreté individuelle et collective est de toute évidence le premier frein. Le manque de temps, la nécessité de se concentrer sur la production ou de se procurer des moyens de survie et la peur de se faire accuser d'activités subversives – avec leurs cortèges d'enchaînements mécaniques graves pour l'usager et l'ensemble de sa famille – ne sont pas de nature à favoriser son adhésion réelle et sa participation active. Même dans les pays où les États commencent à élargir les espaces de libertés, la culture politique générale et les conditions sociales et économiques continuent à agir en faveur de l'abstention et la passivité ;

- La réticence des gouvernants à favoriser toute forme d'organisation autonome de participation d'initiatives et de revendications locales. Toute forme de contre-pouvoir est perçue comme un « anti-pouvoirs », d'où la nécessité d'y mettre fin pour éviter des "troubles" potentiels ;

- La représentation que se font les fonctionnaires et les ingénieurs du secteur hydraulique des usagers et spécialement des paysans, qu'ils considèrent, par leur ignorance, à l'origine de tous les problèmes dont la "mauvaise" gestion de la ressource. Les clichés ne manquent pas : les paysans sont ignorants et analphabètes, ne connaissent pas les règles et les normes de l'irrigation, gaspillent l'eau, ne voient pas les intérêts collectifs, sont incapables de comprendre, d'apprendre et de s'améliorer, incapables de faire des choix. Bref, les paysans ne sauraient vivre et évoluer sans l'aide continue et systématique des "détenteurs exclusifs" des savoirs : les ingénieurs et les décideurs. Par conséquent, les ingénieurs ont tendance à se donner une obligation quasi-divine de soutien à leurs pères, frères et sœurs "paysans ignorants" ! En quelque sorte, les ingénieurs s'imposent l'obligation de faire « avancer » les usagers, y compris par la force de la loi et de l'administration.

Outre la pauvreté, l'impossible liberté d'agir

En plus de la pauvreté des paysans qui les handicape et limite par définition leur participation citoyenne et volontaire, il faut souligner la contradiction entre le

concept de participation et un système politique extrêmement autoritaire qui interdit toute initiative individuelle ou collective locale.

En effet, pour qu'il y ait participation, il faudrait déjà que les citoyens soient autorisés à participer. Ceci veut dire que personne ne doit être sanctionné à cause d'un avis émis ou d'action politique entreprise pour défendre son accès aux ressources et aux espaces de prise de décision. Ceci veut dire aussi que les associations ne soient limitées ni dans les procédures de création ni dans leur fonctionnement interne. Malheureusement c'est très loin d'être le cas de l'Egypte où toute velléité de participation volontaire et réelle peut être considérée comme une entreprise subversive contre la sécurité de l'Etat. Des personnalités, qu'on imaginait trop connues pour être "ennuyées" à cause de telles initiatives, se sont trouvées derrière les barreaux pour plusieurs mois. Le sociologue et professeur à l'Université Américaine du Caire (AUC) Saad Eddin Ibrahim en a fait l'amère expérience pour avoir pensé à contrôler les élections législatives de l'année 2000. Même sa nationalité américaine ne lui a pas été d'une grande utilité et n'a pas pu empêcher son emprisonnement.

Ainsi, l'idée des Associations des Usagers de l'Eau me semble tout simplement incompatible avec la nature du système politique et économique du pays. En plus de la pauvreté handicapante, c'est « l'interdit » politique qui explique l'échec indiscutable du programme de création des AUEs. Cependant l'Etat, qui considère que la participation des usagers doit se limiter à la soumission aux règles imposées par le haut et à la prise en charge des frais d'entretien des canaux et d'équipement des réseaux d'irrigation et de drainage, refuse de reconnaître cet échec et continue imperturbablement son programme sans même de véritables bilans d'étapes. Pourtant toutes les recherches réalisées par/pour des organismes et institutions indépendantes de l'Etat aboutissent à des constatations totalement négatives.

Conclusion

Si l'on se réfère au schéma de la pauvreté hydraulique proposée ci-dessous, on peut voir aisément comment cela correspond parfaitement à la situation égyptienne et comment ce concept permet de comprendre le fait que malgré une disponibilité globale en eau largement suffisante, la problématique de l'eau n'en est pas réduite pour autant. En explication, il suffit de regarder les quatre autres dimensions de la pauvreté hydraulique dans le contexte égyptien :

- ✓ Une pauvreté massive et généralisée qui touche la quasi-totalité des 3,2 millions de paysans et leurs familles ;
- ✓ Un accès très limité aux ressources et aux espaces de prises de décisions ;
- ✓ Une perte générale de capacité causée à la fois par la pauvreté massive et par l'interdiction de l'initiative collective et individuelle ;
- ✓ L'absence totale de participation volontaire, première condition à la réussite des Associations des Usagers de l'eau.

Ceci montre d'abord la complexité de la situation qu'on pourrait résumer par les deux mots clefs de Pauvreté et Accès, qui ne sont en réalité que deux éléments d'une même articulation. Mais cela montre surtout que les problématiques de l'eau que l'on réduit souvent à quelques chiffres volumétriques sont d'abord de natures sociales, économiques et politiques et expriment dans la majorité des situations des difficultés et des inégalités d'accès aux ressources et aux différents mécanismes sensés faciliter cet accès. C'est incontestablement le cas de la question de l'eau en

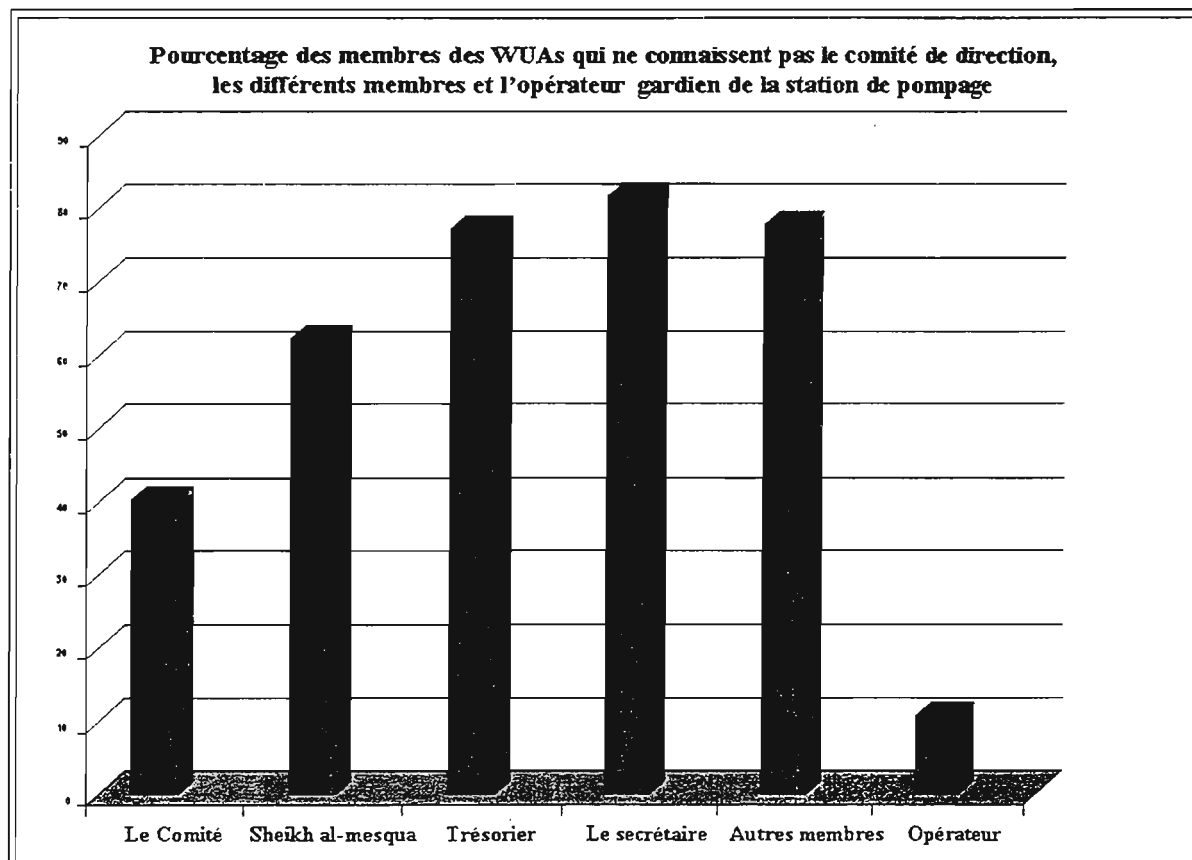
Egypte qui mériterait d'être comparé avec celles que connaissent d'autres pays ou régions comme l'Inde, le Bangladesh qui sur plusieurs aspects du systèmes hydraulique actuel et de l'histoire de l'irrigation présentent des similarités intéressantes avec l'Egypte.

Mais à travers la gravité et la complexité de la pauvreté hydraulique en Egypte et notamment l'absence d'opportunités réelles de participation, limitée à la fois par la pauvreté massive et l'interdiction de l'activité politique et syndicale, on se rend compte du mécanisme d'exclusion qui s'est mis en place poussant de plus en plus de fellahs hors de leurs exploitations. Les premiers à subir les effets de ce processus sont les paysans locataires et ceux dont la propriété est trop petite pour s'assurer un revenu correct. Ces deux catégories correspondent à plus de 90 % des paysans.

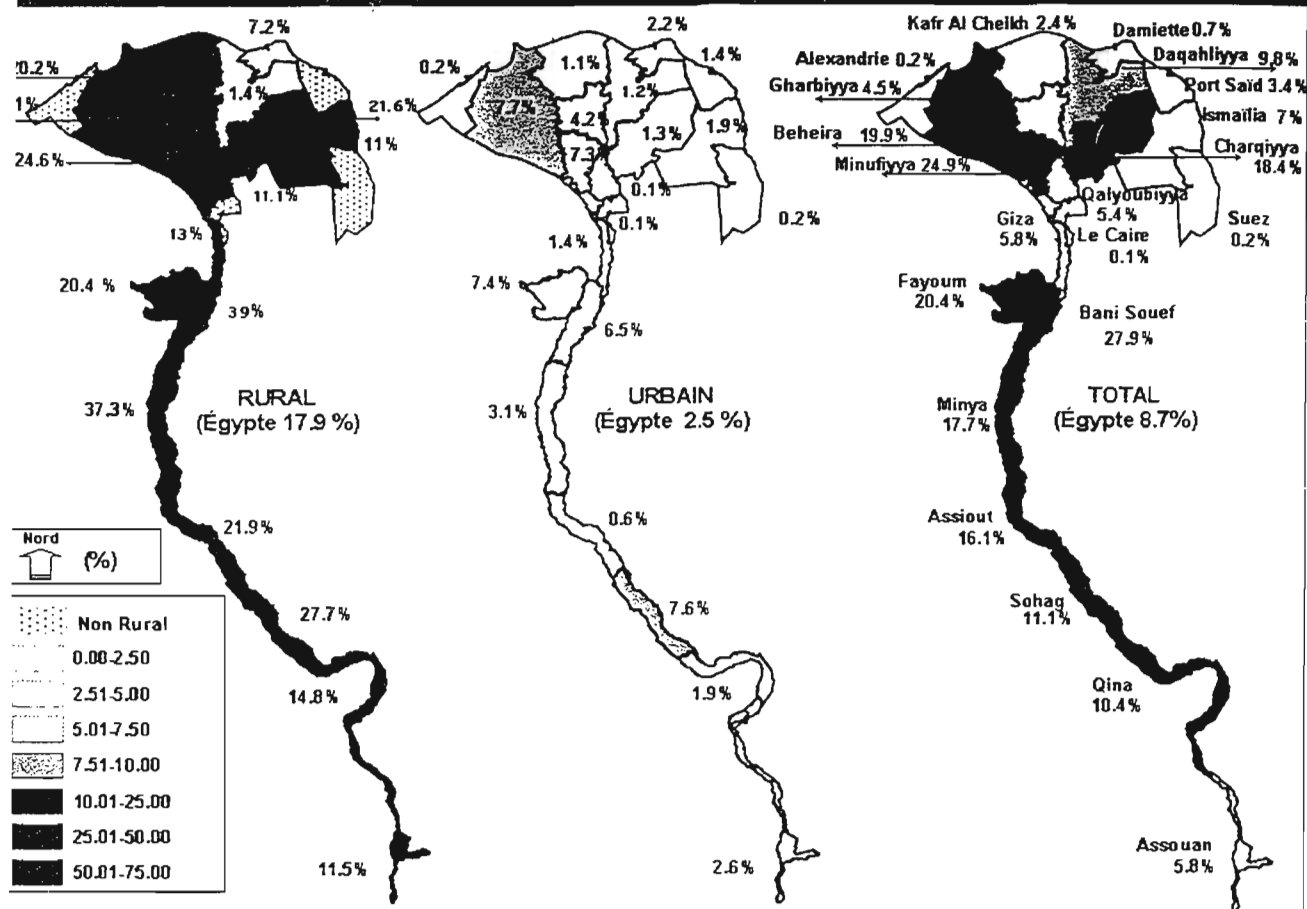
Progressivement le secteur agricole est entrain de passer d'une agriculture de cultivateurs – les fellahs - à une agriculture d'investisseur. En attendant de pouvoir établir le bilan économique de cette transformation de la campagne égyptienne, on peut déjà se poser la question de savoir ce que vont advenir les centaines de milliers de petits paysans pauvres et leurs familles, brutalement dépossédés de leurs moyens de production. Mais comme nous savons qu'aucun autre secteur économique du pays n'est capable d'absorber une telle masse d'exclus du secteur agricole, on ne peut que craindre une aggravation de la situation globale du pays.

Dans un pays comme l'Egypte où l'accès à l'eau du fleuve est la condition première de toute activité productive, le concept de *pauvreté hydraulique* prend tout son sens. Les articulations entre les différentes dimensions se révèlent très clairement. Ici, probablement plus qu'ailleurs, on distingue très clairement l'importance de l'accès à la ressource qui influence à la fois la pauvreté des usagers et leur degré d'implication et leur participation à la gestion de l'eau et plus généralement à l'ensemble des ressources du pays.

VOUS AVEZ DIT PARTICIPATION ?

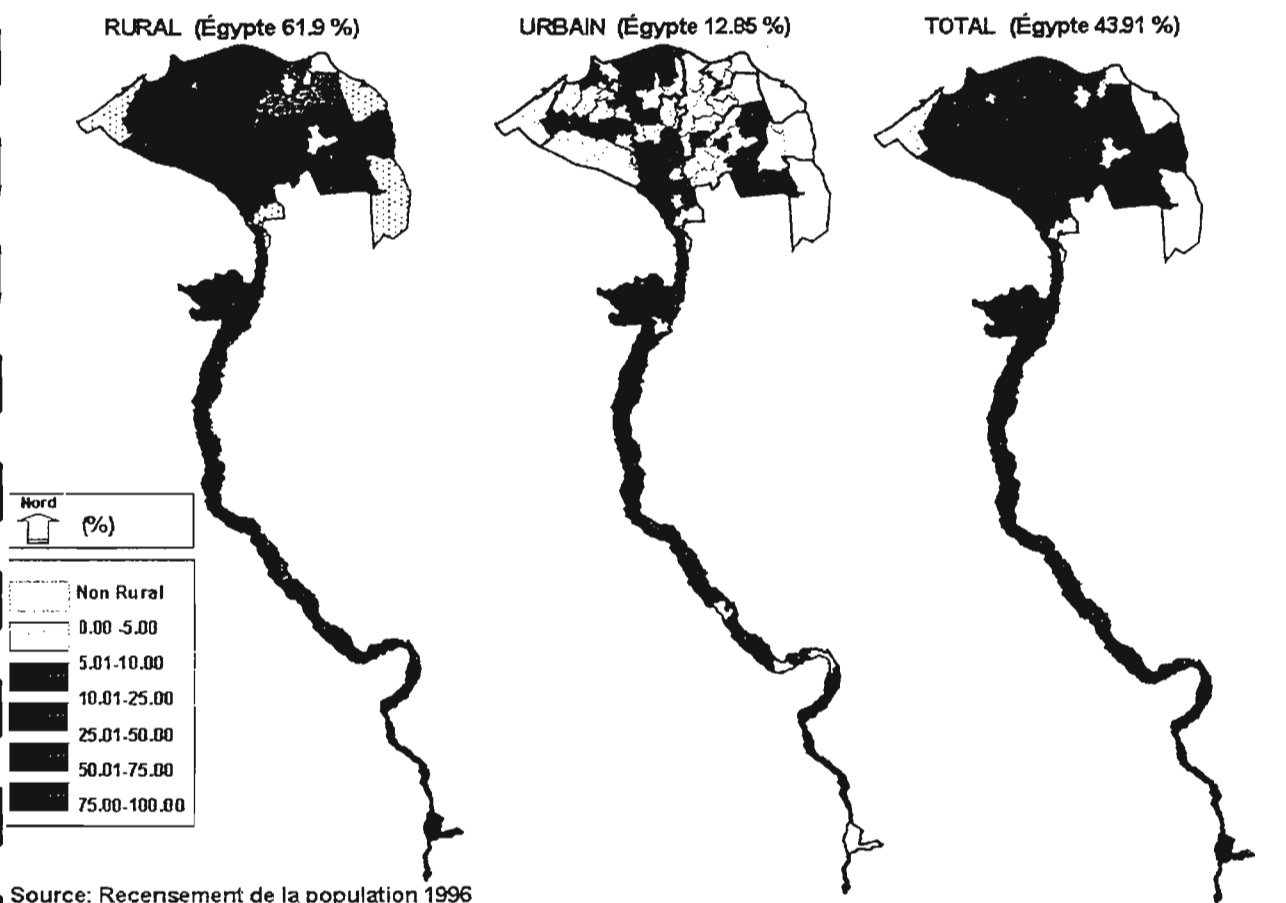


POURCENTAGE DES MÉNAGES SANS ACCÈS À L'EAU POTABLE PAR GOUVERNORAT (URBAIN – RURAL) EN 2001

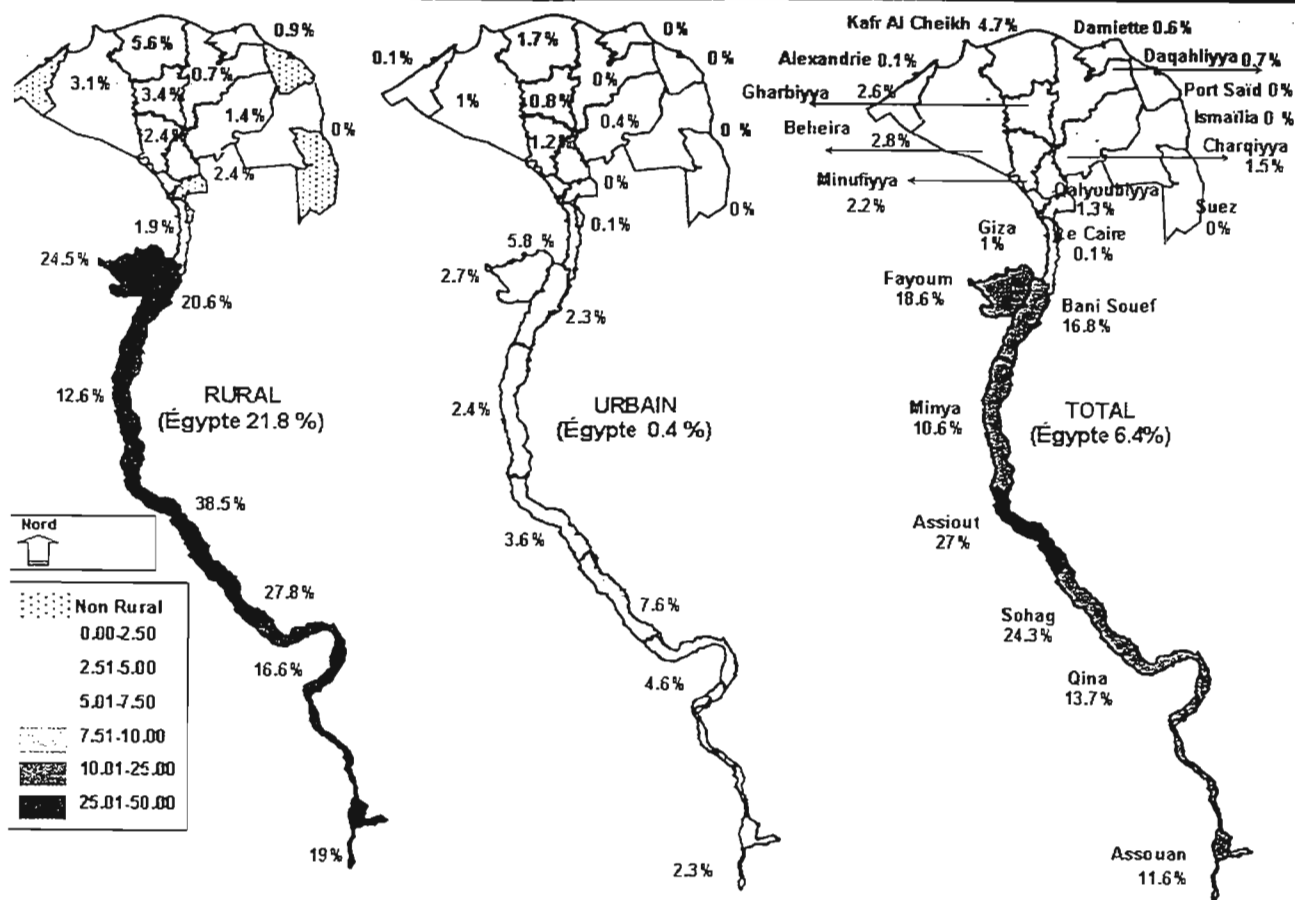


Source: Le rapport sur le développement humain 2003

POURCENTAGE DE MÉNAGES SANS UN ROBINET À L'INTÉRIEUR DE L'UNITÉ PAR MARKAZ (URBAIN-RURAL) 1996

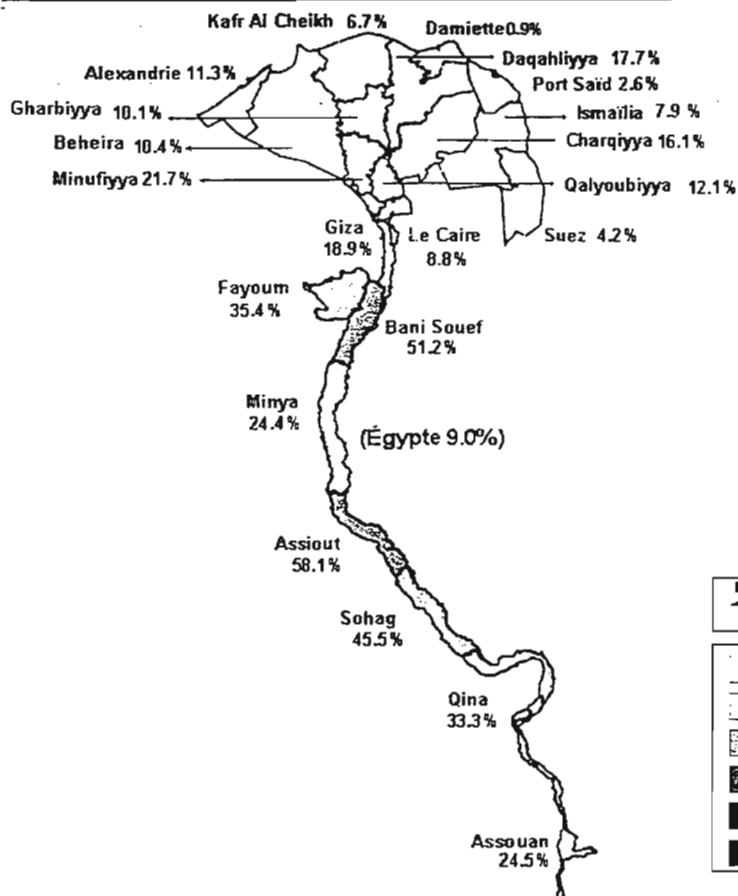


POURCENTAGE DES MÉNAGES SANS ACCÈS AU SYSTÈME SANITAIRE PAR GOUVERNORAT (URBAIN-RURAL) EN 2001

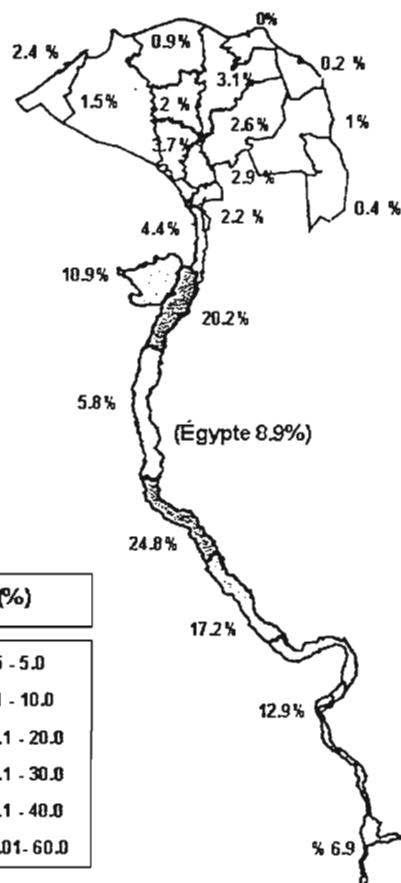


Source: Le rapport sur le développement humain 2003

PAUVRETÉ PAR GOUVERNORAT (% de la population total) 2001



LES ULTRA PAUVRES PAR GOUVERNORAT 2001

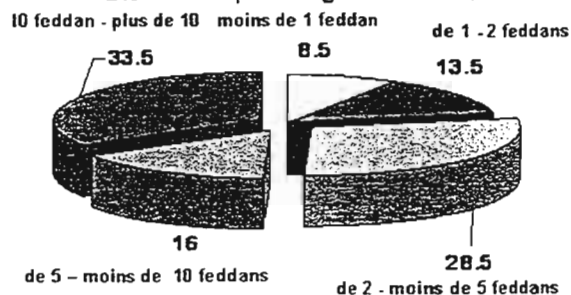


Source: Le rapport sur le développement humain 2003

POURCENTAGE DES EXPLOITATIONS PAR CATÉGORIE EN NOMBRE ET SUPERFICIE EN 2000

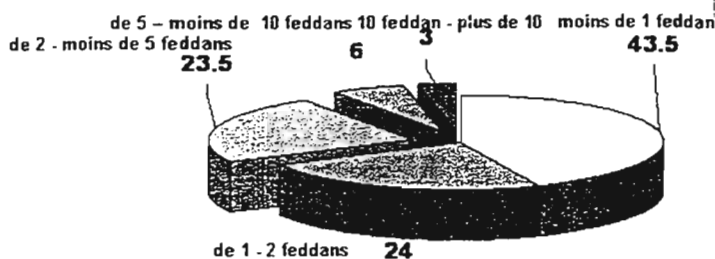
TAILLES DES EXPLOITATIONS

Distribution par catégories de surface



NOMBRE DES EXPLOITATIONS

Distribution par catégories de surface



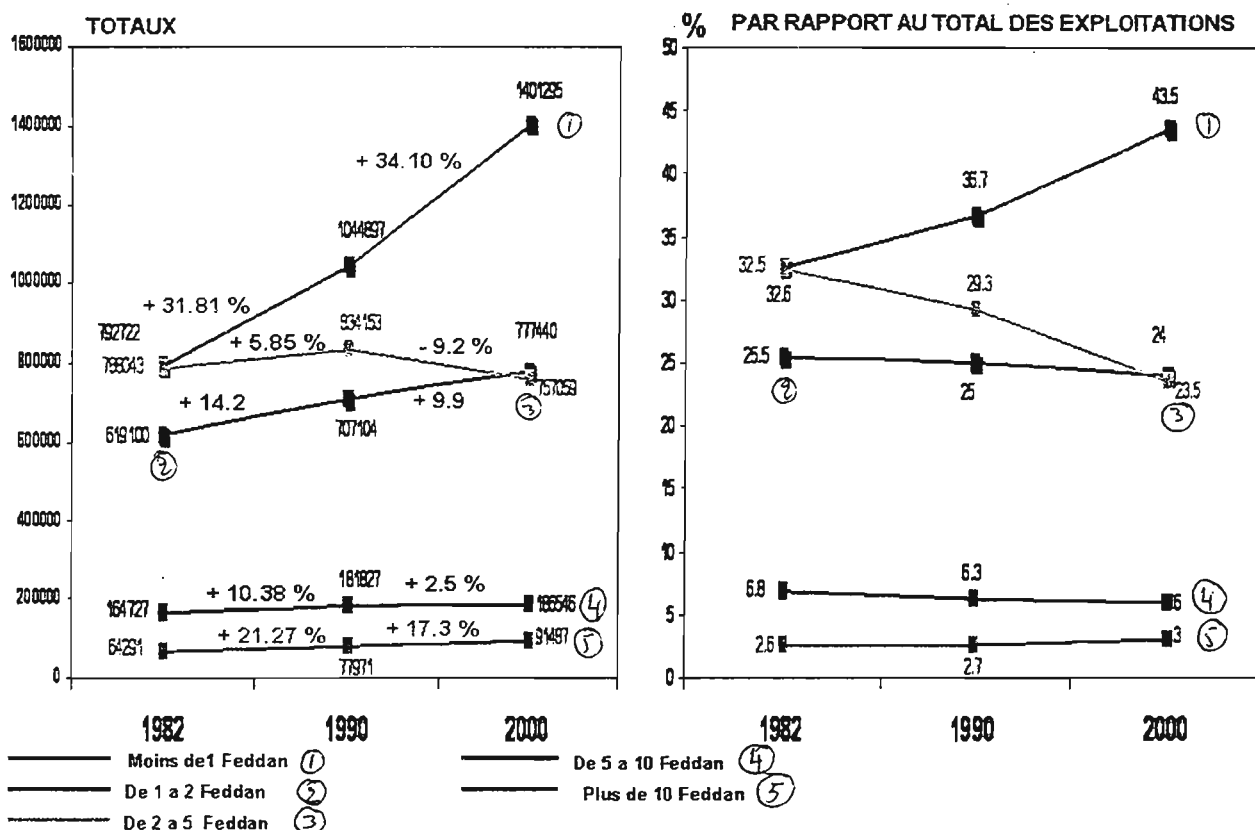
Catégorie de la taille des exploitations	Superficie en feddans	Pourcentage %
Moins de 1 feddan	627555	8.5
1 - 2 feddans	983462	13.5
2 - moins de 5 feddans	2078282	28.5
5 - moins de 10 feddans	1146781	16
10 feddan - plus de 10	2453600	33.5
Totale	7289680	100
Moins 10 feddan	4836080	66.34
Moins 5 feddan	3689299	50.60
Moins 2 feddan	1611017	22.09
Moins 1 feddan	627555	8.5

Taille moyenne des exploitations par catégorie
0.44
2.71
6.14
2.26
1.54
1.25
0.73
0.44

Catégorie de la taille des exploitations	Nombre des exploitations	Pourcentage %
Moins de 1 feddan	1401295	43.5
1 - 2 feddans	777440	24
2 - moins de 5 feddans	757059	23.5
5 - moins de 10 feddans	186546	6
10 feddan - plus de 10	91487	3
Totale	3213827	100
Moins 10 feddan	3122340	97.15
Moins 5 feddan	2935794	91.34
Moins 2 feddan	2178735	67.79
Moins 1 feddan	1401295	43.5

Source : Recensement Agricole 2000 – Note : Les gouvernorats urbains et désertiques ne sont pas pris en considération

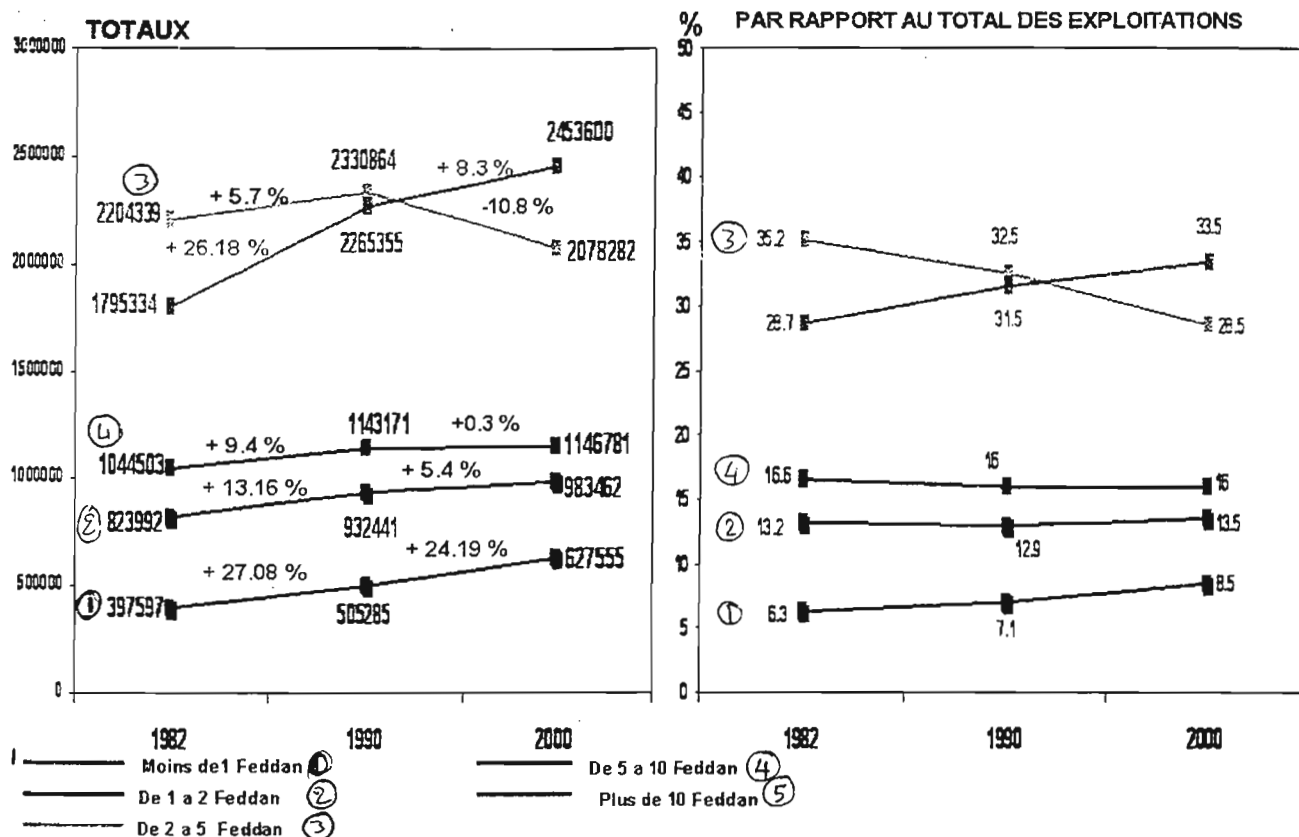
ÉVOLUTION DU NOMBRE DES EXPLOITATIONS D'APRÈS LA CATÉGORIE DE SURFACE (TOTAL) 1982-1990-2000



Note : Tenir compte des changements des superficies et des nombres des exploitations entre les trois recensements agricoles de 1982, 1990 et 2000

Source : Recensements Agricoles 1982-1990-2000

EVOLUTION DE LA SUPERFICIE DES EXPLOITATIONS D'APRES LA CATEGORIE DE SURFACE (TOTAL) 1982-1990-2000



Note : Tenir compte des changements des superficies et des nombres des exploitations entre les trois recensements agricoles de 1982, 1990 et 2000

Source : Recensements Agricoles 1982-1990-2000

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The Right to Water: A Constitutional Perspective

1. Introduction

This paper examines the justiciability of social rights, looking particularly at the Right to Water as part of the all encompassing Right to Life. The Right to water in India has been protected as a fundamental human right by the Indian Supreme Court emanating from the Right to Life guaranteed under Article 21 of the constitution. The right to life has been expanded to include the right to health and the right to a clean environment.

In India, there have also been significant developments in protecting the Right to Food through judicial intervention. The Right to Food has been specifically enforced under the Right to Life guaranteed to all citizens under Article 21 of the Constitution by the Supreme Court of India¹. By protecting the right to food, the Indian Supreme Court not only gave a declaration as to its justiciability, but through its orders also directed the state governments to positively provide mid-day meals to children in state schools and to implement food schemes. Can this protection of the right to food be extended to guarantee access to water under the protection of the Right to Life? I argue that it can be extended. If protection of rights mean not only the negative protection of violation of rights, but also positive protection, then I argue that the right to water can be extended not only to mean that people should not be denied access to water but also that in areas where no access to drinking water is provided by the State, the constitutional Right to Life guarantee would impose a duty on the State to positively provide water.

In framing such an argument, my paper also borrows from South African constitutional jurisprudence, since the South African constitution as the South African Constitution specifically guarantees to citizens the right to adequate food and water in its Bill of Rights. To what extent can this right be enforceable, and is it dependant on state resources? Do water

¹ *Peoples Union for Civil Liberties (PUCL) v. Union of India & Ors.* W.P. (Civil) No. 196 / 2001

providing agencies have any obligations to citizens before disconnection of water supply? And does the state have a duty to provide basic water supply even if it does not have sufficient resources? These are some of the questions that my paper attempts to answer.

2. The Right to water – flowing from the right to food, health and life

The resolution of the UNO passed during the United Nations Water Conference in 1977 as under:

"All people, whatever their stage of development and their social and economic conditions, have the right to have access to *drinking water* in quantum and of a quality equal to their basic needs."

A detailed review of international treaties supports the conclusion that the drafters implicitly considered water to be a fundamental resource. Several of the explicit rights protected by international rights conventions and agreements, specifically those guaranteeing the rights to food, human health and development, cannot be attained or guaranteed without also guaranteeing access to basic clean water. In recent years, more explicit articulations of this view supporting the right to water have been made.

In India, the constitutional right to access to clean drinking water can be drawn from the right to food, the right to clean environment and the right to health, all of which have been protected under the broad rubric of the Right to Life guaranteed under the constitution.

a. Right to Food

The Indian Supreme Court has reiterated in several of its decisions that the Right to Life guaranteed in Article 21 of the constitution in its true meaning includes the basic right to **food, clothing and shelter**.¹⁰ The justiciability of the specific Right to Food as an integral right under Art 21 had never been articulated or enforced until 2001.¹¹ In 2001, there was a massive drought in several states in India especially Orissa, Rajasthan and Madhya Pradesh. Due to the drought, which had been going on for months and the extreme poverty and complete lack of access to food grains, people were starving in large numbers. While the poor were starving in the drought hit villages, the central government had excess food grains in its storehouses, which were not being disbursed and were rotting! Slowly, the agitation over

access to food became a full-fledged Right to Food campaign in the country. As part of this campaign, a public interest litigation was filed by the People's Union for Civil Liberties (PUCL) in April 2001 in the Supreme Court for enforcement of the Right to Food of the thousands of families that were starving in the drought struck States of Orissa, Rajasthan, Chhatisgarh, Gujarat and Maharashtra, and where several had died due to starvation.¹³

In its several hearings, the Court directed all state governments to ensure that all Public Distribution Shops are kept open with regular supplies and stated that it is the prime responsibility of the government to prevent hunger and starvation. On 23 July, 2001, recognising the right to food, the court said:

*'In our opinion, what is of utmost importance is to see that food is provided to the aged, infirm, disabled, destitute women, destitute men who are in danger of starvation, pregnant and lactating women and destitute children, especially in cases where they or members of their family do not have sufficient funds to provide food for them. In case of famine, there may be shortage of food, but here the situation is that amongst plenty there is scarcity. Plenty of food is available, but distribution of the same amongst the very poor and the destitute is scarce and non-existent leading to mal-nourishment, starvation and other related problems.'*¹⁴

The Supreme Court, thus recognised a distinct Right to Food under the constitution under Article 21 and also sought to broaden the scope of the right to not only encompass the right to be free from starvation, but to also include distribution and access to food and the right to be free from mal-nutrition, especially of women, children and the aged. The Court, in an unprecedented interim order on 28 November 2001¹⁵, directed all the state governments and the Union of India to effectively enforce eight different centrally sponsored food schemes to the poor¹⁶. These food security Schemes were declared as entitlements (rights) of the poor, and the Court also laid down very specific time limits for the implementation of these schemes with the responsibility on the states to submit compliance affidavits to the court. These included the Antyodaya Anna Yojna, the National Old-Age Pension Scheme, the Integrated Child Development Services (ICDS) programme, the National Mid-day Meals Programme (NMMP), the Annapurna scheme and several employment schemes providing food for work. Of the eight schemes, the most significant was the Mid-day Meal Scheme and the direction of the Court to all state governments to provide cooked mid-day meals in all government schools by January 2002.

b. Right to clean drinking water – as part of the right to a clean environment and health:

However, the Right to Food has been articulated fairly recently. In India, the right to clean drinking water has been protected as fundamental right by the Indian Supreme court more with regard to cases where water sources were being polluted by industries and the right to health. Thus the right to water has been cited as an integral part of the guarantee of the right to a clean environment.

An important ruling of the Indian Supreme Court was the case of *A.P. Pollution Control Board II v. Prof. M.V. Nayudu*,² The court held that drinking water is of primary importance in any country. Referring to India's participation in the UNO water conference, the court held that the right to access to drinking water is fundamental to life and there is a duty on the State under Article 21 to provide clean drinking water to its citizens. The Supreme Court also referred to the *Narmada Bachao Andolan v. Union of India*³ judgment where Kirpal, J. observed:

"248. Water is the basic need for the survival of human beings and is part of the right to life and human rights as enshrined in Article 21 of the Constitution of India...."

The right to healthy environment and to sustainable development are fundamental human rights implicit in the right to "life".

In *Vellore Citizens' Welfare Forum v. Union of India*,⁴ at page 661 the Supreme Court held:

"The constitutional and statutory provisions protect a person's right to fresh air, clean water and pollution-free environment, but the source of the right is the inalienable common law right of clean environment."

Thus the concept of right to "healthy environment" has been developed as part of the right to "life" under Article 21 of our Constitution. This concept was first articulated in the case of *Bandhua Mukti Morcha v. Union of India*. This case was a public interest litigation filed to free bonded labourers whose living conditions were almost inhuman, the Supreme Court made an

² (2001) 2 SCC 62

³ (2000) 10 SCC 664

⁴ (1996) 5 SCC 647

order giving various directions for identifying, releasing and rehabilitating bonded labourers, ensuring minimum wage payments, observance of labour laws and providing wholesome drinking water. The Supreme Court also set up a monitoring agency, which would continuously check the implementation of those directions. So thus we can see that the right to clean drinking water, although not articulated as a separate right, has been considered as an inseparable part of the right to health and life.

C. Guarantee to the Right to Water under the South African Constitution:

In contrast to the Indian Constitution, which does not specify a right to water but protects a broad right to life under Article 21, the South African Constitution specifically guarantees the right to food and water to all its citizens.

The South African Constitution in Article 27 of the Bill of Rights holds,

"27. (1) Everyone has the right to have access to -

- a.*
- b. sufficient food and water; and*
- c.*

(2) The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights."

While protecting these rights, the South African constitution refers to availability of resources which would be a condition required for implementing these rights.

3. Enforcement of the Right to Water:

So what would the right to water specifically mean? Would it mean providing water to all those who need it, or would it mean something more? Here I would like to borrow some jurisprudence from the South African courts on this issue. Jaap de Visser quite rightly holds that the right of access to water can be seen to place two interrelated but distinct obligations on the State:

1. It must ensure that all people have physical access to water. This means that the facilities that give access to water must be within safe physical reach for all sections of the population, especially for vulnerable and marginalised groups.
2. It must ensure that all people have economic access to water. This implies that the cost of accessing water should be pegged at a level that would ensure that all people are able to gain access to water without having to forgo access to other basic needs.⁵

The South African Constitution places a duty on all three spheres of government to realise the right of access to water by acting in partnership with one another. While the national government is required to establish a national framework to ensure the realisation of this right, local government must play the critical role of ensuring delivery of water to all.

Disconnection of water: The South African High Court (WLD) took a different approach in the unreported case of *Residents of Bon Vista Mansions v Southern Metropolitan Local Council*, where the Court found that the disconnection of water supply would constitute a prima facie breach of the State's duty to respect the right of access to water. The procedures employed to effect a disconnection also have to be fair and equitable. They should not result in a person being denied access to basic water services for non-payment where the person proves, to the satisfaction of the water services authority, that he or she is unable to pay for the basic services.

The above decision can thus be understood to mean that the cost recovery principle combined with a practice by many local authorities to cut off water supply to those who cannot pay, constitutes a severe impediment in the realisation of access to water for all.⁶

Private entities and guarantee of the right to Water

The rhetoric of a human right to water, once implemented and fleshed out in practice, has a tendency to dissolve into a series of strategies eerily resembling consumer rights – an important dimension of a market state but hardly a frontier against its expansion. And the urgency of the rights claim is not necessarily stifled by the web of a complex regulatory framework.⁷ A human need can be left to market forces to fulfill. But if water is a human

⁵ Jaap de Visser, Edward Cottle & Johann Mettler The free basic water supply policy: How effective is it in realising the right?

http://www.communitylawcentre.org.za/ser/esr2002/2002july_water.php

⁶ *Ibid*

⁷ B Morgan

right, then the State is responsible for the fulfillment of that right even if it allows private intermediaries to play a role.⁸ For example, distributive justice and universal access are two core dimensions of socio-economic rights that can be given substance through rules on cross-subsidies, or through detailed codes of procedure governing disconnection practices by companies.

3. Conclusion

As we can see above, both Indian and South African constitutional law address the right to water through different perspectives. However there is no doubt of the fact that the access to water is a fundamental human right and is protected as such. The implementation and enforcement of this right is therefore crucial as it is often dependant upon resources available to guarantee such a right. Therefore governments need to build a strong water policy that protects this fundamental human right.

Some problems despite having the constitutional right to water are as follows:

- There are vast areas in developing countries such as India and South Africa where water infrastructure does not exist and water delivery of any kind is not possible. The policy to provide free basic water therefore needs to be supplemented with a policy that aims to rapidly increase access to water infrastructure - especially for the rural poor.
- Especially in rural communities where there are not a sufficient amount of high volume users to cross-subsidise the provision of free water to all, the policy creates serious problems for local governments, which are often not able to finance the free provision of basic water for all. This leads rural municipalities to take drastic measures (e.g. disconnections) that deprive their residents of access to water. The policy therefore does not seem to be properly targeted to meet the needs of the rural poor - a particularly vulnerable group in society.

Governments, international aid agencies, nongovernmental organizations and local communities should work to provide all humans with a basic water requirement and to guarantee that water as a human right. By acknowledging a human right to water and expressing the willingness to meet this right for those currently deprived of it, the water

⁸ <http://www.elaw.org/resources/text.asp?id=2019>

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community would have a useful tool for addressing one of the most fundamental failures of 21st century development.

**INTERNATIONAL WORKSHOP ON WATER POVERTY AND SOCIAL CRISIS
AGADIR, MOROCCO, 12-15 DECEMBER 2005**

WATER JUSTICE IN NIGERIA: CRISIS OR CHALLENGE

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ABSTRACT

Traditionally, the provision of water supply and services in Nigeria has been regarded as a social responsibility of the Government. Consequently, the costs of water infrastructure have been met from budgetary allocations and donor contributions rather than from water tariffs and charges. This has created the public perception of water as a free good. Currently, Nigeria's annual population growth rate of 2.86% has been projected to result in the doubling of its national population of 118 million within 25 years. Demographic pressures coupled with the rising operational and maintenance costs of water infrastructure have informed the Government's drive to attract private participation in the water sector, for example through privatization of water supply and services. This paper argues that water justice rather than commercial imperatives or economic efficiency must be the paramount consideration in the water privatization programme if poverty eradication is to become a reality. This means that there must be specific pro-poor targets and strategies especially on service coverage (quantity and quality) and tariff settings. This is of crucial importance given the absence of a water pricing strategy in Nigeria and the longstanding practice of fixing water rates either as flat rates or in some case metered but below the full cost of service provision. Adequate protection of both the rural and urban poor also means that participatory decision-making in the water sector and monitoring and evaluation of service provision needs to be embraced.

The paper will therefore present a scorecard of water privatization in Nigeria with a view to determining whether water justice can be achieved. It will assess the adequacy or otherwise of institutional frameworks, water policies, water legislation and framework privatization laws and where gaps or weaknesses are identified, it will advance practical recommendations for achieving water justice.

Keywords: Access to Safe Drinking Water; Human Rights; Water Policy and Laws; Privatization; Commercialization

I. Introduction

At a global level, the 1980s witnessed the intensification of efforts to secure the provision of water to the most vulnerable populations especially the poor. This was the period, 1981–1990, which the United Nations declared as the International Drinking Water Supply and Sanitation Decade. Similarly, at the turn of the century in 2000, the Millennium Development Goals (MDGs), signified the global commitment to the provision of adequate water supply and services. Thus, the MDG target of halving by 2015, the proportion of people living in extreme poverty and without sustainable access to safe drinking water.

In Nigeria, the supply of safe drinking water in Nigeria has been traditionally regarded as a social responsibility of the Government. As a result, the costs of water infrastructure and service delivery have been largely met from Government budgetary allocations as well as from bilateral or multilateral aid rather than from water tariffs and charges. This has led to the longstanding practice of fixing water rates at below the full cost of service provision. Nevertheless, the rapid demographic changes in Nigeria brought about by an annual population growth rate of 2.86% has brought with it increased demand for water not just for drinking purposes but also for sanitation, irrigation and for industrial use.¹ The result has been growing water scarcity and shortages despite the fact that Nigeria has considerable water resources of 226 billion cubic metres of surface water and 40 billion cubic metres of ground water.² This is deemed sufficient to meet demand but combined with planning lapses and the poor management of existing water infrastructure, the national water supply coverage is currently estimated to be 57%.³ With further disaggregating by reference to locality, the World Bank estimates that urban water supply may be as low as 30% of the total population while rural water supply is approximately 35%.⁴

In the face of rising operational and maintenance costs for water infrastructure and the competing demands on public funds, the Government's response has been to seek private participation in water supply development and management. This paper presents a scorecard of water privatization in Nigeria by analyzing to what extent pro-poor concerns have been mainstreamed into its implementation.

II. Access to Water as a Human Right

Unlike the Constitutions of other African countries such as those of Ethiopia, Uganda, Gambia and South Africa,⁵ Nigeria's 1999 Constitution does not establish any express entitlement or right to water. Nonetheless, it is noted that in India, which like Nigeria lacks an express Constitutional entitlement or right to water, the Courts have interpreted the Constitutional right to life as including the right to water. Therefore, in the 1990 case of *Attakoya Thangal v Union of India*, the Kerala High Court ruled that:

“...the administrative agency cannot be permitted to function in this manner as to make inroads, into the fundamental right under Art. 21. The right to life is much more than the right to an animal existence and its attributes are many fold, as life itself. A prioritization of human needs and a new value system has been recognized in these areas. The right to sweet water, and the right to free air, are attributes of the right to life, for, these are the basic elements, which sustain life itself.⁶

At the regional and global levels, the approach adopted in human rights instruments has been to either establish an express entitlement to water or to consider it to be an implicit attribute, that is, in the nature of a derivative right of any of the fundamental rights to life, health or environment. International human rights instruments that enshrine express entitlements to water include the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW);⁷ the United Nations Convention on the Rights of the Child;⁸ and the African Charter on the Rights and Welfare of Children.⁹

The African Charter on Human and Peoples' Rights (“the African Charter”), which is directly enforceable in Nigeria having been domesticated by the African Charter on Human and Peoples' Rights (Ratification and Enforcement) Act,¹⁰ lacks an express entitlement to water.¹¹ However, in a pronouncement of the African Commission on Human and Peoples' Rights in the *Social and Economic Rights Action Centre and the Centre for Economic and Social Rights and the Federal Republic of Nigeria*,¹² a case, which had been brought in connection with, among other issues, the right to adequate housing, the Commission declared that although the African Charter does not expressly provide for an entitlement to adequate housing, the right to enjoy the best attainable state of physical and mental health under Art. 16(1) of the Charter necessarily implies the right to adequate housing. Equally, based on this decision, the right to water can be read into the African Charter's right to enjoy the best attainable state of physical and mental health. This point is further amplified by the fact that in 2002, the United Nations' Committee on Economic, Social and Cultural Rights, which is charged with monitoring State compliance with the International Covenant on Economic, Social and Cultural Rights (ICESCR),¹³ declared in its General Comment 15 (2002) that the right to water should be recognized as an independent human right as it is fundamental to human survival and to achieving an adequate standard of living.¹⁴ Thus, the Committee's position had advanced from that held in 2000, when in General Comment 14 (2000) on the right to health in Art. 12, ICESCR, it declared that the right to health should extend beyond the provision of adequate health care and should cover access to safe drinking water and other requirements essential to achieving good health.

III. Water Policies, Institutional and Legal Frameworks in Nigeria

Although, there is no overall national water policy dealing with the management of water resources,¹⁵ the sub-sectoral policy known as the National Water Supply and Sanitation Policy (NWSSP), which was introduced in January 2000, provides guidelines on urban and rural water supply and defines the institutional and funding responsibilities of the Federal, State and Local Governments. The NWSSP's target is that by 2007, private operators will be responsible for 35% of urban water supply (UWS), 40% of small towns water supply (SWS) and 25% of rural water supply (RWS). As with the division of institutional and funding responsibilities under the NWSSP, the institutional and legal frameworks for water supply reflect the Federal-State divide. On account of the provisions of the 1999 Constitution¹⁶ and the Water Resources Act,¹⁷ the Federal Government has the right to the use and control of inter-state water resources. In all other cases, the State Governments are empowered to enact laws for the development and management of intra-state water resources.¹⁸ At the Federal level, the apex institution is the Federal Ministry of Water Resources,¹⁹ which is also responsible for the River Basin Development Authorities (RBDAs) established under the River Basin Development Authorities Act.²⁰ RBDAs are charged with the development of inter-state surface and underground water resources in specified river basin areas and for the supply of water storage schemes to users for a fee. At the State level, it is the norm for State Governments to establish statutory corporations known as State Water Authorities (SWAs) with responsibility for UWS and SWS. These bodies are usually placed under the supervision of a line Ministry.²¹ In a few cases, some Local Governments have established Departments for Water and Sanitation involved in RWS activities.²² Otherwise, it is fair to state that excluding inter-State water resources and specified river basin areas, the SWAs have general responsibility for water supply development and management within the territories of their respective States.

IV. Implementing Water Privatization

At the policy level, the NWSSP promotes privatization as a viable strategy for sharing the burdens of water infrastructure investments and operational costs and as a solution to incessant water shortages and scarcities. It also emphasizes the need to cover the costs of service provision through revenue collection efficiency and changes to tariff structures. The Policy concedes that despite the onset of privatization, service provision should be maintained for the poor. But what it fails to elaborate upon is how these social commitments are to be mainstreamed into its implementation.

For the Federal Government, the legal basis for the privatization of Federal Government's enterprises is the Public Enterprises (Privatization and Commercialization) Act.²³ In connection with the water sector, Part I of the Second Schedule to the Act provides for the partial commercialization of the RBDAs. Also, by virtue of the Public Enterprises (Privatization) Order 2001, the Abuja Water Board (AWB) is to be partially privatized.²⁴ Although, the terms,

"privatization" and "commercialization" are not defined in the Act, it is clear from its section 2 that privatization entails that the public enterprise must have a share capital. The implication is that the relevant public enterprise must transform into a limited liability company either through the repeal or substantial modification of its enabling law. With commercialization, it is evident from section 8 of the Act that although transformation into a limited liability company is not contemplated, commercialization will confer upon the public enterprise, autonomy especially in connection with the fixing of the prices, rates and charges for goods or services and the capitalization of assets.

In the case of State Governments, a few such as Lagos State have already signified their intention to commercialize or privatize water supply development and management and indeed commenced their programmes. Unfortunately, unlike the position with the Federal Government-owned or controlled public enterprises, most of these States Government have not presented a legal framework to underpin the privatization process. Consequently, civil society groups have raised their concerns about any act of divestiture, which effectively transfers the entire ownership and control of publicly-owned water enterprises to private interests. It is noted that with regards to the AWB, it is intended to transfer 60% of the shares of the privatized entity to the private sector.²⁵

V. Lessons So Far

Nigeria's Presidential Water Initiative was launched in August 2003 with the main objective of fast-tracking the implementation of the MDG target so that by 2007, water supply access and coverage will be achieved for all State capitals, three-quarters of urban and semi-urban areas and two-thirds of rural communities. The MDGs clearly acknowledge that access to safe drinking water is an integral factor in reducing poverty. The NWSSP professes to do the same albeit in somewhat ambiguous terms. What is clearly in issue is the lack of a rights-based approach, (whether by way of a human rights or contractual or property rights regime) for the provision of water to meet the drinking, cooking and hygiene needs of the poor ("basic needs").²⁶ At present, the human right to water is neither explicitly enshrined in the national Constitution nor in extant water laws and regulations and the privatization regimes of the Federal and State Governments.²⁷ Although, section 5 of the Public Enterprises (Privatization and Commercialization) Act, deals with commitments to wider public ownership by requiring that the shares of privatized public enterprises are to be sold on the basis of equality of all States and the FCT, and further that not less than 1% of the shares to be offered for sale are to be reserved for the staff of the public enterprises to be privatized, social equity in the water sector must go beyond commitments on wider public ownership of the shares of privatized public enterprises. Rather what is required are specific water laws, regulations or standards that deal with (i) targets and indicators on service coverage (physical accessibility, quantity and quality) and

tariff settings (affordability); (ii) community participation in water management and decision-making; (iii) accountability; and (iv) regulation and monitoring of service provision.

These gaps or weaknesses in the implementation of water privatization cannot be ignored. It is therefore not surprising that civil society groups and local communities have been mobilizing and intensifying their advocacy campaigns against water privatization, as the process has come to be perceived as non-inclusive without proper regard for the interest, needs and concerns of the most vulnerable populations or their representatives; and with the State authorities seemingly more concerned with economic efficiency and setting water tariffs and charges rather than with enshrining the rights of the poor to have access to water for meeting their basic needs.

VI. Conclusion

Water privatization in Nigeria is not yet in crisis but it certainly presents a formidable challenge. The way forward in integrating pro-poor concerns in the privatization programmes both at the national and State levels must necessarily embrace policy and legal reforms that promote inclusion, accountability, participation and attention to the needs of all vulnerable groups. Also, being a State Party to ICESCR, Governmental authorities in Nigeria are required to utilize "all appropriate means, including particularly the adoption of legislative measures" in the implementation of ICESCR obligations relating to the right to water. This means that water privatization should not undermine compliance with the Covenant obligations. In this regard, General Comment 15 (2002) of the Committee on Economic and Social Rights presents useful guidelines for the components of conforming water laws and regulations. Evidently, there is a need to pass a new Water Act so as to give effect to the draft National Water Policy. This is on account of innovations presented in the draft Policy. These include the introduction of a water pricing policy; the formation of an independent regulatory and monitoring body for the water sector, that is, the National Water Commission, which will have the responsibility of facilitating, in conjunction with civil society groups, the formation of Water User Associations charged with the determination of affordable water tariffs; commitments to public participation in decision-making; and the express recognition of the role of non-governmental organizations (NGOs) "in all aspects of water resources development and management including advocacy, awareness creation, capacity building and mobilization." However, every effort must be made to ensure that the operations of the proposed National Water Commission are fully decentralized and that the Water User Associations are not "captured" by political interests for political patronage purposes.

Thank you for listening.

Notes

¹ The national population of 118 million is projected to double within 25 years, see further, National Population Commission, *Nigeria Population Census 1991 Analysis: National and State Population Projections*, (National Population Commission, Abuja, 2002), pg. 26.

² Federal Ministry of Water Resources, "*National Water Supply and Sanitation Programme*," a briefing paper prepared for the National Implementation and Partnership Workshop on the Presidential Water Initiative, Abuja, Federal Capital Territory (FCT), 26-29 August 2003.

³ M.A.K. Abubakar, "*National Water Supply and Sanitation Programme Strategy*" a paper delivered at the National Implementation and Partnership Workshop on the Presidential Water Initiative, Abuja, Federal Capital Territory (FCT), 26-29 August 2003.

⁴ From the World Bank's, Project Information Document (PID) for the Second National Urban Water Sector Reform Project (Date prepared: 23/3/2005).

⁵ Centre for Economic and Social Rights, Right to Water Factsheet No. 3. Also, "*Legal Redress-Enforcing the Right to Water: South Africa*," for full text, see, <http://www.righttowater.org.uk/code/legal 2.asp>.

⁶ For full text of decision, see, <http://www.elaw.org/resources/text.asp>. Similarly, in *Subhash Kumar v State of Bihar*, in which the Court ruled that the right to life includes the right to enjoy pollution-free water, for full text, see, <http://www.elaw.org/resources/text.asp>.

⁷ Art. 14(2). CEDAW entered into force on 3/9/81 and was ratified by Nigeria on 13/7/85.

⁸ Art. 24. The Convention entered into force on 2/9/90 and the Bill of Rights, which it established for children, has been incorporated into Nigeria's Child's Rights Act, No. 26 of 2003.

⁹ Art. 14. The Charter entered into force on 29/1/99.

¹⁰ Act No. 2 of 1983.

¹¹ On the direct enforceability of the African Charter in Nigeria, see, the Supreme Court decision in *Abacha v Fawehinmi* (2000) 4 S.C. (Part II) 1.

¹² Communication 155/96.

¹³ ICESCR entered into force on 3/1/76 and was ratified by Nigeria on 29/10/93.

¹⁴ For the full text of General Comment 15 (2002), see, United Nations Economic and Social Council, "*Substantive issues Arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights*," E/C.12/2002/11 of 26/11/2002.

¹⁵ A National Water Policy also known as the National Water Resources Management Policy is currently being prepared.

¹⁶ Item 64, Part I of the Second Schedule.

¹⁷ No. 101 of 1993.

¹⁸ There are 36 States in the Federation.

¹⁹ Basically, institutional frameworks in the water sector have been transformed within the last two decades in order to emphasize the importance of water supply and services. At the federal level there has been the emergence of a Ministry for the management of water resources. This is distinct from the previous situation when management of water resources was the responsibility of a department within the Federal Ministry of Agriculture, Water Resources and Rural Development.

²⁰ No. 35 of 1987. The current RBDAs are Anambra-Imo, Benin-Owena, Chad Basin, Cross River, Hadejia-Jama'are, Lower Benue, Niger Delta Basin, Niger, Ogun-Oshun, Upper Benue and Sokoto-Rima.

²¹ The emergence of dedicated State Ministries of Water Resources mirrors the experience at the federal level.

²² There are 774 Local Governments in the Federation. It is further noted that the municipalities, that is, the Local Government Area Councils, usually appoint supervisory councillors in respect of water supply and services. Nevertheless, most RWS schemes in Nigeria have invariably fallen into various states of disrepair and disuse mainly on account of the lack of adequate maintenance.

²³ No. 28 of 1999.

²⁴ The AWB has been operating as non-statutory agency of the Federal Capital Development Authority (FCDA) since its establishment in 1989. To this extent, it differs from SWAs as it does not have an enabling law, which provides for its establishment. Consequently, the corporatization of the Board has been easier to carry out because unlike a statutory body, the amendment or repeal of an enabling law is not required. In October 1998, the Board ceased to receive subventions from the FCDA and the Federal Government.

²⁵ See, Public Enterprises (Privatization) Order 2001.

²⁶ On the classification of the right to water as a human right or a contractual or property right, see further, Overseas Development Institute (ODI) Briefing Paper, *"Right to Water: Legal Forms, Political Channels,"* July 2004.

²⁷ Cf, s. 13(3)(c), Child's Rights Act 2003, which provides that "every Government in Nigeria shall ensure the provision of adequate nutrition and safe drinking water" to every child in Nigeria.

Colloque international
Pauvreté hydraulique et crises sociales
Agadir – Maroc (12-15 décembre 2005)

La pauvreté, entre l'eau et le profit
Christian Bouquet¹

*L'eau ainsi est le regard de la terre,
son appareil à regarder le temps.*
Paul Claudel

Les évolutions récentes enregistrées dans le domaine de la gestion de l'eau ont généralement contribué, dans le court terme, à creuser davantage encore le fossé des inégalités sociales. Mais, à moyen terme, les risques les plus graves viendront de la contradiction entre les politiques dites de développement – auxquelles seront contraints d'adhérer les plus pauvres pour une simple question de survie – et l'épuisement de la ressource dans certaines régions du globe.

Le fil rouge qui permet de conférer une certaine unité à ce paradoxe se trouve dans les nouvelles lois de l'économie : la règle du profit maximum aboutit inévitablement à assurer, en amont, une distribution inéquitable de l'eau potable et à pratiquer, en aval, une utilisation abusive et inappropriée de la ressource. Les pays considérés comme en situation de « stress hydrique »², notamment ceux du pourtour de la Méditerranée, sont d'ores et déjà confrontés à de tels choix contradictoires.

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² Depuis 1986, les recherches visant à quantifier la notion de « stress hydrique » ont conduit à déterminer des seuils d'alerte (moins de 1 300 m³ par habitant et par an), de rareté relative (750 m³) et de rareté absolue (300 m³). Ces deux dernières catégories pourraient concerner plus de trois milliards de personnes en 2025 (Lasserre et Descroix, 2002). Les travaux de Falkenmark et Margat situent les seuils à des niveaux légèrement moins alarmistes, mais Ohlsson et Turton suggèrent de corréliser les statistiques de disponibilité brute d'eau à l'indice de développement humain (IDH), ce qui place les limites comme indiqué dans le texte.

1. L'eau et la pauvreté

Dans la plupart des pays du Sud, l'accès à l'eau domestique pour tous n'est toujours pas un droit humain élémentaire, pas davantage qu'un devoir de solidarité planétaire. L'eau, dont on dit qu'elle est un bien commun de l'humanité, devrait pourtant contraindre les hommes à redevenir humbles et à admettre que, pour survivre ensemble, il faut la partager. D'autant plus qu'une infime partie seulement (2 %) de l'eau de la planète est potable. Dans leur globalité impersonnelle, les chiffres concernant, par exemple, l'Afrique sont impressionnants : 450 millions de personnes, soit plus de la moitié de la population, n'y ont pas accès. Or, les Africains se « contentent » de 30 litres d'eau par jour – le plus souvent de l'eau croupie qu'ils vont chercher à plusieurs kilomètres de leur foyer – alors que les Américains consomment quotidiennement 600 litres³ d'une eau potable et pure qui coule de multiples robinets installés à portée de main.

Carte anamorphique Atlas de l'eau (p. 34)

Certes, les engagements du Millénaire des Nations unies actés en septembre 2000 ont prévu de réduire de moitié d'ici à 2015 la proportion de ceux qui n'ont pas accès à l'eau potable. Mais les estimations à mi-parcours (2002) laissent entendre que la communauté internationale n'y parviendra pas : à l'exception de l'Amérique latine, la partie pauvre du monde n'atteindra pas ces objectifs, et l'Afrique subsaharienne – dont la croissance démographique demeure forte – en sera encore loin. L'Asie du Sud-Est (dont l'Inde et la Chine) sera également en deçà des promesses, pourtant modestes puisqu'elles laissaient encore 10 % de leurs habitants sans « accès durable et aisé à l'eau potable ».

On est d'ailleurs en droit de s'interroger sur la réalité – ou le réalisme – de cette promesse quand on observe les nouvelles modalités de distribution de l'eau, notamment dans les agglomérations urbaines. En effet, si l'accès à l'eau est considéré comme un service public essentiel, la gouvernance mondiale détenue par les institutions de Bretton Woods a décidé qu'il devait être confié à des entreprises privées. En conséquence, le service est aujourd'hui obligatoirement payant, et il faut payer pour boire, pour se laver, pour faire sa lessive, pour arroser son champ, pour abreuver son troupeau.

Nul ne peut nier que la distribution de l'eau potable a un coût : pour la capter, la rendre consommable et l'acheminer jusqu'au robinet, il faut des investissements lourds et une maintenance qui déterminent un certain prix pour le mètre cube d'eau. Mais ce service a longtemps été pris en charge par la collectivité, notamment dans les villes du tiers-monde où les bornes-fontaines étaient en accès libre, mais aussi dans les villages ruraux où les forages profonds étaient simplement équipés de pompes à main à la disposition des habitants. Il s'agissait d'un choix de société, dicté par le contexte socio-économique mais aussi par le simple bon sens.

³ On constate un écart encore plus grand écart dans les pays du Maghreb entre les touristes qui fréquentent les hôtels de luxe et les habitants des villages (ou des bidonvilles) vivant à quelques kilomètres de là...

Or, le « consensus de Washington » accompagné par l'idéologie libérale qui a recouvert le monde a mis fin à cette belle utopie. Il est vrai que, dans bon nombre de pays en développement, les sociétés d'Etat chargées de la gestion de l'eau s'étaient illustrées par une forme d'incompétence qui s'était manifestée par des gaspillages, des détournements et une gabegie que les censeurs du FMI et de la Banque mondiale n'avaient pas manqué, à juste titre d'ailleurs, de dénoncer. Les programmes d'ajustement structurels avaient donc prôné la privatisation du secteur, et les trois grands géants occidentaux de l'eau s'étaient précipités sur ce nouveau marché : Suez-Environnement (Ondéo, ex-Lyonnaise des Eaux), Véolia (ex-Générale des Eaux, puis Vivendi), et Saur (Bouygues)⁴.

On a pu lire les premiers résultats de cette privatisation généralisée dans les dysfonctionnements sud-américains, notamment en Bolivie où la société privée détentrice du monopole de l'eau était allée jusqu'à interdire la récupération de l'eau de pluie (Peredo Montano, 2001). Des émeutes meurtrières avaient fini par ramener la loi à davantage d'humanité. Mais il n'en a pas été de même en Argentine, d'où Ondéo a dû se retirer en septembre 2005. De même, la multiplication des coupures d'eau potable pour cause de non paiement des factures dans les quartiers pauvres de certaines villes du Kwazulu-Natal (Afrique du Sud) a multiplié par cinq le nombre de cas de choléra en 2001-2002, car les populations étaient réduites à consommer l'eau des rivières ou des puits pollués⁵. Et, devant la résistance obstinée des populations, les autorités malgaches ont renoncé, en 2005, à rendre payantes les bornes-fontaines.

Il était donc clair que les nouvelles modalités de distribution d'eau étaient inévitables, et certains pays d'Amérique latine – les plus précocement touchés par les vagues de privatisation – ont expérimenté des mesures allant à la fois dans le sens de la logique marchande du recouvrement des coûts et dans celui de leur répartition, par une forme de péréquation. C'est ainsi que la Colombie – pays que l'on hésite à citer en exemple – a mis en place une réforme en 1994 imposant une surcharge tarifaire de 20 % aux consommateurs les plus aisés.

Plus généralement, les habitants des pays pauvres, notamment dans les grandes villes, ont dû adopter de nouveaux comportements. Tous les petits métiers liés au transport et à la distribution de l'eau ont été contraints d'évoluer, et, s'il est vrai qu'ils se faisaient payer au seau ou au bidon une eau qu'ils avaient obtenue gratuitement, ils la revendaient à des prix très abordables, adaptés au pouvoir d'achat de leurs clients. Quant aux plombiers clandestins qui avaient basculé dans la transgression et qui étaient capables de mettre en place nuitamment des dérivations sur les réseaux existants, ils ont été traqués sans répit par les nouvelles sociétés privées.

⁴ Il est intéressant de noter que ces trois groupes français couvrent 74 % du marché mondial de l'eau et de l'assainissement (Ondéo 35 %, Véolia 32 % et Saur 7 %).

⁵ Le problème de l'équité prend un relief particulier en Afrique du Sud où, pendant des décennies, les Noirs pauvres des bidonvilles de Soweto transportaient péniblement l'eau dans des brouettes pendant que les riches Blancs laissaient les robinets arroser leurs pelouses et remplir leurs piscines. Aujourd'hui, des lois nouvelles ont fixé le prix du mètre cube à 80 cents pour ceux qui s'approvisionnent aux pompes collectives, et à 1,60 \$ pour ceux qui sont directement raccordés. Les utilisations dites « de luxe » sont surtaxées.

C'est là que se situe le premier niveau de la déstructuration sociale urbaine car, pour la majorité de la population des villes, l'abonnement avec compteur individuel est encore inaccessible. Les citoyens pauvres ont donc recours à une forme de distribution informelle passant par un réseau de petits livreurs branchés sur une adduction d'eau payante. Au final, le produit est inévitablement plus cher, et d'autant plus que les nouvelles sociétés ayant obtenu le marché de l'eau hésitent à alimenter les quartiers les plus pauvres, généralement excentrés, au motif qu'il n'y a pas de clientèle solvable. S'approvisionner en eau, dès lors qu'il n'y a plus de bornes-fontaines publiques, devient d'autant plus cher qu'on est loin du premier robinet. « *L'eau est lourde à un jour de la source.* »⁶

Il faudra sans doute reposer dans ces termes les problèmes de solidarité, sans pour autant se cacher les difficultés qui seront rencontrées pour l'identification des bénéficiaires. Et sans oublier que certains groupes sociaux refuseront le principe d'une solidarité systématique. En outre, il faudra inévitablement intégrer les petits marchands d'eau, qui remplissent une fonction de service public et qui participent de manière incontournable à la régulation socio-économique, et dont le travail assure la propre survie. Mais ce schéma vertueux risque d'aboutir à un cloisonnement social, et donc à une « archipellisation des villes » (Jaglin, 2001).

Ainsi les modes de gestion de l'eau sont encore écartelés entre la philosophie du service public et les lois du profit, même si certains cas d'école illustrent la possibilité de faire payer les plus riches pour les plus pauvres, et donc de maintenir quelques bornes-fontaines gratuites dans les agglomérations urbaines. Il reste néanmoins à régler le problème de l'acheminement et de la distribution de l'eau potable là où la prestation n'est pas rentable, faute de solvabilité des consommateurs, c'est-à-dire dans les quartiers précaires des grandes villes et dans les campagnes. Il reste surtout à construire la triangulation entre les intérêts des grands groupes (Veolia, Ondeo, Saur, ...), les prescriptions des institutions qui assurent la gouvernance mondiale (FMI, OMC,...), et les besoins de deux milliards d'hommes.

La réflexion sur la distribution de l'eau potable, notamment en milieu urbain, mérite donc un débat sérieux qui s'inscrit parmi les grands enjeux du monde contemporain. Il conviendra toutefois de ne pas le laisser s'éterniser dans des digressions oiseuses qui ne servent qu'à maintenir la situation en l'état : il est temps d'exiger de la gouvernance mondiale qu'elle impose à l'échelle planétaire le respect d'un droit que l'on croyait acquis, celui de l'accès pour tous à l'eau potable.

2. L'eau et le développement

Mais le plus grave est peut-être ailleurs, car ce ne sont pas les populations pauvres qui, en consommant en moyenne 30 litres d'eau par jour et par personne, mettront en danger les réserves naturelles dans les régions touchées par le « stress hydrique » ; ce sont les politiques mises en œuvre au nom du « développement », qu'il s'agisse de grandes exploitations agricoles consommant d'énormes quantités

⁶ René Char, *Seuls demeurent*, Gallimard.

d'eau pour l'irrigation, ou les grands complexes touristiques avec leurs installations de gaspillage obligé (piscines, golfs).

Or, il s'agit toujours de choix économiques qui semblent aller dans le bon sens, puisque ces entreprises sont généralement présentées comme pouvant sauver les populations locales de la misère, en leur assurant les maigres salaires qui leur permettent de survivre. Qui, au nom de la préservation des ressources en eau, osera interdire les activités touristiques en Tunisie, ou les maraîchages au Maroc ?

Carte prélèvements et consommation Atlas de l'eau p. 28

La comparaison des deux cartes représentant la part relative des prélèvements d'eau douce au profit de l'agriculture et de l'industrie souligne, s'il en était encore besoin, la réalité d'un monde coupé en deux et la profondeur du fossé des inégalités⁷. Certes, il faut savoir redimensionner les données et comprendre que, dans des pays pauvres où l'industrie est inexistante, l'eau douce non domestique est uniquement prélevée à des fins agricoles, et le plus souvent pour de simples objectifs vivriers.

Mais la théorie dite des « avantages comparatifs » et le jeu pervers sur le différentiel des coûts de la main d'œuvre conduisent rapidement à une modification des équilibres. Les pays qui affichent à la fois un climat méditerranéen et une population à faible niveau de vie entrent *ipso facto* dans la catégorie des producteurs intensifs de fruits et légumes, notamment « hors saison »⁸, et dans celle des paradis touristiques à bas prix.

Or, tandis qu'il n'est pas trop tard pour rectifier dans le sens de l'équité les systèmes de distribution d'eau potable aux plus pauvres, il va être difficile de revenir sur les choix qui ont été arrêtés en matière de développement dans les pays du Sud. Car les paysans y ont déjà été confrontés à des mutations rapides qui ont conduit un grand nombre d'entre eux à abandonner la terre et d'autres à se livrer à la culture de plantes illicites. De telle sorte que l'avènement de grandes exploitations dédiées aux cultures d'exportation peut apparaître à la fois comme une soupape pour un trop plein de main d'œuvre et une alternative face à la tentation de la transgression.

L'exemple de la Tunisie (Treyer, 2001) montre qu'il s'y pose d'ores et déjà un véritable choix de société. En effet, ce pays appartient à l'arc de pénurie sud-méditerranéen pour lequel la gestion de la ressource en eau revêt un caractère sensible. Or, les principales options retenues pour le développement économique – les cultures irriguées et le tourisme – sont éminemment gourmandes en eau. Chacun le sait et pourtant nul ne veut ou ne peut remettre en cause des orientations qui assurent la survie d'une partie non négligeable de la population. Cette situation s'apparente, dans sa dialectique contradictoire, aux plantations de cultures illicites que l'on ne peut éradiquer sans proposer des revenus de substitution, mais tous les plans mis en place dans ce sens ont échoué. Dans ces conditions, le « choix de société » n'est-il pas un luxe pour les pays pauvres ?

⁷ Même si la « frontière » entre le Nord et le Sud épouse, dans ce cas d'espèce, une ligne à géométrie variable : ainsi l'Europe méditerranéenne, l'Australie et le Japon affichent des indicateurs davantage orientés vers des prélèvements d'eau à finalité agricole.

⁸ On remarquera la connotation ethnocentrée de l'expression.

Comme la Tunisie, certains de ses voisins profitent de la manne que peut apporter le tourisme. C'est notamment le cas de l'Egypte⁹.

Carte du tourisme Atlas Diplo p. 18

Les cibles choisies ne tournent pas autour d'un écotourisme qui serait soucieux des problèmes auxquels sont confrontés les pays d'accueil. On y développe plutôt des installations qui consomment énormément d'eau, comme les piscines mais surtout les golfs. En région méditerranéenne, l'entretien d'un golf, et notamment du fameux *green* qui en fait la spécificité – autant que le ridicule aux yeux des cultivateurs ou des éleveurs des pays pauvres – représente plus de 250 000 m³ d'eau par an, soit la consommation annuelle de plus de 20 000 habitants des zones rurales du Maghreb. Mais là encore rares sont les voix qui s'élèvent, notamment de l'intérieur du système, pour mettre en garde contre les dangers de tels choix économiques ou en dénoncer la courte vue.

Il est fréquent d'entendre dire que les sociétés, parce qu'elles ont connu d'autres menaces de déséquilibre dans leur histoire, sauront mettre au point les régulations qui s'imposent lorsque le moment sera venu. Mais s'il est vrai que les Romains ont fini par s'habituer aux trop grandes quantités de plomb contenues dans le poisson qu'ils consommaient, cette adaptation se fit au prix d'un grand nombre de morts¹⁰, et on peut vivre sans manger de poisson. Alors que le manque d'eau ne peut conduire qu'à l'exode. A-t-on imaginé les recompositions territoriales qui risquent ainsi de se dessiner à l'horizon 2030, ou bien continue-t-on à croire qu'on dessalera l'eau de mer pour les populations privées d'eau douce ? Et dans ce dernier cas, saura-t-on mieux en rendre la distribution équitable ?

Conclusion

Depuis que l'inquiétude à propos de la ressource a commencé à gagner le monde, on ne cesse de répéter que l'eau est au cœur de multiples enjeux de nature géopolitique. Certains, à défaut d'avoir trouvé des réponses, ont été bien identifiés, comme la nécessité d'assurer à chacun des six milliards d'humains un accès « aisé et durable »¹¹ à l'eau potable. D'autres font l'objet d'une vigilance toute particulière de la part de la communauté internationale, comme les conflits potentiels pouvant naître entre deux pays qui se disputent une ressource trop rare.

Mais les risques les plus graves semblent passer inaperçus, en tout cas de ceux qui, en bas de l'échelle sociale, sont les plus menacés : il s'agit du choix, par les pays à la fois pauvres et menacés de « stress hydrique », d'activités économiques grosses consommatrices d'eau. Et il n'y a pas d'issue, sauf à imaginer que la gouvernance mondiale puisse disposer des moyens de commettre une ingérence économique d'un type nouveau.

⁹ L'OMT avance des chiffres de recettes pour 2003 dépassant 5 milliards de dollars pour l'Egypte et 1,5 milliard de dollars pour la Tunisie.

¹⁰ Et, dit-on, de la décadence de la « civilisation » romaine.

¹¹ Selon l'expression utilisée pour les Objectifs de Développement pour le Millénaire.

Mais le fossé des inégalités ne sera pas pour autant comblé. Ainsi pourrait-on conclure que le double titre de ce Colloque pourrait, hélas, être interverti et devenir « pauvreté sociale et crises hydrauliques » sans être dénaturé.

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International Colloquium

**Water poverty and social crisis
Perspectives for research and action**

Agadir, Morocco.
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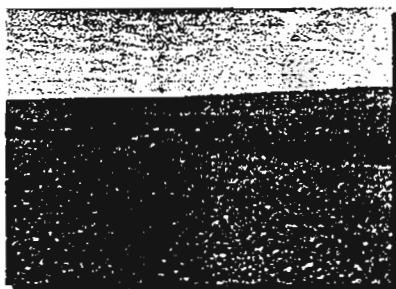
**Water Poverty in Australia: an evaluative account of its impact
on the poor.**

**Janice Gray
Faculty of Law
University of New South Wales
Sydney
Australia**

Hand-feeding sheep in western New South Wales during the extended drought in Queensland and New South Wales during the 1990s

(photo c/o the Fairfax Photo Library). Taken from:

<http://www.bom.gov.au/lam/climate/levelthree/c20thc/drought.htm>



*Denuded earth and dry watercourses during drought near
Gunnedah, in the normally well-watered Namoi Valley region
of New South Wales (photo courtesy of the NSW Dept of
Land and Water Conservation). Taken from*

<http://www.bom.gov.au/lam/climate/levelthree/c20thc/drought.htm>

Water Poverty in Australia: an evaluative account of its impact on the poor.

JANICE GRAY¹

Introduction

Coleridge's well known words from the *Ancient Mariner*, 'Water, water, everywhere/ nor a drop to drink' have strong resonances for Australia which is an island country and, by definition, surrounded by undrinkable sea water.² The bulk of Australia's population is huddled into a belt of arable land on the coastal perimeter of the nation, while its vast dry inland area remains only sparsely populated.

Australia is, on many indicators, a rich nation. It is highly industrialised. It runs a national public hospital system and offers partially subsidised medical treatment through its national health care scheme.³ Free schooling is available and school attendance is compulsory for children aged between five and fourteen (approx).⁴ Many people have internet connections in their homes and mobile phone ownership is amongst the highest in the world. A means-tested old-age pension scheme operates for people over 65 years of age and there is a social security system (although in more recent years it has been cut-back significantly) for the unemployed.⁵ Australia's wealth, measured in terms of its gross national income is high.⁶ Yet, in other ways Australia is poor.⁷ It is poor in the sense that some members of society live below the poverty line, as ascertained by the Henderson Report, 1973 (and seasonally adjusted).⁸ It is arguably poor in spirit; a poverty that is reflected, in the federal government's approach towards refugees, who are held in detention centres for long periods.⁹ It is also water-poor, perhaps not by the standards of some dry, developing countries, but 'water-poor', nevertheless.

The following paper seeks to highlight the water problem in Australia and accordingly discusses the means by which governments and policy-makers have sought to overcome that problem. The paper deals with 'water poverty' in two senses; (1) the impoverished or depleted nature of the resource itself and; (2) the effect on the poor amongst others, of water policies and management. It is perhaps worth noting at this point that in the Australian context, poverty is generally understood in terms of relative poverty meaning, 'to be forced to live on the margins of society, to be excluded from the normal spheres of consumption and activity which together define social participation and normal identity.'¹⁰ This is in contradistinction to absolute poverty which involves insufficient food, shelter and clothing to sustain life.

The dawning realisation that water availability is finite and that Australia needs to rethink its approach to water management is attributable to the work and ideas of a range of individuals and groups including environmentalists, irrigators, scientists, academics, lawyers, farmers, economists, Indigenous groups and political scientists to name but a few. Any reform package which earnestly tried to address water issues would need to consider and/or incorporate the perspectives of such people and accordingly would contain legal changes, policy development, scientific research and education programs, for example. However, the focus of this paper is largely limited to a discussion of legal and policy-oriented considerations.

The paper falls into three main sections. The first highlights some key aspects of the water *problem* in Australia generally but emphasises the New South Wales (NSW) position more particularly. It addresses issues including: high levels of consumption; drought; faulty infrastructure; environmental degradation and population growth.

The paper then turns to consideration of various attempts to *manage* the water problem, including the introduction of desalination plants, water pricing, and the trading of WALs. Throughout the paper there is reference to both rural and urban water issues and in regard to rural water, consideration is given to the issue of commodification and the establishment of a partial water market, as a tool of regulation, Australia having recently followed the lead of other countries such as Chile, in this area. The *Water Management Act* (NSW) 2000 is used as an example of legislation creating the preconditions for trade and the establishment of what is tradeable. In the third part of the paper, an evaluation of the *impact* of these so-called solutions is offered and particular reference is made to how the solutions could impact on the poor. In that regard, the paper considers the pricing regime recently announced by the national regulator, the Independent Pricing and Regulatory Tribunal (IPART) as well as the effects of commodification on the poor and the likelihood of it contributing to the rural poverty trap.

In short, the paper aims to examine the proposition that although Australia is seen as a wealthy nation, its water management has been poor, with inadequate attention having been devoted to long term demands on the water supply. In particular, attention is drawn to the fact that for the last 20 years or so the Sydney region has experienced a demand for water which has exceeded the estimated long term supply from existing infrastructure. This situation has been exacerbated by drought conditions which have lowered water levels in supply storage. The consequences of these problems viewed cumulatively, are potentially severe at both the physical and social levels and they impact most harshly on the poor.¹¹

Part 1: Australia's water problem

Australia's water problem is multi-faceted. The following section spells out some of the reasons for the water problem.

High levels of consumption

Water, along with air, is essential to human existence. It is also a finite resource. Yet, historically, in Australia, water has been used as though it were not a limited resource. This is particularly pertinent given that (with the exception of Antarctica) Australia is the driest continent in the world. Yet, its people seem to have ignored this fact and have been great consumers of water, using more than one million litres of freshwater per person each year or about 24,000 giganlitres.¹² Indeed urban Australians wash themselves, hose their gardens, launder their clothes and flush their toilets with an increasingly rare resource: high standard potable water. In 2004, Sydney was using 106% of the annual sustainable yield of its water supplies; an amount which was/is clearly not sustainable.¹³

Rural water consumption is worse. It tends to far outstrip urban consumption. This is partly explained by irrigated cropping in some rural areas but the consumption rates of rural residents in their homes and gardens is also considerably higher than that of urban residents.¹⁴

Until very recently little thought had been given to how future generations would manage when supplies of water became depleted.¹⁵ That time of scarcity has now arrived and the high levels of fresh water with which modern Australian city dwellers have become familiar, are vastly reduced. Further, widespread drought in rural areas along with poor water management policies and practices have meant that rural dwellers and city dwellers who rely on the production from rural areas, are now feeling the effect of a water crisis.

Drought

Another contributing factor to the present water crisis is drought.¹⁶ Drought has ravaged much of Australia over the last decade and images of cracked earth, dried river beds and skeletal remains of dying animals along with destitute farmers whose livelihoods have been wrecked by poor yields, is a common image both in the media and more generally in the Australian psyche.¹⁷ The cause of the drought is somewhat uncertain but there is some scientific evidence to suggest that it is related to global warming.¹⁸ However, it should be noted that Australia experienced drought long before global warming was a recognised problem.

The reality is that many dams throughout the nation are at critically low levels and have insufficient water to service communities adequately in the mid term. For example, in October, 2005 the main dam that supplies 80% of Sydney's water was only 39.1% full.¹⁹ It has been noted that Sydney is 'within two years of being at an all-time low, where water would literally only be available for drinking.'²⁰

In Western Australia, there has been a 15% drop in rainfall which it has been suggested is being replicated along the eastern coast.²¹ The Commonwealth Scientific and Industrial Research Office (CSIRO) projections which extend to approximately the year 2070 suggest that the area from Perth through to about Sydney will suffer a 40% decrease in its rainfall. Indeed, if the CSIRO rainfall predictions are correct, in 2070 Adelaide will be situated in a 12-14 inch rainfall zone. No other Australian city of Adelaide's size exists in such a limited rainfall zone for the good reason that there would be insufficient resources to sustain it.²²

The present pattern of reduced rainfall, resulting in drought, has meant that many farmers have had to 'buy in' water and have suffered huge stock loss or crop failure. The effect of drought financially, domestically and emotionally has been painful for many and it is irrefutable that drought has meant severely decreased water availability, particularly in rural areas.²³

Yet, whether or not drought should be seen as an aberration rather than a normal part of Australia's climate pattern is a moot point.²⁴ There is a growing awareness that the better way to approach drought is to acknowledge that it has been a regular visitor to the Australian landscape and that land and water management policies need to take account of the fact that it will come again and again. Hence, water/drought management needs to be seen as a long term rather than short term project and consequently Australians need to change land and water management practices so that they are prepared for times, in the future, when water will be in short supply again.²⁵ Ultimately, it will be unsatisfactory to deal with the present water crisis simply in terms of a response to the present drought.

Faulty infrastructure

Faulty infrastructure including very old, cracked and broken pipes is another of New South Wales's water problems. In order to appreciate the magnitude of Sydney's faulty infrastructure it is useful to understand how water is supplied to that city.²⁶

The supply of water comes from 16,000 square metres of catchments which contain nine major dams and seven reservoirs. The dams and reservoirs have a collective storage capacity of 2,400,000 million litres (megalitres).²⁷ There are also 11 processing plants, 165 pumping stations, 261 service reservoirs and around 20,000 kilometres of piping which supplies about 1,500 megalitres of water a day throughout Sydney, the Blue Mountains, and the Illawarra.²⁸ Since 1996, all of Sydney's drinking water has been artificially filtered before it has been distributed.²⁹ This complex and large water supply system has been augmented by an extensive sewerage and drainage works.³⁰

Faulty equipment has been found to exist in Sydney Water's network of piping which carries water to and from Sydney properties.³¹ Decayed infrastructure has, therefore, been cited as both a cause of the water shortage in Sydney and a manifestation of the water problems that beset the country. Few resources have been devoted to the maintenance and replacement of Sydney's water infrastructure over many years, with the result that large water losses have occurred. The leakage is calculated to be a little less than 10% of Sydney Water's water.³² According to media reports some pipes have been leaking up to 1,000 litres a day for five years. Put another way, more than 144 Olympic-sized swimming pools of drinking water is being wasted each year because of leaky pipes in NSW.³³ Of the leakages in Sydney, a spokesperson for the relevant trade union, the Australian Services Union, has claimed that staff reductions have contributed to an increase in faulty infrastructure, leading to leakages. The spokesperson noted that the number of maintenance workers employed by Sydney Water has been halved in the past five years.³⁴

It is notable that Sydney Water's Operating Licence (para 9.2.1) requires that Sydney Water give 'due consideration to demand side management as the basis for planning the future provision of its Services, including addressing Water Leakage'. Further, para 9.2.3 (h) of the same instrument requires Sydney Water 'identify strategies for reducing water leakage.' These obligations are mandatory rather than optional but they fall short of requiring that leakages are actually fixed, presumably because repairing has cost implications.

It is improbable that the water loss associated with these leakages would alone account for the water crisis in Sydney but as other sources have noted '[a]s water restrictions bite in many Australian cities and towns, the fact that the chief wasters of water are the supply companies is not sitting well with consumers.'³⁵

Environmental degradation

High levels of water consumption in rural areas, particularly consumption associated with irrigation schemes and the production of water heavy crops, such as cotton, have also contributed to the water problem in Australia. So, too, has the fact that some land in Australia deemed totally unsuitable for agriculture, was opened up for that very purpose, despite warnings dating back to the 1860s, when experts such as George Goyder, Surveyor General of South Australia, tried to prevent agricultural expansion into land with no or very low rainfall.³⁶

Today, it has become increasingly obvious that Goyder's approach was prudent. Some parts of the Australian landscape simply cannot readily sustain the kinds of (agricultural) activities being undertaken on them. Where the land does not support the agricultural pursuit in question resultant hardship is commonly experienced by farmers in terms of crop failure and high personal cost³⁷, yet there remains a reticence on the part of many farmers to leave the land because of its water-poor status.³⁸ This lack of willingness to leave is related to a range of reasons including struggles for better compensation packages and emotional ties to the land. Yet continuing to maintain agricultural

industries on unsuitable land involves heavy investment in expensive agricultural systems and/or reliance on irrigation schemes, both of which are questionable in terms of their environmental sustainability.³⁹

Where there is dependence on the diversion of water, via irrigation schemes, from rivers and streams, to land without direct access to water, the alteration of ecosystems generally occurs. With the development of floodplains (eg along the Murray Darling river systems)⁴⁰ has come the loss of a natural treatment works to filter out pollutants from reaching the inland river systems. Biological life is also unable to be nurtured in the rich alluvial soils of the floodplain and scientific analysis has revealed that such changes may have severe consequences.⁴¹ The Australian eco-system therefore faces threats, to soil, water, atmosphere and biodiversity, all of which are interlinked.⁴²

Associated with a reliance on irrigation and the development of flood plains is the problem of increased salinity levels. In order to remove the salt, bore pumps, which pump out large volumes of salt every day (and use a lot of electricity) have been placed along the Murray River. Without this intervention the Murray River would be unusable for between two to four months per year⁴³ and the South Australian towns which are totally dependent on the Murray River would not survive. Adelaide, which usually takes 40% of its water from the Murray River, may in drought times, become 100% water-dependent on the Murray.⁴⁴ In this context, a solution to the problem of high salinity levels has become urgent and the fact that it has not been found yet, poses very real questions about the long term viability of cities such as Adelaide.⁴⁵

Population growth

Yet another reason for the water problem in large urban areas of Australia, such as Sydney, is population growth. Sydney's population is presently about four million people. That figure is expected to grow by one million people over the next 25 years. It has been calculated that 'if consumption remains at current levels and nothing is done to reduce demand, an extra 200 billion litres of water will be needed each year within 25 years.'⁴⁶ Although growth in Sydney's population is likely to be higher than in other state capitals or rural areas, Australia's population outside Sydney also looks set to increase. The growth in population has already exacerbated an overburdened water system.

In September, 2005 the NSW Auditor General found the State Government had failed to secure Sydney's water supply against both the effects of climate change and increased population.⁴⁷

Part 2: Attempts to manage the water problem

Policies and initiatives which attempt to solve the water crisis have been developed at Federal, State and local levels. At the national level, the National Water Initiative (NWI) signed in June, 2004 takes a whole-of-country approach. Its objective is 'the development of: a nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes'.⁴⁸

At the large city level, plans have also been developed. For example, the plan for Sydney's water management over the next twenty five years is contained in a policy document known as, *Meeting the challenges- Securing Sydney's water future*, which was released by the NSW government in October, 2004. It noted that 'if no further demand management strategies were introduced, and low runoff into dams continued, Sydney would have approximately three and a half years of water storage left before it ran out'.⁴⁹ At the more local rural level, water management and sharing plans have been developed, mainly relative to water catchment areas. These plans are localised and must be in compliance with the *Water Management Act* (NSW) 2000.

Solutions, which are catalogued below, include: water restrictions, the subsidisation of water- saving devices to reduce consumption, water transfers from the Shoalhaven River; large scale recycling plants; desalination plants, new pricing regimes, and the commodification of some water entitlements.

Water restrictions

One approach to reducing water consumption has been to implement mandatory water restrictions. This has been done in all state capital cities except Darwin. In Sydney, water restrictions were introduced on 1 October, 2001 and they have been progressively increased. The restrictions prevent hand-held hosing of lawns and gardens, except at restricted

times on two days a week. They also prohibit the hosing of all hard surfaces and cars except where exemptions apply. Remarkably, the restrictions do not limit use of bore water by Sydneysiders.

Subsidisation of water saving devices

Sydney Water has introduced a number of subsidies for water saving devices designed to help reduce consumption. These included aerated shower-heads and water tanks with a capacity of 2000 litres or more.

Transferring water from the Shoalhaven River

This project represents an attempt to focus on Sydney's water problem not by reducing consumption, but rather by increasing the supply of water to Sydney. It involves transferring water from the Tallowa Dam, in the Shoalhaven region south of Sydney, by virtue of a purpose-built pipeline, up to Sydney's Warragamba Dam. The project will involve significant expenditure on new pumps. Stage 1 is set to commence in 2007 and is estimated to cost \$250 million. It has the potential to provide between 50-80 billion litres of water when completed in 2009. Stage 2 is not expected to commence until 2012. It is estimated that it will cost \$430 million and will provide a potential increase in water of up to 110 billion litres.⁵⁰

Large scale re-cycling programs

Recycling of waste water into re-usable water is a popular water management tool in several parts of the world. In Australia, an effective recycling scheme presently operates in Rouse Hill, in the north west of Sydney, but it is relatively small scale. Fifteen thousand homes use recycled water from the Rouse Hill Sewerage Plant and on average the scheme is saving 35% of drinking water per household.⁵¹ The NSW government plans to expand such a scheme into new land release areas linking those areas by pipe to an existing treatment plant. Treated waste would then be pumped into the new release areas to be used for non-drinking purposes. The cost of such a scheme is calculated to be \$563 million while the amount of water saved per year would be approximately 24 billion litres.⁵²

Desalination Plants

In response to the water problem in Sydney, in July 2005, the state government announced a plan to build a large desalination plant at Kurnell.⁵³ Desalination plants have gained popularity in other parts of the world and already operate or are planned in Algeria, Singapore, England (London), United Arab Emirates, Spain, Ashkelon, and Israel.⁵⁴

Air filtration

Air filtration machines provide another method of increasing the water supply. Whereas desalination takes the salt out of sea water, an air filtration machine takes the moisture out of air, filters it extensively and even chills it if required. One firm responsible for a machine of this type has already supplied large versions to the Israeli and American militaries and; to the Sri-Lankan and Thai governments in the post tsunami period.⁵⁵

Pricing

According to economists and policy makers one of the key methods of addressing high levels of water consumption is through an increase in the price of water. Such a view can be traced back, at least as far as 1994, when the Council of Australian Governments (COAG) accepted a report known as the National Water Framework. The Framework affirmed principles which related to water allocation, water trading, environmental considerations, public involvement in water management as well as water pricing. COAG agreed to the development of 'a strategic framework to achieve an efficient and sustainable water industry'⁵⁶ and significantly, the Framework supported a shift away from property-based pricing to full price recovery for water based on consumption as well as the rejection of cross subsidies.⁵⁷ Some decade later, in October, 2004, the NSW government released its Metropolitan Water Plan for Sydney.⁵⁸ That plan had implications for pricing (in part because it involved expenditure on infrastructure as well as demand control) and accordingly the NSW government requested the Independent Pricing and Regulatory Tribunal (IPART) provide assistance in the development of new pricing principles for the Greater Sydney Region. It was hoped that a new model would assist Sydney Water to achieve a sustainable outcome.⁵⁹ Some of the pricing issues dealt with by IPART, such as 'infrastructure access' pricing, which is relevant to competitors wishing to access Sydney Water's infrastructure, is again beyond the scope of this paper. This paper only considers 'customer supply' pricing.

Trading

The COAG Framework of 1994 supported the introduction of a partial water market as a means of achieving a better balance between efficiency and environmental objectives. Accordingly the COAG principle of clear and tradeable allocations,⁶⁰ which were separate from land title,⁶¹ was incorporated into the *Water Management Act* (NSW) 2000 (*WMA*).⁶² The Act has implications for the supply of water to retailers such as Sydney Water but it is more focused on issues that relate to rural water management.

While entitlements to water remained tied to ownership of land, it was very difficult (although not impossible) to trade in them.⁶³ By effectively doing away with riparian rights, which were derivative of rights in land, and by creating Water Access Licences (WALs), the *WMA* established some of the legal pre-conditions for trade. As WALs may exist independently of land ownership, they can potentially be traded without a simultaneous trade of rights in land.

As such the *WMA* permits the trading of entitlements to access regulated surface water rather than the trading of the resource itself. A WAL is comprised of a share component and an extraction component both of which are tradeable. The share component provides the holder with a specified share in the available water within a specified management area or water source⁶⁴ while the extraction component is what allows the holder to take water at specified rates or in specified circumstances, for example between 1 February and 30 June in any given year from River X. It is possible to trade WALs permanently or to effect a term transfer which is not unlike a lease.⁶⁵ Water allocations are themselves assignable (pursuant to s 71T of the *WMA*). Notably a WAL does not permit the holder to use the water to which s/he has access. For that, a separate Water Use Approval must be granted. Unlike WALs, Water Use Approvals are still tied to the land.

At this stage a Register exists recording the entitlements of holders but as insufficient checking has been done on the veracity of the entries, there is no governmental move afoot to cause registration to give rise to indefeasibility, whereby the title of the holder would be conclusive.

Part 3: Evaluation of the solutions to the water problem

This section offers an evaluation of the impact (with particular reference to the poor) of the suggested solutions to water problems.

Water restrictions

One of the main criticisms of Sydney's water restrictions is that they are somewhat narrow in their ambit in that they do not limit water use for the purposes of showering, bathing and laundering.⁶⁶

Enforcement of the restrictions has proved difficult to implement. Officers in patrol cars try to locate offenders but much illicit water use goes on in back yards and away from public view. Apprehensions are largely dependent on neighbours reporting breaches. (Between November, 2003 and 11 October, 2005, 3,262 penalties notices for water restriction offences were issued.)⁶⁷ Arguably the fines for breach of the water restrictions are insufficiently high (\$A220 for individuals and \$550 for corporations) if they are to act as a deterrent to consumption. It is estimated that the present mandatory water restrictions in Sydney save 63 GL per year.⁶⁸

It would seem somewhat cavalier not to apply restrictions to aquifers as well. Although water from aquifers within the Sydney region is not regarded as potable, it is still an important source of water for purposes other than drinking. Further, the plan of the NSW government to sink bores to augment the existing dam supply also seems somewhat ill-founded given that there is no existing inventory detailing the amount of water held in the state's aquifers.⁶⁹ It could perhaps be seen as imprudent to siphon off water from these underground supplies as though they contained an infinite amount of available water. Such an approach was taken with regard to river water and the effect of that is, in part, what we are dealing with today.

Subsidisation of water saving devices

Media reports indicate that the take-up rate on aerated shower heads is not high because they provide a low pressure flow which is unpopular.⁷⁰ It is also notable that such devices have not been provided to public housing residents free of charge. If the NSW government were keen both to reduce domestic consumption and to protect low income earners in public housing, from increased water use costs, the free installation of such water saving devices would be considered.

In regard to water tanks the figures demonstrate that the number of water tanks being installed in Sydney's residential properties has increased but unfortunately there is no corollary in terms of reduced water consumption of Sydney Water-supplied water.⁷¹ This initiative has not yet had the desired outcome.

Transferring Water from the Shoalhaven

This project involves very expensive infrastructure expenditure; expenditure which would place a heavy burden on State resources and at the same time result in environmental damage in the form of increased salinity and pollution levels caused by pipe laying.⁷² Hence while the transfer of water from the Shoalhaven to Sydney is a possible (partial) solution to Sydney's water problem its overall effectiveness is questionable. The 'solution' has also offended people in the Shoalhaven who feel 'their' resource is being robbed.

Recycling Schemes

Recycling schemes have appeal in that they do not contribute to the depletion of water. Yet, if they are to be used in older, more established areas of Sydney access to existing Sydney Water pipework would need to be made available to those operating the re-cycling schemes or otherwise the schemes would be too expensive to implement. Resistance by Sydney Water to applications by Services Sydney, a competitor in the waste industry, to access Sydney Water's pipe work and sewers has led to a ruling by the National Competition Council that Sydney's sewers should be opened up to private competition. Government failed to respond to the ruling so the matter was referred to the Australian Competition Tribunal.⁷³

Some Sydney residents have also expressed reticence about drinking recycled sewerage water (known as the 'yuck factor') but there is much support for recycling schemes among environmentalists. The Total Environment Centre has gone as far as suggesting a scheme whereby water would be recycled from the Western Sydney Sewerage Treatment Plants and then fed back into the Warragamba Dam or Prospect Reservoir for dilution before further processing at the Prospect Water Filtration Plant. The benefit of this could be great. It is estimated that the total contribution of permanent water restrictions *and* recycling under such a proposal would be 75GL per year.⁷⁴

As there is convincing evidence that processes such as reverse osmosis, microfiltration, and ultraviolet disinfection can produce high quality water and the risk of drinking recycled water which has been treated by these methods is significantly lower than the acceptable risk involved in drinking potable water it would seem worthwhile to pursue such initiatives.⁷⁵ Several other jurisdictions, such as Orange County, California,⁷⁶ Singapore⁷⁷ and Bendigo, Victoria⁷⁸ have either implemented or are considering implementing recycling schemes.

Much expert opinion emphasises that recycling is a more economically sensible option than the use of desalination plants.⁷⁹ However, a recent report commissioned by the NWI, suggests that many stakeholders do not share this view. It claims that the cost of water to users, the lack of financial incentives of water authorities to encourage recycling projects, investment risk and uncertain demand are seen as impediments to investment in water recycling.⁸⁰ Further, over 43% of respondents believed that the issue of legal liability was 'very significant' as a deterrent to investment in recycled water schemes.⁸¹ Although, fear of litigation based on the knowledge that water authorities may be sued in negligence for a failure to take reasonable care to prevent foreseeable harm (where water is not of an appropriate quality or monitoring arrangements are deemed inadequate)⁸² may exist, that fear should not be used to remove the water authorities' (and others') liability. Those tortious legal safeguards are in place, for good reason. They are designed to protect citizens from wrongs and to provide recompense to them where wrongs are committed. Such laws have important ethical underpinnings and the solution, therefore, is not to reduce the liability of water authorities (public or private), so as to encourage investment in water recycling plants (and ultimately profit acquisition by the shareholders of the corporations that invest). Cutting back on tortious liability (via statute or contract) and causing the supplier only to be responsible for a minimum standard, is not a beneficial step. To explain, NSW confronted a version of this problem, when in 1998 *Cryptosporidium* and *Giardia* contaminated Sydney's water supply. Water from the privatised Prospect treatment plant was probably the source of the problem but the company which built and operated the plant (Australian Water Services) denied all responsibility because its contract did not require that it test for *Cryptosporidium* or *Giardia*. Fortunately, there were no fatalities but government issued warnings to Sydney residents to boil water for several weeks. If a similar problem occurred in the context of a recycling plant and the victim was unable to sue in tort, on the basis of the investor's limited liability, the consequences could result in very serious health outcomes. The poor would suffer most because they would have no tortfeasor against whom they could claim; they

would be less able to pay for appropriate medical treatment and; they would be more affected by work absences if they happened to be in some form of employment.⁸³

Desalination Plants

Disputing the claims that a large desalination plant is excessively expensive, the NSW government plans to build such a plant at Kurnell, in Sydney. This scheme would appear to be ill-founded. Apparently the plant would use high levels of electricity which will lead to an increase in fossil fuel consumption and a resultant increase in greenhouse gas emissions; greenhouse gas emissions having been blamed for global warming, which in turn, arguably increases the likelihood of drought, one of the contributors to Australia's water problem in the first place. The process is cyclical and rather than helping solve the water problem desalination plants may lead to an exacerbation of it. This would result in negative consequences for all, but again the poor would be the most severely affected because they could not afford simply to pay increased prices for an even more in-demand resource.

Another impact of *any* planned construction is that it may interfere with the rights of other parties. In Perth, Western Australia this was the case. There, a plan for a proposed \$A387 million desalination plant conflicted with the interest of the Nyungah Council of Elders, a local Perth Aboriginal Group. Consequently, the Elders sought emergency protection for Cockburn Sound and the surrounding sand dunes (the site of the proposed plant) by lodging an application, under s 9 of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*. The Minister for the Environment and Heritage, rejected it saying that he was not convinced that the plant posed 'a serious and immediate threat' to the area's Indigenous heritage.⁸⁴ Therefore, the plan for a desalination plant in this part of the country remains on foot but it may be derailed if another application, by the same group, under s 10 of the Act, seeking long term protection of the area, is successful.

Air filtration

Air filtration machines may well take pressure off Australian dams and used in combination with other water saving or water increasing strategies could help alleviate the water crisis. In homes where residents presently use three 15-litre bottles of water per week, an air filtration machine would pay for itself in a year. That makes these machines viable options for many middle class homes. Should they be embraced in offices and middle class homes presumably there would be more water left in the consumptive pool (provided by surface and groundwater sources) for those unable to afford to buy such a machine.⁸⁵ Alternatively and/or additionally such machines could be incorporated into public housing developments either free of charge or on the basis of a generous subsidy.

That these machines are mobile is also an advantage to people in remote areas. For example, the solar versions could be taken to remote Aboriginal communities and as the sun and air (the resources on which they rely) have not, as yet, been commodified, the machines would have very low running costs.⁸⁶ Further, as the NSW Departments of Health and Aboriginal Affairs are presently working on an Aboriginal Community Water and Sewerage Project to set up community based infrastructures in remote Aboriginal communities (such as Wilmoringle) where there is only a discrete (non-town) water supply, machines such as these could prove a great asset in relieving water poverty as some can produce in excess of 50 litres per day.

Water Pricing

In considering the impact of a new pricing scheme, it is useful to begin with the issue of 'postage stamp' pricing. To explain, traditionally the customer supply pricing system used in Sydney has not reflected the cost of supplying water to a particular location although some locations are more difficult to supply than others. Instead, prices have been calculated on the average cost of supply so that there has been uniformity of pricing across the city. This approach is sometimes called 'postage-stamp pricing'.⁸⁷ Postage stamp pricing is likely to lead to horizontal and geographic equity across the Sydney region making targeted subsidies for the less privileged either unnecessary or fewer.⁸⁸

Alternatives to postage stamp pricing involve fully cost-reflective pricing; a form of pricing rejected by the Public Interest Advocacy Centre (PIAC) in its submission to IPART on water and wastewater but favoured in the COAG framework.⁸⁹ PIAC claimed that postage stamp pricing represented a better option because it 'delivers social benefits at both [a] retail and ...network level [and] [t]here is social benefit in having everyone entitled to the same level of access and affordability in water and wastewater services'. In having come to a decision in favour of uniform pricing it would seem that IPART heeded arguments based on social equity concerns such as these. This is a positive outcome of the new pricing structure.

In designing a new pricing regime IPART had to consider several options including differential pricing, flat rate pricing and two tiered (ie 'inclining block') pricing, with or without add-ons such as service charges. From a social justice perspective flat rate pricing, which charged the rich as much as the poor, is a less than appealing alternative once it is recognised that all people (whether rich or poor) require a core amount of water for drinking and hygiene. Such an option also would not effectively penalise the better off who could continue to be water-wasteful as long as they paid for their excessive usage. Fortunately, IPART did not opt for such a pricing option. Instead it chose a two tier scheme with a lower first tier charge followed by a higher second tier charge for consumption above the base amount. The final scheme also includes a relatively low fixed service charge per annum which will be used to collect the balance of Sydney Water's revenue requirements. The viability of the option for those less well-off will, in part, depend on the actual price determinations made, from time to time, by IPART. They need to remain within the reach of the poor if they are to serve the community well.⁹⁰

One benefit of this option is that it targets discretionary users, ie those people who use extra water in a wasteful manner, to hose gardens, wash cars and hard surfaces. One notable drawback is that it does not cap water use at a maximum level. Without such a cap the effect could be that revenue is raised for Sydney Water (by heavy use) but consumption is not reduced as much as is desirable. Put simply, those well off could continue to use high levels of water and simply pay for it. How 'vulnerable customers' will be affected by the new pricing regime is somewhat uncertain.

Interestingly IPART acknowledged that when developing its new pricing structure it did not have in mind the objective of avoiding price increases altogether for vulnerable customers.⁹¹ It claimed that if the number of vulnerable customers, who were forced to pay more under the new pricing scheme, were sufficiently low, Sydney Water could offer rebates for large households. Yet, experience demonstrates that rebate schemes are necessarily clumsy, requiring high levels of bureaucratic support and burdensome for those who have to comply with them. Further, in its projections on how the new pricing system will affect vulnerable customers, IPART classified vulnerable customers on the basis of (a) low household incomes and/or (b) a large household. It estimated 'a reasonably efficient volume of water use' for these customers. If those facing difficulty in paying increased charges were also not using water 'efficiently' (and according to IPART's calculation were not therefore categorised as 'vulnerable') they would be ineligible for the rebate. Given that IPART's methodology for deciding on vulnerability does not appear to have factored in water consumption beyond what was considered 'efficient,' one wonders how reliable IPART's categorisation is in cases involving illness or nursing of the sick or where damaged plumbing in substandard rental accommodation causes higher than efficient water consumption.

Whether these new prices will have the effect of reducing water consumption will also depend on the broader issue of the price elasticity of demand (PED). If the price elasticity of water proves high then small increases in price will cause large decreases in water consumption. The art is in knowing where water pricing in Australia sits on the elasticity/inelasticity continuum. This is a new venture for Australia and so there is little experience on which to rely. Further, overseas experience is not culturally, geographically and climatically directly comparable.

An alternative approach to regulating water use through pricing would be the introduction of a scheme reflective of the 'carbon credits' scheme that operates in regard to pollution. Already there is discussion of how the carbon credit scheme could be down-scaled and made operational for individuals, with individuals being given a personal carbon credit in which they could trade. Perhaps such a personalised scheme would be transferable to the water context so that individuals were given a specified number of water credits. However, it is anticipated that serious outcomes would arise if the poor sold off their water credits, leaving themselves unable to sustain life. Such a scheme, if it were to come into operation would need to ensure that trading in water credits was restricted to credits above a specified level; that level marking the minimum amount of water an individual needed for health, hygiene and basic enjoyment of life.⁹²

Trading

The *WMA* is the tool by which trading of water entitlements, in NSW, has been effected. The objectives of the *WMA* are inclusive of many stakeholder perspectives and in so being they are potentially inconsistent. Whilst they amplify the key COAG platforms of environmental sustainability on one hand and economic efficiency on the other, they also import the tensions inherent in those two divergent goals. To explain, if there is a limited consumptive pool, the water for environmental flows is in competition with the water for trading. On at least one occasion so far this tension has

been resolved in favour of trade, with the relevant Minister reducing environmental flows. Environmentalists argue, with some force, that there is no point ensuring trade if there is nothing left to trade in.

Another effect of the introduction of the *WMA*, as a tool of water management, has been the highlighting of the uncertain nature of the right being traded. Even if it were conceded (which it is not) that trading assisted water management, such uncertainty cannot aid the development of a strong water market. Traders need to know exactly 'what' it is that they are trading. Although WALs look to have many of the indicia of real property, the drafters of the legislation have assiduously avoided classifying WALs as property rights; a property right being a right enforceable against all of the world⁹³ as opposed to a contractual right which is only enforceable between the parties to the contract. Perhaps this resistance to classifying a WAL as real or personal property may, in fact, be prudent. Ultimately, it may be better to recognise water entitlements as being special and therefore the subject of either a new form of property or alternatively as a *sui generis* right.⁹⁴

Nevertheless, we have seen an increase in trade, both temporary and permanent, particularly in the Murray Darling basin, for example, where irrigators are continuously moving water from one activity to another.⁹⁵ Craik, has noted that 'commodity markets are competitive, fluctuating and global. The speed of change in supply, demand, technology and evolution of substitute goods are [sic] increasing. Water is just one of a range of input costs which are [sic] highly variable from one season to the next. Irrigation dependent industries need maximum flexibility to compete and adjust'.⁹⁶

Inherent in these words is a strong commitment to water trading as a means of protecting the resource itself and simultaneously maintaining an efficient system of supply. This approach reflects the view that water is a product like any other. Yet whether privatisation and commodification is in fact, the answer to the water problem is a moot point. The view is open that there is perhaps something different or special in the nature of water which suggests that it should remain outside the sphere of privatisation. It is, as noted earlier, essential to human existence or put more strongly, it is 'one of the few universal, non-negotiable, non-contestable realities of life that no person, plant pet household, neighbourhood, suburb, town city or country can be secure without a reliable supply of fresh water'.⁹⁷ Indeed the great economist, Adam Smith, did not see the supply of water as an ordinary branch of commerce but rather by reference to the 'Public Works and Institutions which are necessary for facilitating particular Branches of Commerce'.⁹⁸ To Adam Smith, the provision of water was not purely a function of commerce but was part of the infrastructure that helped support commerce. In that sense it was a pre-condition to commerce.⁹⁹ Such a conclusion raises the issue of whether water should, therefore, be treated differently, by virtue of the fact that it is not simply a product. Water is like air, ie special. Yet running counter to this argument is the proposition that water is no different from food, in that food is needed to sustain life but we accept food's commodification without question.

Craik could be correct in her observations about commodification and trade serving the needs of larger scale irrigation-dependent industry and providing it with the flexibility it desires to buy in entitlements in times of need, but one is left wondering how effective water trading is for small scale holders of water entitlements? Perhaps they are less well served by the move to allow the market to determine efficiencies. One worries that in times of desperate need these small-scale holders will sell off their WALs and be left with dry-lots which not only become unproductive but also lose the value they once had to act as security for loans etc. If these outcomes occur it is possible that the market approach to selling off water access entitlements may contribute to the rural poverty trap and cause greater burdens including those on individuals, as well as the social security and health systems, for example.

Trading and Indigenous Australians

In reflecting on the effects that water solutions such as trading have on the poor, it is important to consider the position of Indigenous/Aboriginal Australians. They are some of the poorest members of the community and experience significantly higher levels of unemployment compared with non Indigenous Australians. They are less well qualified in terms of school and vocational training.¹⁰⁰ They are also under-represented in tertiary education.¹⁰¹ They do not exhibit high levels of home ownership and are more likely to live in social/public housing, often in overcrowded conditions.¹⁰² It is notable that many Indigenous Australians reside in temporary accommodation and where they do reside in permanent accommodation, the dwellings are often in a seriously poor state of repair.¹⁰³ Further, Indigenous Australians present with more health problems than non Indigenous Australians and are also more susceptible to environmental and behavioural health risk factors because of their relative socio-economic disadvantage.¹⁰⁴ The life expectancy of an Indigenous Australian is 20 years less than that of a non Indigenous Australian.¹⁰⁵ Indigenous

Australians' life expectancy is, therefore, similar to that of people in Bangladesh but Australia is ten times richer than Bangladesh.

Water management issues, which have both urban and rural dimensions, have serious implications for Indigenous Australians. For example, in the rural context, s 55 of the *WMA* 2000 is relevant because it makes provision for Aboriginal people to exercise their native title rights without having to apply for WALs or a water use approvals. However, the permissible exercise of native title would appear to be limited to using water for traditional purposes only. The section precludes native title holders from using water to construct a dam or bore unless a 'works supply approval' is granted and it also prohibits a native title holder from constructing or using a water supply work otherwise than on the land that he or she owns. Finally, the maximum amount of water to be used by native title holders is limited to that prescribed by the regulations.

Meanwhile the *Native Title (NSW) Act* 1994, which codified native title (as first recognised in the *Mabo*¹⁰⁶ decision) has the effect of upholding and protecting rights obtained through a 'valid act'. An example of a 'valid act' would be the granting of a WAL. If, by the protection of a valid act, native title is impaired, the loss is compensable. Applying this law, it is possible to imagine a case where Aboriginal people established native title in the waters of a particular river. If those people were also involved in aquaculture on a substantial scale, perhaps by the setting of fish traps, the right to high volumes of water (needed to make the traps work properly) would be subordinate to the rights of WAL holders.¹⁰⁷ Aboriginal people would miss out. In such a case it has been noted that 'money doesn't fix the problem. The loss is not only the fish that are not caught in the fish trap but the damage to the continuation of the culture through loss of use and [the] contextual relevance of the fish traps.'¹⁰⁸ Hence it possible to see how the *WMA* could operate to the disadvantage of the poorest group in Australia.

The creation, under the *WMA*, of a semi-regulated water market marks a significant change for water use by Indigenous Australians. Now that rights to access water are not tied to land and WALs can be traded, the value of water has increased. Governments can no longer simply reallocate water. Instead, as noted above, trade is now used as a tool of re-allocation. Accordingly, government is limited in the ways it can acquire water. It can reserve water for environmental flows or it can compulsorily acquire water but it cannot simply reserve access to water for Indigenous Australians. Hence, it is arguable that some of the poorest members of the community are not well protected by the introduction of a partial water market. In 2000, it was suggested by the NSW Aboriginal Land Council and the NSW Native Title Services that a supplementary scheme should operate in the form of an Aboriginal Water Trust.¹⁰⁹ It was envisaged that the Water Trust would buy WALs (and related rights) from money which was paid into the Trust. The plan was for the Trust to keep the water on the market and available to users, through leasing, for the first ten years. In that time 10% of water could be allocated to cultural purposes and 10% to commercial purposes whilst at the end of the ten year period, the rights in and in relation to water could be divided between traditional owners, or the trust could continue to manage the water on behalf of the traditional owners.

The Water Trust proposal was an acknowledged that involvement in the market, through ownership of the commodity, yielded power. In turn, that power, could, if Indigenous people owned WALs, be used by those most closely affected, to make decisions about whether water was extracted or remained in the river to support traditional activities. Further, the idea of a Water Trust found justification in the policy underpinnings of the *Aboriginal Land Rights Act* 1983 (NSW) which provided a mechanism for compensation to Aboriginal people if they were dispossessed from their land. Application of the Act meant that Aboriginal people could receive money and the non Indigenous dispossessors received rights in land, recognised by the common law. Those rights in land included rights to access water through a system of riparian rights; riparian rights (as noted above) being a concomitant of land ownership. When, as we have observed, eventually entitlements to water were severed from land rights (under the *WMA*), it was the non Indigenous dispossessors who were able to apply for WALs; licences which are now the subject of trade and potential profit. Initially, the NSW Government and Cabinet were persuaded by the reasoning in favour of an Aboriginal Water Trust and they agreed to an initial payment of \$5 million over two years but their position changed and uncertain of how the water market would perform, they withdrew support for the idea. As Mc Avoy has noted approximately, six months after the Aboriginal Water Trust idea was submitted to the Commonwealth for consideration in the NWI, the eminent group of scientists known as the Wentworth Group, floated a similar idea in relation to an environmental water bank or trust whereby the government was to pay money into a trust from which WALs would be purchased on the open market.¹¹⁰ The water entitlements under the WALs would then be leased back to industry for a limited period so that more funds could be accumulated to fund the purchase of further WALs. The idea gained governmental support, unlike the Aboriginal Water Trust which fell out of favour with government, particularly after legal advice suggested

that the grants program which would fund the Aboriginal Water Trust could not be classified as a charitable trust for taxation purposes. Again as McAvey observes, it is a 'sad day ...when Aboriginal people must claim money for compensation for dispossession from waters only to use that money to buy back water rights in order to ensure that they have some control over the health of rivers.'¹¹¹

Conclusion

In conclusion, this paper has found that there is no single or perfect solution to the water problem in Australia. The problem exists on many fronts and not surprisingly it affects the poor more harshly than those better off. The problem is a result of high consumption levels, drought, faulty infrastructure, environmental degradation and population growth to name but some areas. Clearly, no, one solution can deal with all these diverse aspects of the problem.

The range of potential solutions discussed is also diverse. It includes water restrictions, the subsidisation of water saving devices, transferring water from the Shoalhaven, large scale recycling plants, desalination plants, air filtration schemes, new pricing regimes, and water entitlement trading. Some of these solutions are more effective than others. Hence the most appropriate of them need to be selected and need to operate in concert with each other. The process of selection also needs to be dependent on consideration of the impacts of these potential solutions, an understanding of which was provided in Part 3 of this paper.

In Australia, it appears that it is probably too late in the day to pull back from the strident march towards the privatisation of water facilities and infrastructure, and the commodification of water entitlements. That is unfortunate. Overseas experience is chastening when we observe that in Argentina's Tucuman province, since water was privatised and sold to a French company, Vivendi, water prices doubled. Further, in Chile (which is often cited as a positive model for privatisation) in the four year period following privatisation in 1998, private water companies' water prices went up by 40%, which is twice the rise of public companies.¹¹² It is hard to predict but if profit making is behind the willingness of investors to enter into BOOT (build, own, operate, transfer) contracts such as the one for the Prospect Filtration Plant (and there is no reason to think otherwise) then it would seem logical that prices will increase so profits can increase in the hands of the investing companies.

Finally, the thread running through this paper is that many purported solutions would have deleterious effects on Australians generally, but the most vulnerable in the community, the poor and particularly the Indigenous poor would suffer more than others.

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² S T Coleridge, 'The Rime of the Ancient Mariner' published in *The Oxford Book of English Verse: 1250-1900*, and available at: <http://www.bartleby.com>.

³ See details on Medicare at: http://www.hic.gov.au/yourhealth/our_services/am.htm

⁴ Note that these ages vary across the states.

⁵ Details available through the Department of Human Services at <http://www.humanservices.gov.au>

⁶ See Australian Statistics on National Income at <http://www.abs.gov.au>

⁷ For indications of further ways in which Australia is poor see The Australian Council of Social Security (ACOSS), *Research Compendium: Poverty and Inequality in Australia*, October, 2001. Available at: <http://www.acoss.org.au>

⁸ Melbourne Institute of Applied Economic and Social Research, University of Melbourne, *Poverty Lines: Australia*, ISSN 1448-0530, March Quarter, 2005. Available at: <http://www.melbourneinstitute.com/miesi/poverty/Poverty%20Australia%20March%202005.pdf>. Australia has got one of the largest gaps between rich and poor in the developed world. See: M Peel at <http://www.antipovertyweek.org.au/info.html>

⁹ In Australia, those seeking refugee status are held in detention centres while their applications are processed. Julian Burnside SC, has spoken of the conditions in detention centres and the policy behind it, in his address to the Lionel Murphy Foundation in 2002. Available at: http://lionelmurphy.anu.edu.au/memorial_lecture.htm. For an account of some 'undemocratic' trends in Australia see The Hon Sir Anthony Mason AC, KBE, (Former Chief Justice of Australia), Law and Justice Address, NSW Parliament House, 6 October, 2005. Available at: <http://www.lawfoundation.net.au>

¹⁰ P Saunders, 'Year Book Australia, 1996, ABS' in J Healy (ed) *Poverty, Issues in Australia*, Vol 170 (2002) p5.

¹¹ IPART, *Investigation into Water and Wastewater Service Provision in the Greater Sydney Region*, Draft Report, Sept, 2005, p1. (Final Report due October, 2005). Available at: <http://www.ipart.nsw.gov.au>

¹² See <http://www.savewater.com.au/default.asp?SectionId=5&SortTag=269&mode=print>

- ¹³ S Smith, *Desalination, Waste Water, and the Sydney Metropolitan Water Plan*, Briefing Paper No 10/05 for the NSW Parliament, NSW Parliamentary Library Research Service p 1. See also IPART, *Investigation into Water and Wastewater Service Provision in the Greater Sydney Region*, Draft Report, September, 2005, p1 available at: <http://www.ipart.nsw.gov.au> Sydney is the largest city in Australia.
- ¹⁴ S Peatling, 'In rural Australia water consumption strongly outstrips that in urban areas,' *Sydney Morning Herald*, 7 May, 2004. This article notes that people living around irrigated agriculture use about three times as much water (in their homes and gardens) as urban residents in their homes and gardens. It notes that a government report indicates that people in towns such as Griffith, use up to 775 kilolitres of water per year while the average Sydney household uses 249 kilolitres per year.
- ¹⁵ Of course, small coteries of scientists and environmentalists etc have been alert to a water crisis in Australia for some years but the general public has not confronted the issue and by and large nor has government until recently.
- ¹⁶ Sydney was and still is experiencing the worst drought since the 1930s. See S Smith *opcit*, p1.
- ¹⁷ For example, drought reports are a common feature of news reports on the national broadcaster (the Australian Broadcasting Commission- ABC). Drought has also featured heavily in Australian poetry such as that by Dorothea McKellar, Henry Lawson and Judith Wright. See also the Home (Camel) Expedition of scientists, for further evidence of Australia's long association with drought. (Baldwin Spencer 1896).
- ¹⁸ NSW Department of Infrastructure, Planning and Natural Resources, *Meeting the Challenges: Securing Sydney's water future. The Metropolitan Water Plan 2004* at p4 suggests that the NSW Government has accepted there is a link between global warming and drought. In Western Australia there has been a 15% drop in rainfall which is perhaps being replicated along the eastern coast according to Professor Peter Cullen (scientist, founding member of the Wentworth Group and member of board of the National Water Commission, Australia). See interview with Eleanor Hall, *Coming to grips with a drier Australia*, 'The World Today', ABC Radio, 17/5/05. Transcript available at: <http://www.abc.net.au/worldtoday/content/2005/s1370516.htm>
- ¹⁹ Warragamba Dam dipped to 38.8% of its storage capacity on 10 December, 2004. By 20 October, 2005 the situation had hardly improved with the dam being only full to 39.1% of its storage capacity. See www.sydneysydney.com.au. In 2005 Sydney's population is approximately 4 million.
- ²⁰ These are the words of Dr Charles Essery, formerly a senior executive with Sydney Water and an advisor to the New South Wales government on water issues. Dr Essery is now an independent consultant on water and is associated with the University of Western Sydney. Quotation taken from transcript from the 'The 7.30 Report', *Experts divided over water shortage solutions*, ABC Television, 23/5/05.
- ²¹ See views of Professor Peter Cullen (scientist, founding member of the Wentworth Group and member of board of the National Water Commission, Australia) expressed in interview with Eleanor Hall, *Coming to grips with a drier Australia*, 'The World Today', ABC Radio, 17/5/05. Transcript available at: <http://www.abc.net.au/worldtoday/content/2005/s1370516.htm>
- ²² This view and these figures are contained in T Flannery, 'Humanism and the Environment: Addressing need in a world of environmental limits' Lionel Murphy Annual Lecture, 2003. See <http://www.lionelmurphy.anu.edu.au>
- ²³ For an understanding of why Australia is drought prone and the effects of drought see: <http://www.bom.gov.au/lam/climate/levelthree/c20thc/drought.htm> See also *Year Book Australia*, 1988 (ABS cat. No 1301.0)Special Article- 'Drought in Australia'. Article contributed to by the National Climate Centre, Bureau of Meteorology and reproduced at: <http://www.abs.gov.au/Ausstats/abs@.nsf/0/068f13bccd03f27bca2569de001f1072?OpenDocument>
- ²⁴ L Courtenay Botterill & M Fisher (eds) *Beyond Drought: People, Policy and Perspectives*, CSIRO Publishing, Collingwood, Victoria, 2004 argue that drought is a normal part of Australia's climate pattern. This view was formerly adopted by the Australian government in the 90s. See <http://www.bom.gov.au/lam/climate/levelthree/c20thc/drought.htm>.
- ²⁵ See L Courtenay Botterill & M Fisher (eds) *Beyond Drought: People, Policy and Perspectives*, CSIRO Publishing, Collingwood, Victoria, 2004; M McKernan, *Drought*, Allen & Unwin, Sydney, November, 2005 (forthcoming).
- ²⁶ Sydney is Australia's largest city.
- ²⁷ C Sheil, *Water's Fall*, Pluto, Sydney, 2000, p7.
- ²⁸ *ibid*;
- ²⁹ The filtration system at Prospect failed the city when in 1998 cryptosporidium was found in the water supply.
- ³⁰ Sydney has 23 sewerage systems, 7 of which drain to the ocean and 16 emptying into inland treatment plants.
- ³¹ Sydney Water is the name of the corporation that retails water to the greater Sydney Region.
- ³² See 'Water leaks plugged, but much still going to waste' *Sydney Morning Herald*, 12 September, 2005. Article refers to source as Sydney Water.
- ³³ L Silmalis, 'What drips', *Sunday Telegraph*, 11 September, 2005.
- ³⁴ Sally McManus, Secretary of the Australian Services Union cited in L Silmalis, 'What drips', *Sunday Telegraph*, 11 September, 2005.
- ³⁵ 'Saving water is no pipe dream', *InMotion*, Feature Article, 2004 available at: http://www.inmotiononline.com.au/inmotion/feature_article/item_022004b.asp
- ³⁶ Godyer recognised the lack of suitability of farming in very inhospitable areas and so on his trip north to investigate the drought of 1863-1866 drew a line indicating the limit of the rainfall; a line which coincided with the southern boundary of saltbush country. He suggested that farming should not go beyond this line and that land beyond the line should be reserved for pastoralism. 'Flinders Ranges Research- George Goyder' material available at <http://www.southernaustralianhistory.com.au/goyder.htm>
- ³⁷ Examples include cases where one or more members of a family (including parents of young children) have to live and work away from the farm, marital breakdown, debilitating debt and in some cases suicide. See <http://www.agric.nsw.gov.au/rwn/aboutrwn.htm>
- ³⁸ Interview by Eleanor Hall with Prof Peter Cullen and Ben Fargher, President of the National Farmers' Association, 'Coming to grips with a drier Australia', *The World Today* (ABC Radio), 17 May, 2005. Transcript available at: <http://www.abc.net.au/worldtoday/content/2005/s1370516.htm>
- ³⁹ This view is supported by T Jeyaretnam, a Principal at the Sustainable Investment Research Institute, a Board Member of the Environmental Engineering Society and the editor of *Environmental Engineer* in the 'Wentworth's Group Blueprint for Sustainability' available at: http://www.ees.ieaust.org.au/pdf/Wentworth_Group.pdf
- ⁴⁰ See www.savethemurray.com/environment_rivers_floodplains_wetlands.php_zik; www.murrayusers.sa.gov.au/floodplains.htm; <http://www.deh.gov.au/minister/cnv/200/mr9Jan01.html>
- ⁴¹ See the Murray Darling Basin Commission's site at http://www.mdbc.gov.au/natural/resources/floodplains/floodplain_manage.htm. See also interview by Mike Sexton with Jack Seekamp (fruitgrower, hydrologist and conversationalist) and Prof Tim Flannery et al, 'Questions Raised Over Water Management of Murray Darling', *The 7.30 Report*, ABC Television, 31/1/2003. Transcript available at: <http://www.abc.net.au/7.30/content/2003/s774234.htm> or at <http://www.wetlandcare.com.au/Content/annviewer.asp?a=9&print=yes&F2%80%9D>. The removal of bridges, levees and retaining walls which has been built on flood plains is also very expensive and not always feasible.

- ⁴² T Flannery (Wentworth Group) Memorial Address to Lionei Murphy Foundation 2003. See http://www.lionelmurphy.anu.edu.au/memorial_lectures.htm
- ⁴³ J Williams (Wentworth Group) CSIRO Land and Water Australia cited at <http://www.abc.net.au/learn/silentflood/faqs/htm>. Williams explains that if there were 80 kilometres of the river with bores along it those bores would pump 1100 tonnes of salt away from the river each day. If they ran, as bore pumps do, 365 days a year, the cost to the community in power alone would be two million dollars a year. See also W Craik, *Weather Climate, Water and Sustainable Development*, World Meteorological Day Address, 23/3/05. Available at: http://www.bom.gov.au/announcements/media_releases/ho/20050323-craik.shtml
- ⁴⁴ J Williams, *opcit*;
- ⁴⁵ The long term viability of cities such as Perth (which is not on the Murray River but the Swan River) and Adelaide has been raised by many including eminent scientists such as Prof Tim Flannery. Flannery *opcit*;
- ⁴⁶ S Smith, *opcit*;
- ⁴⁷ See NSW Auditor-General's Report: Sydney Water Corporation: Northside Storage Tunnel Project, published 2005 available through: <http://www.bookshop.nsw.gov.au/category.jsp?category=1037&parent=147>
- ⁴⁸ Clause 23, National Water Initiative, available at <http://www.coag.gov.au>
- ⁴⁹ S Smith, *opcit*;
- ⁵⁰ *ibid*; p3. See also: <http://www.waterforlife.nsw.gov.au/government/shoalhaven.shtml>
- ⁵¹ NSW Government, *Metropolitan Water Plan, Seawater Desalination Fact Sheet 5- Seawater Desalination Compared to Recycling*.
- ⁵² NSW Department of Infrastructure, Planning and Natural Resources, *Securing the Future of our Water Supply. Part one of The Metropolitan Water Plan. The NSW Government's infrastructure plan to secure Sydney's water supply*. October, 2004.
- ⁵³ Premier Bob Carr announced the plan in July, 2005 before his resignation. The new Premier Morris Iemma has supported it. S Smith, *opcit*; Executive Summary.
- ⁵⁴ S Smith, *opcit*; pp 19-27.
- ⁵⁵ See Brent Lobel's AirWater System at <http://www.gizmag.com.au>
- ⁵⁶ COAG, *Communique from Meeting of 25 February, 1994, COAG, Canberra, 1994 and Report of the Working Group on Water Resource Policy to the Council of Australian Governments* (unpublished paper February, 1994 cited in A Gardner, 'Developments in the Whole-of-Government Management of Terrestrial Water Resources,' (2000) 29 116 *Western Australian Law Review*, 124. Also cited in Poh-Ling Tan, 'Water Reform in NSW, 1995-1999' (2003) 20 *EPLJ* 161.
- ⁵⁷ It also embraced reform in relation to both the quality and quantity of water. See COAG, *Communique from Meeting of 25 February, 1994, COAG, Canberra, 1994 and Report of the Working Group on Water Resource Policy to the Council of Australian Governments opcit*; NB The shift to full price recovery was tied to National Competition Council payments which State governments received from the Federal government for compliance with the competition policy package based on the Hilmer Report, 1993 (formerly the National Competition Policy Report.)
- ⁵⁸ NSW Government, *Meeting the challenges: Securing Sydney's water future, The Metropolitan Water Plan*, October, 2004.
- ⁵⁹ In 2003 Sydney Water was taking 630 gegalitres out of dams. This was 30 gegalitres more than was considered sustainable.
- ⁶⁰ COAG Water Resource Policy cls 6(g), 7(b) & 8(b).
- ⁶¹ *ibid*; cl 4.
- ⁶² Objects, *WMA* (2000) NSW.
- ⁶³ We know that it was not impossible to trade because water allocations were traded from 1986 onwards under the previous Act, the *Water Act* (NSW) 1912; an Act which did not 'unbundle' rights.
- ⁶⁴ See ss 52; 56 (2) *WMA*.
- ⁶⁵ See ss 71M; 71 N *WMA* 2000.
- ⁶⁶ In this regard timed/metered showers etc have been suggested.
- ⁶⁷ Information supplied by J. Etherell, Manager, Water Restriction Enforcement, Sydney Water, email 20/10/05.
- ⁶⁸ Source: Jeff Angel, The Total Environment Centre. See <http://www.tec.nccnsw.org.au/member/tec/projects/UrbanESD/ads.html>
- ⁶⁹ The sinking of bores is one of the five major projects, of the NSW government, to alleviate Sydney's water problem. The plan is detailed in NSW Department of Infrastructure, Planning and Natural Resources, *Meeting the challenges- Securing Sydney's water future*, October, 2004. Dr Wendy Craik, Chief Executive for the Murray Darling Basin Commission, has noted that such an inventory is needed.
- ⁷⁰ See <http://www.sydnevwater.com.au>. The subsidised installation cost is \$22 while the real cost is approximately \$150.
- ⁷¹ A Sydney Water source has confirmed that Sydney Water's records indicate there has been no equivalent reduction in water usage at properties where tanks have been installed. It would seem that tank installers continue to use the same amount of water inside their homes and simply use tanks on their gardens.
- ⁷² See <http://www.smh.com.au/news/national/bitter-outpouring-at-carrs-water-plan/2005/07/24/1122143730141.html?oneclick=true>
- ⁷³ For recommendation see: <http://www.ncc.gov.au/publication.asp?publicationID=188>
- ⁷⁴ Jeff Angel, *opcit*;
- ⁷⁵ See G Leslie et al, *Membrane Systems for Municipal Water Systems. A road map for the next generation of water recycling plants*, University of New South Wales, UNESCO Centre for Membrane Science and Technology & A Childress, University of Nevada, USA. Presentation at Australian Water Association Speciality Conference: Membranes and Desalination, Adelaide February, 23-25, 2005 cited in S Smith, *opcit*; p 28.
- ⁷⁶ Orange County Water District, Water Factory 21 Overview. See <http://www.ocwd.com/html/wf21.htm>
- ⁷⁷ H Seah, *The NEWater Experience and Singapore's Four National Taps*, Director, (Technology) Singapore Public Utilities Board, International Key Note Speaker Presentation at Australian Water Association Speciality Conference: Membranes and Desalination, Adelaide, Feb 23-25, 2005.
- ⁷⁸ Media Release from the Victorian Minister for Water, John Thwaites, 14 September, 2005. See: http://www.dpc.vic.gov.au/domino/Web_Notes/newmedia.nsf/8fc6e140ef55837cca25
- ⁷⁹ T Fane, *Harvesting Water from Compromised Sources. Membranes and the Water Cycle*, UNESCO Centre for Membrane Science and Technology, UNSW, Australia, Institute for Environmental Science and Engineering, NTU, Singapore. Presentation at the Australian Water Association Conference Speciality Conference *opcit*; See also Jeff Angel, *opcit*;
- ⁸⁰ Department of Agriculture, Fisheries and Forests, *Research into access to recycled water and impediments to recycled water investment*, June, 2005 p vii. See: <http://www.daff.gov.au>
- ⁸¹ *ibid*;
- ⁸² *opcit*;

- ⁸³ The casualisation of labour in Australia has meant that many people have some form of employment but still live in poverty.
- ⁸⁴ Media Release of the Australian Minister for the Environment and Heritage, Senator the Hon Ian Campbell, 31 August, 2005. See: <http://www.deh.gov.au/minister/env/2005/mr31aug05.html>
- ⁸⁵ A machine producing up to 20 litres of water today and relying on electricity rather than solar power costs A\$1,300.
- ⁸⁶ The terms 'Aboriginal' and 'Indigenous' have been used interchangeably.
- ⁸⁷ Presumably because it costs the same to send a letter in Australia a short distance as a long distance.
- ⁸⁸ E Freeman & J Wellmore, Submission of the Public Interest Advocacy Centre to IPART on the 'Investigation into water and wastewater service providers in the greater Sydney region', May, 2005, p6 take a similar view.
- ⁸⁹ E Freeman & J Wellmore, *ibid.*
- ⁹⁰ The actual amounts decided on by IPART and released on 2 September, 2004 are available at: <http://www.ipart.nsw.gov.au> In order to contextualise these figures, see figures on Australia's average national wage at: <http://www.abs.gov.au/Ausstats/abs@.nsf/0/35f488b5f9f7d242ca256df000814610?OpenDocument>
- ⁹¹ See Melbourne Institute of Applied Economics and Social Research, *Poverty Lines*, June Quarter, 2003 on the question of vulnerability. See IPART, *Investigation into price structures to reduce the demand for water in the Sydney Basin Final Report*, 30/7/2004, Appendix 3.
- ⁹² See J Button, 'Sell me you Carbon Credit', *Sydney Morning Herald*, 7 October, 2005.
- ⁹³ See *Milirrpum v Nabalco* (1971) 17 FLR 141 (also known as the Gove Case).
- ⁹⁴ As was the case of native title in *Mabo v State of Queensland* (No 2) (1992) 107 ALR 1.
- ⁹⁵ W Craik, *Weather, Climate, Water and Sustainable Development*, World Meteorological Day Address, 23/5/05. Available at: <http://www.bom.gov.au>
- ⁹⁶ W Craik, *ibid.*
- ⁹⁷ C Sheil, *opcit.*, p 6.
- ⁹⁸ A Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, University of Chicago Press edition, Chicago, 1976 (the first edition was first published on 9 March, 1776, this edition is copied from the fifth edition, published in 1789) cited in C Sheil, *Water's Fall*, Pluto, Sydney, 2000, p 9.
- ⁹⁹ This interpretation is discussed in C Sheil, *opcit.*, p 9.
- ¹⁰⁰ On Indigenous poverty see NSW Department of Aboriginal Affairs, *Introducing Indigenous Australia, Background Briefing*, www.daa.nsw.gov.au; *National Report 2-17.3 Causes of Aboriginal Poverty*, see <http://beta.austlii.edu.au/au/other/IndigLRes/rciadic/national/vol2/210.html>
- ¹⁰¹ Australian Bureau of Statistics, *The Health and Welfare of Australia's Aboriginal And Torres Straight Islander Peoples*, AusStats 4704.0, www.abs.gov.au/AusStats/abs@.nsf
- ¹⁰² *ibid.*
- ¹⁰³ *ibid.*
- ¹⁰⁴ Australian Bureau of Statistics, *The Health and Welfare of Australia's Aboriginal And Torres Straight Islander Peoples*, AusStats 4704.0, www.abs.gov.au/AusStats/abs@.nsf
- ¹⁰⁵ See <http://www.antipovertyweek.org.au/info.html>; see Australian Bureau of Statistics, *The Health and Welfare of Australia's Aboriginal And Torres Straight Islander Peoples*, AusStats 4704.0, www.abs.gov.au/AusStats/abs@.nsf. See also Balkanu Cape York Development Corporation at <http://www.balkanu.com.au/people/poverty.htm>.
- ¹⁰⁶ *Mabo v Queensland* (1992) 175 CLR 1.
- ¹⁰⁷ This example and the explanation above and below in this section is that of A McAvoy, 'Water- Fluid Perceptions', paper presented at the 'Fresh and Salt: Water, Borders and Commons in Australia and Asia Symposium', Transforming Cultures, University of Technology, Sydney, 8-10 May, 2005 (unpublished paper).
- ¹⁰⁸ *ibid.*
- ¹⁰⁹ Re Water Trust see: <http://www.alc.org.au/news/speeches/western%20sydney/western.htm>
- ¹¹⁰ Discussion in this section, of the *WMA* and the Water Trust is heavily dependent on A McAvoy, *opcit.*
- ¹¹¹ *ibid.*
- ¹¹² <http://www.wdm.org.uk/news/balcrowstunt.htm>

« L'eau comme révélateur de la crise multiforme en Algérie : aspects économiques et impacts sociaux »

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«L'eau a toujours hanté l'esprit des hommes. Des différents symboles qu'elle suggère, le plus perceptible est celui du mouvement et de la vie : les sources, les eaux courantes, les vagues sont déjà des objets offerts à une vision animiste du monde. La réalité dépasse de beaucoup cette évocation. Si, depuis leur apparition dans les océans primitifs, les êtres vivants participent plus ou moins au « cycle de l'eau », c'est que, réciproquement, cette substance conditionne leur existence : elle est le constituant principal de leur organisme et de leur nourriture. »

In :

Encyclopédia-Universalis (2004) – Paris – CD-ROM – Version 9.

Ce travail n'aurait pu voir le jour, en tous cas sous sa forme présente, sans la collaboration acharnée et souvent polémique, mais stimulante de Mme MERIEM KHAOUA-REMITA, biologiste et chercheuse en sciences de la vie et de la terre.

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- a- Qu'est-ce que « l'eau » ?
- b- Le contenu du « développement »
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Centralité de la crise de l'eau et critique des politiques économiques :

- 1 – Analyse économique des politiques de développement
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Conclusion

Introduction : Eau, développement et pauvreté : tentatives de définitions

Avant d'accorder à la question de l'eau une centralité dans l'analyse des connexions de la disponibilité et de la répartition sociale ainsi qu'économique de cette ressource multi usages, en relation avec le niveau et l'évolution de la pauvreté, il semble nécessaire de pouvoir préciser sa définition et sa nature, en particulier lorsque le champ d'investigation concerne un pays sous développé, tel que l'Algérie. En même temps, il s'agit aussi de clarifier le contenu du concept de développement, et de préciser les relations liant « développement économique » et « développement social ».

S'agit-il d'un même phénomène, prenant deux aspects : celui relevant strictement de l'activité économique, avec celui irradiant les effets de celle-ci sur la société, avec ses différences, ses couches sociales, leurs intérêts souvent conflictuels et divergents ?

S'agit-il d'un phénomène circonscrit, dans son évolution, ses pratiques et ses tendances, dans la stricte sphère du changement technique ? La pauvreté en serait alors un effet incident, comme presque un effet social fatal, que les politiques que conduisent les pouvoirs tentent d'amoindrir, mais qu'elles ne sauraient éradiquer.

Ou bien relève-t-il beaucoup plus des choix sociaux, c'est-à-dire des choix politiques, que se considèrent comme fondés de faire les groupes sociaux détenant le pouvoir de décision et représentant ainsi « l'Etat », à chaque période nouvelle que traverse le pays considéré ? La pauvreté en serait alors dans ce cas, une conséquence de choix préalables, susceptibles d'être remis en cause, car ayant conduit à son émergence et à sa diffusion sociale. « La pauvreté » ne peut être maîtrisée alors que si ces choix sont remis en cause et remplacés par d'autres plus à même de concrétiser les objectifs généraux liés à la diminution constante du niveau social de pauvreté.

« L'Etat », en Algérie, par son rôle d'arbitre dans les conflits d'intérêts qui font se confronter en permanence les différentes couches sociales, n'oublie-t-il pas d'assurer un minimum de vie aux populations les plus marginalisées économiquement et socialement, en réformant ses choix économiques et sociaux ? Ce minimum de vie ne peut-il pas être approché à travers les niveaux de disponibilité de certaines ressources naturelles socialement vitales, telle que l'eau ? Ce niveau de vie minimum, dans sa connexion avec la disponibilité de l'eau pour les besoins humains, étant par nature en évolution dynamique dans le temps, en fonction des évolutions économiques et sociales, ne soumet-il pas à une révision constante les politiques économiques et les choix de développement en particulier lorsque les objectifs de développement économique et social et de lutte contre la pauvreté, annoncés à chaque période, sont loin d'être atteints comme dans le cas de l'Algérie ?

D'autant plus que dans le cas de ce pays, environ 70% de la population, c'est-à-dire 24 millions d'habitants, vivent à moins de 100 km des côtes qui s'étendent d'Est en Ouest sur 1200 km.

-a- Qu'est ce que « l'eau » ?

Ce questionnement est, méthodologiquement incontournable, au vu des phénomènes conflictuels et parfois armés et violents, qui entourent la problématique de l'eau et sa répartition, aussi bien entre groupes d'habitants et activités économiques dans les différentes régions de l'Algérie, qu'entre pays et Nations au niveau international.

Au-delà de ses caractéristiques de « ressource naturelle », renouvelable dans certaines de ses formes, dans le temps et au fil de la succession des saisons, il s'agit de saisir toutes les particularités et les spécificités de « l'eau » qui en font d'elle une ressource naturelle particulière, qui se distingue, aux yeux des collectivités sociales, de toutes les autres ressources qu'offre la nature.

Plus d'une approche de l'eau peut être tentée :

—A—Tout d'abord, il est possible de la définir par sa nature : c'est une ressource naturelle, caractérisée par sa faculté de renouvellement sous contraintes (prospections, recherches, pollutions, infrastructures, etc.), mais aussi par sa rareté, face à sa demande sociale et à sa demande économique.

A ce titre, la priorité serait donnée à la préservation des sources de production et de renouvellement de l'eau :

- * Par la forestation des territoires, on contribue à favoriser l'augmentation du volume annuel des précipitations d'eau de pluie ;

- * Par la lutte organisée contre la pollution atmosphérique, on contribue à la pureté et à la « potabilité » de cette eau de pluie ;

- * Par la construction de barrages et de retenues collinaires, on contribue à capter une part importante des eaux de surface ;

- * Par l'établissement de stations d'épuration, on contribue à maximiser les volumes d'eau potable et on diminue les possibilités de diffusion, par l'eau, des pollutions ;

- * Par la lutte contre les pollutions des sols, on contribue à la préservation pour ensuite les exploiter, des nappes phréatiques et de leurs potentiels hydriques.

—B—Ensuite, il est tout aussi nécessaire de définir l'eau à partir de sa triple caractéristique d'être, en même temps :

- a- une ressource naturelle ayant une relative capacité de renouvellement, sous certaines contraintes impliquant l'intervention de politiques spécifiques de protection de celle-ci face aux différents types de pollution auxquels elle fait face ;

- b- un « bien public », dans la mesure où sa consommation sociale est vitale pour tout individu au-delà du niveau de revenu dont il peut disposer ;

- c- un « bien marchand », car de plus en plus, la sphère du marché domine toutes les transactions opérées sur toutes les catégories de biens et services, dont les biens issus des ressources naturelles, l'eau précisément dans ce cas.

« L'eau est un élément vital pour les êtres humains. De tout temps, son accès fut l'objet de conflits entre groupes sociaux, États ou nations. Si ces aspects n'ont pas disparu, l'eau est devenue depuis un demi-siècle un enjeu pour de nouveaux pouvoirs (financier, industriel, économique) dont l'objectif est d'en faire une simple marchandise. Nous sommes donc face à un choix politique, un choix de société : l'eau doit-elle être un bien marchand ou doit-elle être considérée comme un bien commun de l'humanité dans le cadre d'une société guidée par les principes d'une économie solidaire et durable ? » (1).

-b- le contenu du « développement » :

Le concept de « développement » a été depuis plusieurs décennies maintenant, au centre des travaux de différents chercheurs. Parmi les conceptions qui ont laissé leurs empreintes au niveau des pratiques économiques des États, on peut citer celle de W. W. ROSTOW (3), qui considère que celui-ci est un processus s'organisant selon des étapes ordonnées se déroulant de manière séquentielle dans le temps.

Le passage de l'une à l'autre ne se réalise que si la précédente s'est pleinement concrétisée. Mais il fait lui-même référence aux critiques possibles à cette approche linéaire, gommant les aspects sociaux et politiques du développement :

« *One reason for the resistance to the stages approach is that it denies the statistical analyst the easy use, in good conscience, of GNP per capita as a measure of growth. If the degree of efficient absorption of technologies is taken as a basic measure of growth (as it should be), one can have relatively rich and relatively poor countries at the same stage of growth, depending on population/resource balances, export capabilities, tourism, foreign aid, etc.* » (4)

Plusieurs observations importantes, qui peuvent conditionner par la suite une relecture actualisée du contenu conceptuel du « développement » peuvent être faites à la suite de l'apport de W. W. ROSTOW.

-1- Association « ATTAC » : L'eau, bien commun de l'humanité.

Cf. www.attac.org

-2- les premiers travaux centrés sur le concept de développement datent des années cinquante.

-3- W. W. ROSTOW (1971) : The Stages of Economic Growth.

Cambridge University Press – London – G.B.

-4- W.W.ROSTOW. (1971):

Op.cit.

Ces observations peuvent être synthétisées dans les points principaux suivants :

-*- Il est manifeste que le développement économique et social est assimilé, selon ce qui apparaît dans la citation ici mentionnée, à ses effets économiques directement mesurables et quantifiables, tels que le niveau du Revenu National ainsi que celui du Revenu National par habitant.

Or le développement ne peut-il être pensé qu'en fonction des possibilités de sa quantification et de sa mesure ? N'y a-t-il pas d'autres aspects, peut-être se prêtant moins à la mesure et à la quantification, qui lui donnent un sens plus réel et plus objectif, et qui peuvent faire l'objet des réflexions des économistes ?

-*- La disponibilité, dans un pays donné, à fortiori lorsque ce pays est un pays sous-développé tel que l'Algérie, à une période particulière de son évolution, d'un « Revenu par habitant » plus ou moins élevé, ne pose-t-elle pas des questions sur les modalités pratiques et concrètes de sa répartition sociale ? Ces observations montrent la nécessité d'une relecture du concept de développement et son adaptation à la réalité de la question sociale telle qu'elle se pose dans les pays où la « quête » du développement est toujours l'objectif le plus important. Nous adoptons quant à nous, dans ce travail, la définition que propose Philippe HUGON (2004) :

Le développement est un « processus endogène et cumulatif de long terme, caractérisé par des progrès de productivité et un partage équitable de ceux-ci, permettant, avec des coûts humains et environnementaux acceptables, à un nombre croissant de personnes de passer d'une situation de précarité, de vulnérabilité et d'insécurité à une situation de plus grande maîtrise de l'incertitude, des instabilités et de satisfaction des besoins fondamentaux grâce à l'acquisition de droits, à la mise en œuvre d'organisations et d'institutions et de modes de régulations permettant de piloter des systèmes complexes. » (1)

De cette définition du « développement », qui se veut adapté aux situations économiques et sociales complexes des pays « en quête du développement » tels que l'Algérie, nous pouvons déduire plusieurs éléments :

Ces éléments font jonction entre d'une part « l'économie publique », c'est-à-dire celle évoluant sous la conduite et le contrôle, non pas du marché, mais de l'État, et d'autre part « l'économie de l'environnement », entendue comme la soumission de la protection et de la préservation des ressources naturelles, telles que l'eau, aux règles du marché (2). De ce fait, peut émerger une analyse de cette catégorie de « biens », tels que l'eau, qui ne sont ni seulement des « biens marchands », ni seulement des « biens non marchands ».

Ils sont en fait des « biens marchands » dans le sens où les critères qui président à leur « connaissance » sont les critères que fixe le marché, mais ils sont en même temps des « biens » qui ne peuvent souffrir une appropriation privée exclusive, car celle-ci exclue leur appropriation sociale équitable alors qu'ils sont indispensables à la poursuite de la vie humaine :

-1- Philippe HUGON (2004) : Apports des courants théoriques francophones en économie du développement. XVème Colloque annuel du CEDIMES – Université Léopold SENGHOR –14 – 18 Mars – Alexandrie – Egypte – CD-ROM.

-2- Nadji KHAOUA et Nabila GHAFOURI (2005) : Economie de l'environnement et environnement de la quête du développement : le cas de la région d'Annaba.

« Premières Journées Scientifiques de l'Environnement : les Stratégies et les Acteurs ».CREAD/INA – Alger – 1 § 2 /10/.

-c- Approche de la notion de « pauvreté » :

Il serait loisible de choisir certains des critères quantitatifs les plus communément admis par les chercheurs et autres analystes au niveau mondial, pour décider d'une définition de la « pauvreté » en relation avec ces critères préalablement fixés.

Mais faisant cela, cette démarche nous garantit-elle de définir la « pauvreté » de façon objective, ce qui veut dire la définir non seulement par rapport aux critères de mesure des différents aspects du niveau de vie, mais aussi en rapport aux valeurs sociales et culturelles du pays objet de l'étude ?

Ainsi, il apparaît que la définition de la notion de « pauvreté » n'est pas seulement une question qui s'achève dans la détermination des niveaux quantitatifs des revenus au-dessous desquels l'individu et le groupe sont considérés comme pauvres. En particulier, le rapport de la pauvreté à l'eau en tant que ressource naturelle, en même temps que marchandise, n'est pas seulement limité à la disponibilité et à la consommation de cette marchandise, singulière par rapport à toutes les autres, car vitale quotidiennement en un volume incompressible pour tout individu même s'il n'a aucun revenu.

Ce rapport contient aussi les questions liées à la disponibilité des réseaux de collecte, de stockage, de traitement et de distribution géographique et sociale de cette eau. Il contient enfin les aspects liés à la collecte des eaux usées, à leur traitement, etc...

Ainsi, les éléments que dévoile l'état de pauvreté, des individus et des groupes sociaux, lui-même induit essentiellement par le niveau du revenu disponible, sont complexes et pluriels. Ils ne se limitent pas au niveau du revenu disponible, même si ce niveau les met à nu. En fait, ils interpellent le statut économique et politique des différentes catégories sociales, en particulier les moins dotées en revenus, dans la politique générale et dans la réalité de l'exercice par l'État de ses fonctions.

C'est en ce sens, selon nous, même si cela est de manière indirecte, que les Organisations Internationales mettent en avant un certain nombre d'éléments (l'éducation, la santé, le revenu, etc.) dont la somme, quantifiée et valorisée en dollars américain et au-dessous d'un certain seuil minimal, définit selon elles, le niveau de pauvreté (1).

-1- Programme des Nations Unies pour le Développement (2004) :
Rapport mondial sur le développement humain – New York.

L'eau en Algérie :

-1- Approche économique :

-1.1- Les réserves et la politique de prospection :

L'eau, ressource naturelle rare par essence et aux utilisations indispensables tant sociales qu'économiques, se présente sous différentes formes.

Mais dans tous les cas, celle-ci manque cruellement et ce manque d'eau suit, sur le long terme, une tendance régulièrement croissante : « Il faudrait disposer entre 15 et 20 milliards de mètres-cubes par an, en réservant 70% à l'agriculture, pour parvenir à une sécurité alimentaire satisfaisante. C'est un défi titanesque lorsqu'on sait qu'on mobilise à peine au plus 5 milliards de mètres-cubes d'eau par an » (1).

Selon un des responsables de l'A.D.E. (entreprise publique de gestion des eaux dénommée : Algérienne Des Eaux) dans la région Ouest du pays : « Nous arriverons à assurer les 110 litres par jour et par habitant en moyenne que nous nous sommes fixé (en deçà des 150 litres jour/habitant proposés par l'O.M.S.) lorsque nous aurons amélioré la mobilisation de l'eau dans les barrages, lancé la production des eaux non conventionnelles et achevé l'architecture d'un système de transfert des eaux interrégional ».

-1- Conseil National Economique et Social (CNES) (2000): « L'eau en Algérie : le grand défi de demain ». Avant-projet de rapport – XVme Session Plénière – Alger.

-a- l'eau de surface :

Elle est constituée par, d'une part les lacs, les rivières, les retenues collines et d'autre part les barrages de différents types construits pour retenir, stocker et exploiter le maximum possible des eaux fluviales et des précipitations.

Les réserves de cette eau dépendent ainsi directement des actions entreprises par les pouvoirs publics en vue de capter, stocker, traiter et exploiter ce type d'eau.

Estimées à environ 15 milliards de m³ durant la période coloniale, les eaux de surface ne renferment, actuellement, que 12,4 milliards de m³, selon les estimations les plus autorisées (2).

En dehors du caractère semi-aride du pays dans sa plus grande surface, et de l'étroitesse de la bande tellienne du Nord renfermant les principales réserves des eaux de surface dans six bassins hydrographiques, il est légitime, au vu des données ci-dessus, de s'interroger sur l'action des pouvoirs publics dans la prospection et la mise en place de nouveaux moyens de captage des eaux de surface.

La comparaison, sur cette question, avec les pays voisins, en dehors des spécificités climatiques de chacun d'eux, montre le chemin qui reste à parcourir pour l'Algérie.

-2- C.N.E.S. (2000) :

Op. cit.

-b- les nappes phréatiques :

Les données les plus anciennes qui concernent le potentiel hydrique des nappes phréatiques de l'Algérie, s'accordent toutes sur l'énormité de ce potentiel, dont la seule limite est de n'être renouvelable que partiellement et sur le très long terme.

En plus de leur potentiel énorme en eau potable, les nappes phréatiques ne se limitent pas à celles existantes dans la bande tellienne du Nord du pays.

Certaines d'entre ces nappes ont été identifiées depuis la fin du XIX^{ème} siècle, sous les vastes territoires du Sahara et ont donné lieu à diverses études et propositions d'exploitation, jugées parfois excentriques à l'époque.

Les données les plus récentes montrent toutes que l'eau des nappes phréatiques en Algérie, au-delà parfois des infiltrations polluantes qu'elles continuent de subir (comme dans la région des Oasis à El-Oued), de la faiblesse des prospections entreprises pour connaître de manière actualisée leur potentiel réel selon les régions, diminuent drastiquement et de manière continue, en particulier dans certaines régions comme dans l'Ouest algérien, où le manque d'eau potable pour les habitants accroît le niveau de pauvreté par toutes les implications économiques, sociales, de santé publique et d'aménagement des territoires qu'il continue d'entraîner.

Le déficit pluviométrique chronique, les forages sauvages et la surexploitation de la nappe phréatique pour les besoins agricoles essentiellement, sont les principaux éléments à aggraver le déficit permanent d'eau, en cette région de l'Ouest du pays. Seuls 21 000 mètres cubes par jour sont mobilisés à partir des nappes phréatiques de toute cette région de l'Algérie.

Ce manque drastique et chronique d'eau peut être illustré par le cas de la plus importante « wilaya »⁽¹⁾ de l'Ouest, celle d'Oran, deuxième ville d'Algérie en nombre d'habitants, entre autres. Celle-ci compte 26 communes, dont seulement 15 ont une antenne de « l'Algérienne des Eaux » (2). Sept autres communes s'approvisionnent en eau par citernes pour satisfaire les besoins minimaux de leurs habitants et ne disposent pas de réseau de distribution d'eau potable couvrant tous leurs résidents, alors que quatre communes restantes n'ont pas du tout de réseau pour l'eau potable et leur situation en ce domaine est inconnue par les pouvoirs publics.⁽³⁾

Quant aux nappes phréatiques dans leur globalité, elles ont souffert des dernières 25 années de sécheresse qui ont sévi en Algérie. L'épuisement de l'eau issue des multiples forages anarchiques et des sources en est un signe les plus probants.

Ainsi, ni l'exploitation au rythme actuel des nappes, ni la cinquantaine de barrages, pour la plupart envasés, encore en exploitation, ni sur ceux en cours de réalisation, ne suffisent pour « que l'Algérie quitte le « panel » des 17 pays africains souffrant de stress hydrique – 700 millions de mètres-cubes de déficit en 2002 » (4), année référence de la rareté.

-1- Dans l'organisation territoriale algérienne, la « Wilaya » est similaire globalement à un département en France.

-2- Algérienne des Eaux (A.D.E.) : Entreprise publique de gestion et de distribution de l'eau en Algérie.

-3- Les données de ce paragraphe concernant l'eau dans l'Ouest du pays ont été puisées auprès de la Direction de l'Hydraulique de la Wilaya d'Oran, en septembre et octobre 2005.

-4- El Kadi Ihsene (2005) : Cette eau potable qui ruisselle vers le marché.

« El Watan » - Supplément économique hebdomadaire – Du 27 juin au 3 juillet – Alger – page 3

1.2 – La production :

La production de l'eau, même si elle peut prendre la forme de plus en plus dominante aujourd'hui, d'une activité strictement économique, associe en fait d'autres éléments, dans le cas réel de l'Algérie.

1.3 – les pratiques de mobilisation :

Les méthodes adoptées pour utiliser les volumes d'eau existants dépendent d'un certain nombre de paramètres, tous liés plus ou moins à la nature des moyens mis en place, de l'utilisation de cette eau et des objectifs attendus de celle-ci.

Le réseau de distribution est unique : un seul réseau distribue l'eau mobilisée (dont le volume est toujours inférieur au volume potentiel d'eau existante), quelle que soit sa destination finale. La différence se situe, d'une manière logique, dans la couverture des coûts du mètre-cube d'eau distribuée, par le prix de ce mètre, selon qu'il est facturé aux utilisateurs industriels, aux agriculteurs que l'on veut fixer sur leurs terres, ou au consommateur individuel (l'individu, le ménage familial). Dans ce prix, le consommateur, quel qu'il soit, paye actuellement les défaillances du système d'approvisionnement en eau à l'échelle nationale. Ces défaillances ressortent surtout de la vétusté des réseaux d'adduction qui entraîne une fuite phénoménale de près de 70% des volumes d'eau distribués.

1.3.1. les besoins de l'industrie et des services :

Supposées consommer l'eau à son prix de marché, c'est à dire à un prix au mètre-cube supérieur au coût total (production, traitement, stockage, distribution) de ce mètre-cube, les industries et services n'ont jamais vu leurs besoins en eau réellement couverts. Ainsi, certaines des activités de service les plus prometteuses en terme de création d'emplois et d'essaimage sur l'ensemble de l'économie, faisant par-là reculer la pauvreté, sont totalement bloquées dans leur essor parce que leurs besoins quotidiens en eau ne sont pas du tout assurés, l'eau leur est rationnée et ne coule dans leurs robinets que 2 à 3 heures tous les 24 heures : Ceci, aussi incroyable que cela paraît, est le lot des infrastructures hôtelières aujourd'hui, quel que soit leur rang. L'avant-projet de rapport du C.N.E.S. cité ci-dessus confirme indirectement cela en relevant « les tensions fréquentes sur l'eau entre villes et industries en raison d'implantations industrielles mal pensées ».

1.3.2. les besoins de l'agriculture :

Les activités agricoles, même si elles souffrent du manque d'eau au même titre que l'ensemble des activités économiques en Algérie, se maintiennent difficilement, en particulier grâce au hasard de la pluviométrie. Ainsi, certaines régions, en particulier au centre et au Nord-est du pays, sont plus arrosées que d'autres et concentrent ainsi une plus grande partie des activités de l'agriculture assurant un minimum d'emplois en majorité saisonniers, et des revenus de subsistance aux paysans.

Cela n'empêche pas, « la disparition de certains vergers traditionnels, suite à des prélèvements opérés sur les eaux d'irrigation » (1), au profit de l'alimentation en eau potable

des populations urbaines des centres-villes. La conséquence la plus importante qui en découle et qui élargit socialement la pauvreté, surtout dans les campagnes, est « une diminution très significative de la superficie irriguée équipée pour 1000 habitants, qui est passée de 13 hectares en 1962 à 5,4 hectares en 1999 » (2).

-1- C.N.E.S. (2000) :
Op.cit.

-2- C.N.E.S. (2000) :
Op.cit.

1.3.3. les besoins domestiques :

La question de la satisfaction des besoins humains en eau potable pour l'alimentation et l'hygiène des habitants, est celle qui dévoile le plus clairement l'état et le niveau de la pauvreté dans la société algérienne d'aujourd'hui. En même temps, les évolutions rapides en pire que connaissent ces éléments, indiquent une tendance certaine vers l'exacerbation des conflits sociaux et leur massification à partir de l'indisponibilité croissante des volumes d'eau potable requis, car cette ressource se transforme de plus en plus en une marchandise. Et en tant que telle, de plus larges catégories de la population n'ont plus et n'auront plus les moyens financiers de se l'approprier en fonction de leurs besoins incompressibles.

« En passant du tout-Etat aux multiples types de gestion privée, le secteur de l'eau en Algérie est désormais inscrit dans le catalogue des produits marchands. Une nouvelle politique est mise en place, et, tout autant que le secteur lui-même, la privatisation du secteur public reste théoriquement en tous cas l'inévitable implication de l'entrée en scène des opérateurs privés étrangers. La gestion ancienne ayant été mise au placard, le secteur de l'eau, face à la rareté de ce liquide précieux dans le pays, est ainsi entré dans l'ère de la libéralisation charriant déjà quelques nouveautés à son début, à savoir l'augmentation des prix » (1) dans un pays où seuls environ 1/4 de la population exerce une activité rémunérée et où le salaire moyen mensuel ne dépasse pas l'équivalent de 80 euros.

2 – Analyse sociale :

2.1 – la consommation domestique :

Comme on l'a noté plus haut, la consommation domestique d'eau potable pour les besoins en alimentation et en hygiène corporelle dépend de deux types de facteurs, les conditions techniques d'acheminement de l'eau aux habitants des villes et des campagnes et les revenus distribués, tous les deux imbriqués de telle sorte qu'ils participent en même temps dans la persistance et l'élargissement social de la pauvreté dans la majorité des couches sociales dans le pays.

Ainsi, la consommation domestique d'eau est de plus en plus tributaire des niveaux de revenus réels, soit pour les individus, les ménages ou les catégories sociales. Autant le revenu perçu est faible ou inexistant pour cause, par exemple, de chômage, autant l'eau consommée est insalubre mais surtout très insuffisante face aux besoins. Son caractère de consommation incompressible oblige l'individu, la famille et toute la catégorie sociale à sacrifier le peu de ressources de tout ordre dont ils disposent encore, y compris même parfois leur dignité, pour acquérir de quoi épancher leurs soifs.

2.2 – l'eau et l'évolution du revenu national :

Au-delà des analyses quantitatives poussées, qui malgré leur intérêt, noient les caractéristiques fondamentales des phénomènes étudiés surtout lorsqu'il s'agit comme dans ce cas d'un phénomène éminemment complexe, à triple connotation sociale, économique et donc aussi politique, quelles sont ces caractéristiques dans le cas du thème qui nous occupe ?

-1- « El-Watan Economie »(2005) : hebdomadaire spécialisé – n°18 – Alger – page 1.

Une de ces caractéristiques fondamentales, qui imprègnent depuis toujours l'économie de l'Algérie de son empreinte indélébile, est que celle-ci est uniquement mono-exportatrice de matières-premières, les hydrocarbures, par lesquels elle s'est intégrée au commerce international comme mono-exportateur et pluri-importateur. Le revenu national, dont ces exportations d'hydrocarbures, avec ce qu'elles entraînent comme ressources fiscales et para-fiscales, constituent la part la plus significative, n'a aucune source ou possibilité ni de diversification ni d'élargissement dans les conditions actuelles que traverse l'économie du pays.

Les incidences socio-économiques en sont immédiates et touchent toutes les catégories sociales : du moment que le système économique existant ne produit pas de valeur au même niveau que celui des exigences sociales et continue à vivre sur la rente que dégage le commerce extérieur des matières premières énergétiques, les possibilités de croissance et de consolidation du revenu national, en fonction de la croissance et de la transformation des besoins sociaux, sont quasi nulles. Tous les indices, que ce soit celui du taux de chômage annuel, celui de la création d'emplois nouveaux permanents par an, celui du volume des investissements nouveaux et de leur taux par rapport à la P.I.B. ou enfin celui du volume des Investissements Directs Étrangers (hors hydrocarbures), etc. montrent que le marasme économique, et donc social, de l'économie de l'Algérie, n'est pas prêt de diminuer, bien au contraire. Ainsi, le revenu national ne s'améliorant pas sensiblement en dehors des incidences hasardeuses du prix d'exportation des hydrocarbures, aujourd'hui positives mais pouvant se retourner dans le futur, le revenu disponible par habitant stagne, s'il n'est pas rongé par les différents types d'inflations existantes.

Ce revenu dans son plancher, pour ce qui est des emplois formels dont les contrats de travail sont à durée indéterminée, ne dépasse pas l'équivalent de 80 euros.

Le paradoxe lié au faible revenu de la plupart des salariés, dans un pays riche de la rente d'exportation de ses hydrocarbures (rente affectée à un « Fonds de Régulation des Recettes Pétrolières », en dehors de tout contrôle transparent ou parlementaire et qui avoisinent en septembre 2005 les 50 milliards de dollars américains courants) ne s'arrête pas là. En effet la faiblesse du revenu minimum pour les emplois formels est un luxe d'un autre temps, comparée à l'état des salaires versés, quand ils sont versés, par le principal employeur aujourd'hui en Algérie : l'économie parallèle, présente dans tous les secteurs de l'économie et dominant déjà beaucoup d'activités. Ces revenus mensuels informels, dont la contre partie est une exploitation du travail en dehors de toute norme et de toute reconnaissance de l'effort fourni par le travailleur, ne dépassent guère l'équivalent de 50 euros pour des rythmes de travail hebdomadaire de plus de 50 heures, en dehors de toute couverture sociale, en cas d'accident du travail de travail, de maladie professionnelle ou de licenciement.

Le montant de la facture de consommation d'eau potable, dans ces conditions, représente un immense sacrifice dont les victimes s'interrogent pourquoi il n'est pas amoindri ou pris en charge par les pouvoirs publics, vu leur état de pauvreté proche de la misère.

2.3 – l'eau et la dynamique de la pauvreté :

Ainsi, la crise de l'économie, avec ce qu'elle induit comme chômage, économie informelle, baisse drastique des revenus disponibles, segmente la société algérienne et fait éclater les catégories sociales, selon que celles-ci disposent, ou ne disposent pas, d'un revenu décent leur permettant de satisfaire, selon les normes admises, leurs besoins incompressibles en eau potable.

De plus en plus, autant la crise économique s'approfondit et touche une plus grande partie de la population à travers le chômage et les pertes d'emplois dues à la libéralisation en cours depuis 1990 ⁽¹⁾, autant les revenus disponibles des individus et des ménages baissent.

-1- En 1990, a été promulguée la « Loi sur la Monnaie et le Crédit » dite loi « L.M.C. » qui constitue la première étape de concrétisation des réformes libérales en Algérie.

Ces revenus subissent de plein fouet un réel « effet de ciseaux » concentrant les impacts en termes de pouvoir d'achat de l'effritement du taux de change du dinar (la monnaie locale) et la faiblesse intrinsèque des revenus distribués qui sont inhérents à la faiblesse de la productivité du travail dans le système productif national.

Dans ces conditions, plusieurs éléments se rejoignent et concourent au renforcement d'une véritable dynamique de la pauvreté, accentuant par là les obstacles face à la satisfaction des besoins incompressibles en eau potable des populations.

Car le prix de celle-ci devient de plus en plus prohibitif pour la majorité de la population, compte tenu de l'évolution croissante de ses coûts de production et des objectifs, aujourd'hui publiquement annoncés, de sa privatisation. En effet, pour l'A.D.E., « faire du service public de l'eau une activité attractive et commerçante implique qu'il faille vendre le mètre-cube de l'eau avec une marge sur son prix coûtant : - le coût du mètre-cube d'eau conventionnelle (barrages, forages) revenait environ à 44 D.A. (dinars algériens)⁽¹⁾ avant les hausses des tarifs de l'énergie. Il est vendu à 22 D.A. le mètre-cube en moyenne. Celui de l'eau dessalée reviendra entre 80 et 100 D.A. selon les sites d'implantation qui déterminent la qualité de l'eau mais aussi la facilité d'acheminement vers le réseau d'adduction » ⁽²⁾.

Qui peut maintenant, et qui pourra à l'avenir, subvenir de manière satisfaisante à ses besoins en eau, compte tenu de l'état de l'emploi et du niveau des revenus distribués en Algérie, tels que mentionnés ci-dessus ?

Centralité de la crise de l'eau et critique des politiques économiques :

1 – Analyse économique des politiques de développement :

Les réactions recueillies par les médias dans ces tous derniers jours, suite aux émeutes qui sont survenues dans la ville d'Arzew, principal port d'exportation du gaz naturel algérien, renseignent on ne peut mieux sur les échecs patents des politiques économiques suivies en Algérie depuis 1980.

Ainsi, un jeune de 26 ans de cette ville secouée par des émeutes qui ont fait des morts et des dizaines de blessés : « Je ne suis pas fier de ma condition. J'ai tenté des centaines de fois de me débrouiller un boulot, mais ces gens-là (d'un hochement de tête, il désigne les usines de la zone industrielle d'Arzew) ne veulent pas des personnes comme moi. Ils ont toujours la réponse qu'il faut pour te couper tout espoir de trouver un travail. Aux exclus du système éducatif, comme moi, ils nous demandent des diplômes. Aux jeunes universitaires, ils demandent l'expérience. Enfin, pour ceux qui sont universitaires et expérimentés, ils avancent le critère d'âge, sous prétexte que l'entreprise procède au rajeunissement de ses effectifs pour préparer la relève »⁽³⁾.

Plus que tous les discours et toutes les analyses, ces quelques phrases dites spontanément résument on ne peut mieux la crise de l'économie algérienne, dont les répercussions immédiates sont le chômage et la précarité pour des pans entiers de la population.

Ne créant pas d'emplois à la mesure des demandes sociales, ces politiques de développement commencées par des réformes de structure durant les années 1980 et se poursuivant par une libéralisation graduelle de l'acte économique, pour toutes les marchandises y compris l'eau, depuis 1990 ⁽⁴⁾, elles échouent à réaliser le moindre de leurs objectifs, puisque ni les réformes de structure n'ont amélioré la productivité, ni la libéralisation n'a conduit à un programme d'investissements conséquent dans les secteurs de la production, principaux pourvoyeurs traditionnels d'emplois nouveaux.

-1-S'étant déprécié de plus de 1000 fois depuis le début des années 1980, le dinar vaut aujourd'hui 0,13 euro sur le marché libre.

-2-El Kadi Ihsen (2005) :
Op.cit.

-3-A.S.A.(2005) : Émeutes de la ville d'Arzew : le calme revient.
« El-Watan » - quotidien - Alger - page 2

-4- La première loi prônant la libéralisation économique et financière, dite Loi de la Monnaie et du Crédit, a été promulguée en 1990.

2 – Analyse prospective des impacts sociaux de ces politiques :

Cette situation produit des effets économiques et sociaux qui s'enchaînent pour élargir socialement la pauvreté, dont le critère de la satisfaction des besoins en eau potable n'en devient qu'un révélateur parmi d'autres. Dans le même temps, l'inexistence ou la faiblesse des revenus disponibles pour les catégories sociales marginalisées entraînent dans un effet « boule-de-neige » incessant une pression toujours accrue sur les possibilités de consommation de l'eau potable.

La question de la crise de l'eau, en particulier l'eau potable pour les besoins humains, devient ainsi une question centrale dans l'approche globale de la crise structurelle de l'économie et de la société en Algérie.

En effet, la pauvreté due au chômage et à la précarité des populations, couplée à la marchandisation de plus en plus croissante, pour cause de libéralisme, de la ressource naturelle dont l'eau, entraîne un moindre accès social à celle-ci.

Un cercle vicieux de la pauvreté s'élargit, car parce qu'elles sont de plus en plus pauvres, les catégories sociales marginalisées sont rejetées hors des villes disposant de réseaux de distribution d'eau potable et d'assainissement des eaux usées.

Ce faisant, les banlieues excentrées et les campagnes isolées où elles sont confinées disposent encore moins de structures de distribution d'eau potable. Celle-ci, quand elle existe, l'est toujours en quantité limitée et fait l'objet de trafics la rendant encore plus chères pour les pauvres. Quand elle résulte de leurs propres efforts de recherche de puits ou de sources pour s'approvisionner, elle n'est ni traitée ni exploitée dans le respect du maintien des capacités potentielles des nappes et des sources d'où elle est puisée.

Ainsi, l'une des principales ressources publiques, l'eau, dont le caractère de « bien public » ne souffre d'aucun doute, n'a jamais été l'objet des politiques économiques successives. En revanche, les objectifs de la libéralisation, ignorant le sous-développement social et économique du pays qui impose des fonctions sociales et économiques à l'État à la place du « tout marché » veulent rapidement englober le bien public « eau » et limiter sa consommation à ceux des individus qui ont un revenu suffisant pour le consommer.

Conclusion :

Ne pouvant résulter d'une évolution imprévue et hasardeuse, la connexion entre la question de la pauvreté, parce qu'elle s'élargit socialement à un rythme rapide, avec celle de l'eau parce qu'il s'agit d'un « bien public », doublement singulier à cause de sa nature de « bien de toute la collectivité » et en même temps ressource assurant la poursuite de la vie humaine des individus et des groupes, qui sans cela ne pourraient vivre, est bien le résultat de choix politiques des pouvoirs représentant les États, et ayant le monopôle de la décision dans les pays du Sud comme en Algérie.

En effet, nous avons estimé, d'après les indications du prix de l'eau et du revenu minimum distribué des individus ayant un emploi aujourd'hui en Algérie, la part du coût de l'eau pour l'algérien moyen. L'estimation du coût de l'eau rapportée au revenu minimum mensuel distribué (r.m.m.), au delà des discours politiques et des sophistications académiques justificatrices des politiques en cours, dévoile la réalité de l'eau en tant que révélateur central de la massification de la pauvreté au Sud, même dans les pays « Sud-rentiers » tels que l'Algérie.

Cette estimation s'établit comme suit, quand on prend comme hypothèse une famille moyenne composée de 07 personnes.

Critère de satisfaction des besoins en eau potable par personne :

- pour l'O.M.S. = 150 litres/jour/individu.
- pour l'Etat algérien = 110 litres/jour/individu

-a- eau conventionnelle :

- a1- prix du mètre-cube : 22 DA.
- a2 – revenu minimum mensuel (r.m.m.) : 8 000 DA

a3 – Part du coût de l'eau/r.m.m.= de 40% à 60% selon soit le critère local de satisfaction, soit celui fixé par l'O.M.S.

-b- eau (de mer) dessalée :

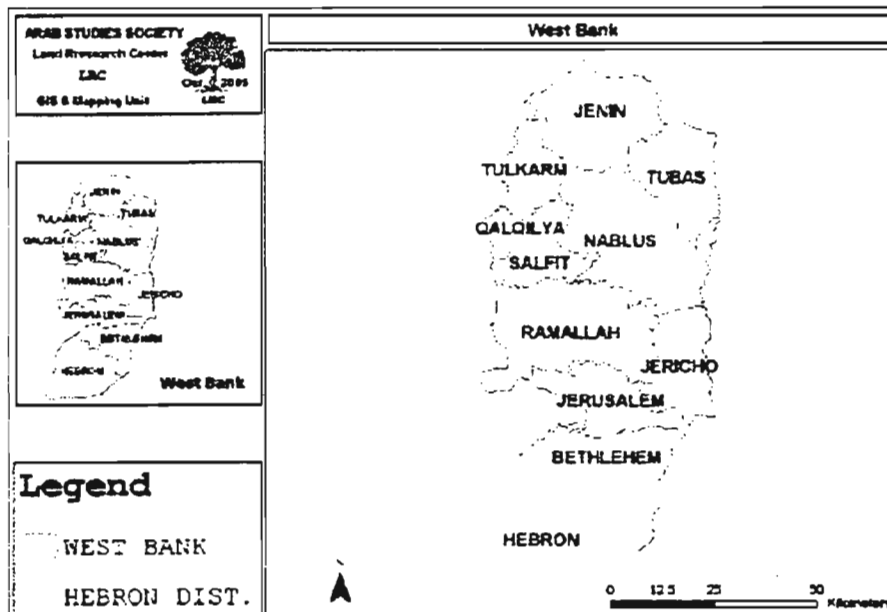
- b1 – prix du mètre – cube 44 DA.
- b2 – r.m.m. 8 000 DA

b3 – Part du coût de l'eau/r.m.m. = de 80% à 100% selon soit le critère local de satisfaction, soit celui fixé par l'O.M.S.

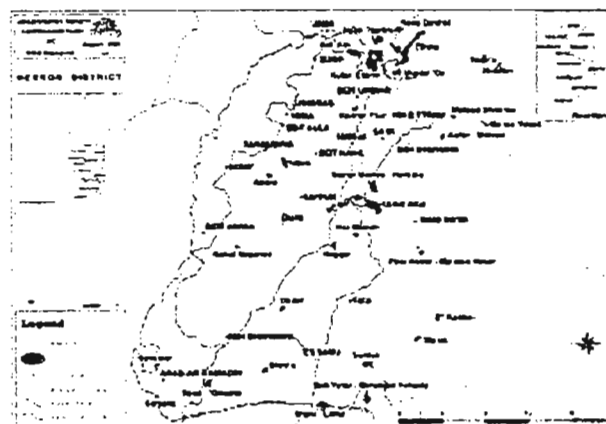
Location, population and area:

Hebron district is located at the southern part of West Bank. Its total population is half million and its total land area is 1036 km² which makes it the biggest district in West Bank. After the war of 1948, the district lost 50% of its original land area to Israel.

Once the Annexation and Expansion Wall plan has been completed, another 50 km² (about 5% of the district land area will have been lost).



There are 25 Israeli colonies in Hebron district, with a total population of 13000 Israelis. Colonies occupy 5.3 km² (about 0.5% of the district's total area).



Israeli colonies and a apartheid Wall in Hebron district

Climate, topography:

The district has arid and semi arid climate. Elevation ranges from 100m to 1021m above sea level. The general topography is hilly to sloppy at the western and eastern parts of the district. As regards temperature the average in winter is 5.8 centigrade and 22 centigrade in summer. Climate variety is caused by topographic variety.

Rain fall:

Hebron district has a Mediterranean climate and has about four rainy months (December – March). The average annual rainfall in the western part of the district varies from 300 mm in the south to 500 mm in the north. In the eastern part, it varies from 100 mm to 200 mm. In the heart land mountainous area, the average annual rainfall varies from 500 to 700 mm. The latter average is higher than that of the most famous grain producing countries, but yet, the problem here is the non- equal distribution of rain fall through out the months of the year and the long period of summer time (dry season). About 65% of annual rainfall occurs during the months of December, January and February.

Evaporation is principally strong in summer as a result of high temperature, intensive sun shine and low humidity. In the western part of the district, the evaporation rate is around 1700 mm per year while in the eastern part its is around 1900 mm per year. Evaporation decreases to 1500 mm per year in the heart land mountainous area. The annual volume of precipitation in Hebron district is 390,720,450 M³. The annual volume of rainfall that infiltrates to underground water is 105,494,521.5 M³. The annual volume of runoff is 15,785,106.18 M³, while 2,096,822 M³ is coming out through springs and dug wells and 103,397,699.5 M³ infiltrates to the deeper groundwater aquifers.

Vegetation and land use:

Out of the total area of 1036 km², arable land amounts to 257.12 km² and mainly supported grains. The irrigated area which mainly supported vegetables is only 2.5 km² or approximately 0.2% of the total area. The area of permanent crops, such as grapes, olives, citrus and other fruits is 108.05 km². The area of urban areas is 78.46 km² or approximately 7.6% of the total. Woodland and forests represents approximately 0.8% of the total area or about 8.5 km².

The very low figure above regarding irrigated area clearly reflects the water problem in the district.

Current water situation:**A. Available water sources:**

Palestinians in Hebron district get water from the following sources:

1. **Locally:** from springs, dug wells and cisterns.
2. **Purchased:** from the Israeli Mekharot water company despite the fact that the great portion of water is taken from the West Bank aquifers and resold to Palestinians.

Total Available Water Sources and Output per Capita

District	Pop.	Total available sources MCM					
		Local sources			Purchased sources from Mekharot MCM	Total of water	Average per capita
		Dug well	Springs	Water harvesting (cisterns)	Total		
Hebron	500000	1127448	983808	1810595	3921851	7831000	11752851 64

The table shows that the average per capita in Hebron district is 64 liter per person per day. Out of this quantity about 30-40% goes to agriculture, industry or lost due to network leakage or stealing. Therefore, the remaining amount for domestic use do not exceed 30 liter per person per day, especially during the dry summer time (from may to October). It is a stunning figure and it is significantly below the 100 liters per day recommended by the World Health Organization as the minimum.

Inequity in water distribution and pricing:

On the contrary, Israel's per capita water use is approximately 350 liter per capita/day, or five times that of Palestinians while Israeli colonists who live in the occupied Hebron district consume six times as much water as Palestinians.

Relevant research has shown that, historically, Mekhorot has applied a system of pricing whereby Palestinians are charged exorbitant rates while Israeli settlers occupying land in the Territories enjoy a lower pricing scheme. Whereas settlers pay \$0.40 per M³ for domestic consumption and a highly subsidized rate of \$0.16 per M³ for agricultural use, Palestinians pay a standard rate of \$1.20 per M³ for their piped water.

Significant price increases that have occurred over the last five years have dramatic impacts on consumers when the decrease in employment and income are taken into consideration; income is decreasing while costs are increasing.

High prices coupled with rising un-employment ensure problems; in some areas of Hebron district the percentage of families unable to pay water bills is as high as 100%.

B. Water Conveyance:

- The total number of communities in Hebron district is 145 (cities, towns, villages, refugee camps and Bedouin camps).
- According to LRC field work, only 73 communities have water network coverage (almost half).
- 22 communities out of the 73 are having a 100 % water network coverage (about 30% of the total or 15% of the total number of communities in the district). For the rest of communities, the average network coverage is 50%.
- Only two thirds of the served communities enjoy constant water flow, while the rest suffer short, medium and long water stoppages due to the lack of quantities from source.
- The average water network age in served communities is 25 years.
- The water network conditions in 18 communities are classified as leaking (24%) .
- The water network conditions in 29 communities are classified as good (42%).
- The water network conditions in 26 communities are classified as bad (35%).
- Regarding communities who don't have water network coverage or limited coverage they have to buy water from mobile tanks at high prices or depend on collected rain fall in their cisterns or get water from springs.

C. Israeli water terrorism

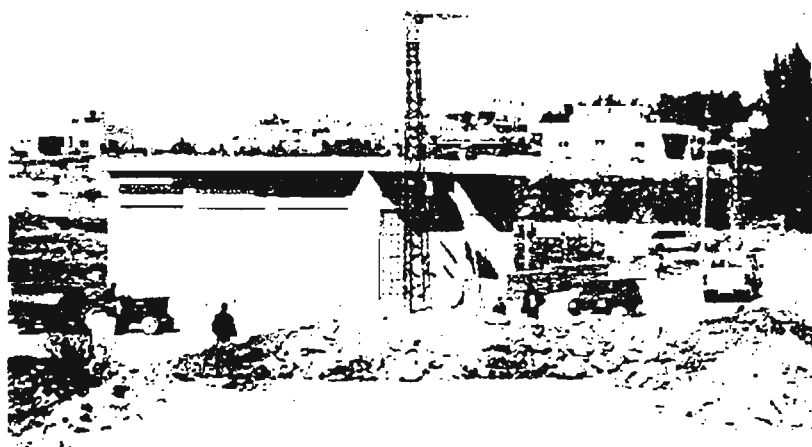
The most important obstacle for Palestinians is the inability to get control over their water resources. This has been due to the following:

1. Dependency on the Israeli water supplier, Mekhorot company, which routinely cuts services and limits supply. Moreover, many rural communities that rely on Mekhorot for their water supply are forced to seek additional sources, such as tankers, cisterns and springs because the amount supplied by Mekhorot alone is insufficient to meet even their basic needs.



With the unit roll in place (by Mekhorot), the opening is only 24 millimeters in diameter instead of 4 inches diameter.

2. Tight closures on the city of Hebron, towns, villages and refugee camps by the means of checkpoints, cement blocks, earth mounds, iron gates and trenches and the expanded implementation of permit and regulation systems results in the inability of water tankers, in many cases a primary water source, to reach their destination. Closures, checkpoints and curfew have had a devastating impact on nearly every aspect of Palestinian daily life. Routinely imposed by the Israeli Occupation forces, these measures are often employed as collective punishment, or simply as a means of further humiliation and destabilization. As a result of these harsh policies, numerous communities in Hebron district have been left without food, work and/or water and other necessities for days, weeks or even months. With regards to the water sector in particular, these restrictions impose incredible barriers on tankers' access to communities. Water tankers have become an especially vital source of water to many Palestinian communities in light of reductions from Mekhorot and insufficient water networks. In addition, the restrictions hinder the availability of wastewater and sewage removal, block passage of maintenance teams en route to repair water and wastewater infrastructure.



Road blocked with earth mounds in Surif town- Hebron

Increased difficulties related to travel and water transport, of course, also have economic consequences. Water tanker drivers are well aware of the risks in their job due to travel, and the various restrictions along their route that may either deem their destination unreachable or put them in danger of arrest or worse. Such conditions equate to unavoidable price increases imposed on an already deeply ailing economy (consumer have to pay an average of 100 NIS per 10 M³).



Water tank descending an earth mound set up by the Israeli army on the road to Yatta (August, 2003)

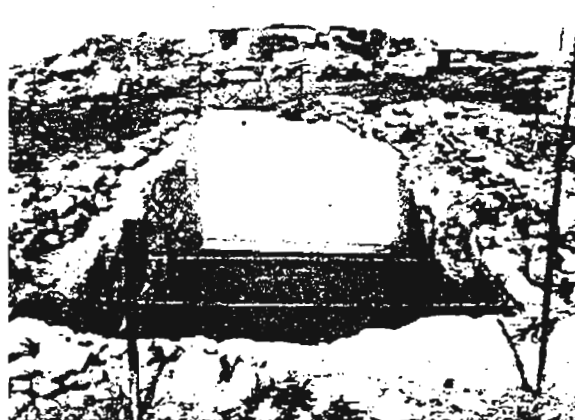
3. Destruction of primary and secondary water lines in many Palestinian communities by the Israeli army bulldozers.



A pool created by the destruction of water pipes in Beit Ummer town by Israeli bulldozers (January 1994)

4. Demolition of many cisterns and pools in Hebron district under the pretext of un-licensing or for security reasons. During the current Intifada, more than one hundred cistern and pools have been demolished in Hebron district. Roof tanks are either a deliberate target or are caught in the line of excessive gunfire from Israeli occupation forces. Hundreds of roof tanks have been damaged by Israeli gunfire.

5. Springs and tankers are also a target of the Israeli army during military incursions.



A cistern destroyed in Yatta for un-licensing (March 2003)

Damaged springs in Hebron District

Complete Damage	Partial damage	Total
71	66	137

Damaged Tankers in Hebron District

Complete Damage	Partial damage	Total
9	25	34

6. Colonists' violence and destruction is another serious concern facing Palestinian communities. In light of the near impunity granted to Israeli settlers living in the West Bank and Gaza, it is not uncommon that settlers wreak havoc on Palestinian communities. Attacks are widely viewed as strategic actions taken to force the expulsion of Palestinian communities in order to enable settlement expansion and land/resource confiscation. In regards to water, a number of cisterns, wells and springs have been poisoned or contaminated at the hands of Israeli colonists living in Hebron district.
7. Denial of infrastructure development and maintenance within Palestinian communities (refusing permits, banning drilling of wells, pumping quotas, etc...). As far as the water crisis is concerned, Palestinians are not allowed to dig new wells in their areas because of Israeli fears that subterranean water resources might be affected. But the real purpose, Palestinians argue, is Israel's intention to keep its hand on the taps. "Whoever's hand on the tap can control the fine details of other people's daily life. Israel is imposing a general siege on the PNA areas and allows herself to decide how many glasses of water Palestinians are allowed, or rather un-allowed, to drink,"

Pollution Sources

The range of potential pollution sources is unfortunately vast, though among the most frequently reported are nearby dumping sites, waste and sewage from colonies specifically (including Israeli military bases and industrial sites) open wastewater,

sewage flow (where the source is not always specified, though could include colonies as well as nearby towns and cities), wastewater flow and percolation pits. Other reported pollution sources include factors such as solid waste sites, coal and industrial production, animal waste and the consistent burning of plastic and garbage (due largely from insufficient ability to evacuate it).



Sewage flow from Israeli colonies in Hebron district

Only two thirds of the city of Hebron is served by sewage network. In addition, there are only three villages in the district which are partially served with sewage networks: Kharas, Nuba and Deir Samit. The rest of communities use house cesspools (percolation pits) as a means of getting rid of waste water which seriously causes ecological hazards to underground water and environment.

Health situation

Given the intrinsic relationship between water, sanitation and community hygiene, it can be no surprise that public health among Palestinians has suffered drastically as a result of the Occupation and recent antagonism. The forced usage of "alternative" contaminated water sources, inadequate sewage and waste control as well as the inability to implement a regulatory water infrastructure have led to a sharp rise in water-related diseases. Skin infections, diarrhea and amoeba are widespread in many communities in Hebron district.

In addition, 7 communities reported high incidents of cancer, which may or may not be related to water and/or sanitation conditions, but should warrant further investigation.

In the past five years of intensified closures, movement restrictions, military incursions, destruction of infrastructure and unprecedented unemployment, have all severely impacted Palestinian health and access to healthcare. A situation that was hardly sufficient prior to the Intifada has become significantly worse, as health is intricately linked to the social conditions that have deteriorated in Hebron district. Despite the valiant efforts of hospital staff and medical personnel to attend to that in need and certainly, the number of that in need has grown over the course of the Intifada, the barriers to providing and receiving healthcare are great.

In addition to direct attacks on health infrastructure and access to healthcare, devastation within the water sector also lead to increased disease and insufficient sanitation. There is strong evidence that the spread of disease in many communities is linked to the forced use of "alternative", contaminated water sources, insufficient or no watertreatment, absence of wastewater networks and/or blocked access to waste

removal, polluted water sources and/or sewage flow and contamination from nearby colonies. Of course, these conditions are compounded by closures and the consequent inability to reach medical care.

Water-Related Infection

Despite efforts to treat water in the face of potentially dangerous conditions, the dependency on alternative and inconsistent sources of water, coupled with subsequent poor sanitation and hygiene, has led to an outbreak in water related infections and diseases in many communities.

Certain related diseases that were specifically monitored include amoeba, dysentery and skin diseases, however, there were also several reports of other such as bacterial infections, kidney diseases, diarrhea and intestinal worms/pinworms..

In any case, poor health and frequent infection is compounded in Palestinian communities in light of limited or blocked access to medical facilities and care.

Implications of the Apartheid Wall construction

- Isolates people from wells and water sources which are located on the "other side of the Wall (be it western or eastern);
- Isolates lands which are in need of water for irrigation;
- Damages and completely destroys wells, cisterns, reservoirs and/or water pipes;
- Interrupts water pipe routes which can not be rerouted because of the Wall ' s construction;
- Blocks transport of water via tankers;
- Blocks access to Public Health Centers and medical assistance.

Urgent Findings and Recommendations

1. A complete and comprehensive end to the Occupation, including the Palestinian control and rights over their water resources, in addition to the full removal of the Wall, are the basic solutions to all problems related to water in Hebron district.
2. Ample and good quality water, at least of the minimum quantities assigned by the World Health Organization, must immediately be made available to all Palestinian communities.
3. All checkpoints, fixed and mobile, must be removed in order to assure access to necessary water supply and other resources.
4. All colonies must be dismantled in order to return Palestinian land and resources to their control, and remove the problem of wastewater production and flow which is damaging the environment and polluting ground water resources. In the interim, there must be an immediate solution to the flow of wastewater and industrial waste coming from colonies.
5. All communities currently unconnected with water and wastewater networks, or with networks that are not functioning, must be equipped with functioning networks. Cisterns should only be seen as a secondary tool for water management since, in most cases, the quantity of water is only enough for part of the year (basically during winter time).
6. Water quality of all sources, networks and households must be routinely tested and monitored in all Palestinian communities and improved where unacceptable.
7. Solid waste must be removed from all temporary dumping sites currently being used by nearly all Palestinian communities. Sanitary landfills must be constructed as an alternative.

8. Public Health Centers must be established in all Palestinian communities, especially in light of current checkpoints and closures affecting individuals' ability to get basic medical care especially during emergency cases.

9. Until rights over water management are handed back to Palestinian control, the Israeli Mekhorot Water Company must increase supply levels in light of community needs and population increases. Mekhorot Water Company's "normal" water quantities to Palestinian communities have been the same since 1967 until before the beginning of the Intifada in September 2000, when the Company began reducing the supplied quantities and even completely stopping supply in some cases. Taking into consideration the increase in population, needs and standard of living, the "normal" quantities must be increased.

10. Construction of the Wall must be stopped immediately, sections already built must be dismantled and people must be compensated for damage to land and resources. The Wall is a new version of an old plan, based on discrimination and land and resource confiscation. The Western Aquifer, located almost entirely in the West Bank and among the most valuable water resources in the region, must remain under Palestinian control in order to ensure consistent water supply to Palestinians.

11. Promoting rainfed farming in the district is another tool for increasing water quantity in the district. Despite the immense quantities of water that are used by Israel for agriculture, this sector contributes 2.4% to the GNP while in Palestine agriculture contributes 30% to the GNP. The agricultural sector employs 3.3% of the working force in Israel compared to 25% of the working force in Palestine. Optimization of water use for irrigation, development of rain fed farming, cultivating low-water consuming crops, and reducing water subsidies by Israel are effective trends for proper use of water in the water-scarce area of the Middle East.

5. Specifically, three issues - water equity, increasing water supplies and appropriate water utilization - should be considered within a single formula. **To reiterate: the water crisis is not one of insufficient supply, but of an uneven and inequitable distribution which is aggravated by inappropriate consumption practices.**

6. Improving water conveyance systems and water distribution service to international standards may also assist in conserving water. Water networks in most Palestinian communities are old and deteriorating causing a water loss due to leaking. This water loss is estimated at 40% of the water passing through these systems. As a priority, the maintenance of the existing water networks is therefore essential and may save Palestinians additional water quantities and provide efficient utilization of the available resources.

7. Increases in service levels must be accompanied with programs targeting conservation and awareness to meet projected demands and to emphasize efficiency in utilization. Low-flush toilets, for example, can significantly reduce water volumes consumed.

8. It is essential to create an infrastructure in the district which would enable a sound and integrated management of the available water resources. Information is a key factor in this process. Establishing water monitoring stations and an information networks which would feed the Palestinian Water Authority (PWA) with vital data required for planning and policy formulation is a priority. A multi-disciplinary water information database which is integrated with a powerful Geographic Information System (GIS) could also provide the PWA with tools for analysis and planning. Such system could allow the modeling of ground and surface water in regard to quality and

quantities, through which outcomes for proposed water projects and policies can be projected and evaluated. Social and economic factors could as well be integrated in the system to display a comprehensive and inclusive representation of the water sector in the district

9. Promoting the capacity building of the regional parties in the area of integrated water management.

10. Promoting the participation of water planners, distributors and users in the district in decision making;

Enabling Poor through Institutional Alternatives to Access Drinking Water Supplies in Rural India *A Field Review of Some Best Practices*¹

K.V.Raju² and S.Manasi³

Abstract

Addressing rural water supply concerns has been on since the First Five Year plan of India. Since providing water is a state subject, various approaches have been adopted to reach the targets, but to no avail, results have been mixed and unsustainable, most of the times. Approach has been shifted from supply driven to demand driven lately. Setting up strong institutional set up is seen as one of the focal point to solve the crisis. While the government has been spending crores working out processes and methods, innovative efforts undertaken by four villages in Karnataka were documented, thus revealing their efforts in addressing the problem amicably. Drawing lessons from their experiences would aid the government in replicating such models.

Background

Rural water supply is one of the major challenges that has been addressed by the Indian government and attempts made towards tackling the crisis in providing safe and adequate water to the rural people. Lately, the problem has become particularly severe in rural areas. A review of the government's efforts in implementing various programmes, policies adopted has shown inadequate progress in providing sufficient quantity of potable water to all persons (Rajashekar and Veerashekarappa, 2003, Raju et al, 2004). Several factors like increased urbanization leading to negligence of traditional water sources, lack of water management, resource depletion due to overexploitation of existing resources, ineffective co-ordination between departments and inadequate institutional setup in addressing the problem have led to the severity of the problem over the years.

It has been internationally accepted that rural water supply and sanitation services are managed more efficiently at the lowest appropriate level and has to be strengthened for sustainability of the program. However, the understanding with respect to the degree of the most appropriate level is still being experimented. With the shift in approach where the government acts as a facilitator and not a provider, the role and functions in implementing water supply schemes are streamlined from the Central, State, PRIs and village level and focus has been to involve community intensively.

- *Community participation:* The idea has been to promote demand-driven approach by empowering villagers to ensure their full participation in the project at every stage and decision making on the design and management arrangement.
- *Community facilitation:* Role of the state, district and village level has been to facilitate community in scheme selection and effective monitoring and evaluation mechanisms to ensure high quality of construction and sustainability of investments and also ensure co-ordination of project components at the village and district level.

¹ Paper submitted to the International Workshop on Water Poverty and Social Crisis: Perspectives for Research and Action, to be held on 12-15 December 2005 at Morocco. This paper is based on a larger study supported by the IWMI-TATA Programme.

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- *Community contribution:* Focus has been to involve the beneficiaries to develop a sense of ownership and responsibility through capital cost sharing and operation and maintenance.
- *Community awareness:* Community awareness on water resources and management of water through conservation.
- *Capacity building:* Capacity building of the beneficiaries and make them self sufficient in managing the made-available systems so that they do not depend on external help.

In this context, streamlining of roles at the local level has been different in different states. The situation in the Indian context is between the *Gram Panchayat* (Village Council) and Village Water Supply and Sanitation Committee (VWSC). The usual practice in many villages has been that, VWCS's are co-existing with GP's and sometimes as sub-committees and also independent institutions. Few studies conducted reflect opinions on the functioning of the systems at the village level. Jal manthan meeting (a travel forum that aims to be network for informal policy level dialogue between sector practitioners and professionals) – Comparative advantages of two institutions i.e. Gram Panchayat and Village water supply and sanitation committee was taken up. The results of an exercise conducted to compare the performances of VWSCs and GPs, the main activities on capacity building, planning, implementation, operation and maintenance and monitoring were probed. It was difficult to draw definitive conclusions on perfect institutional models. VWSC has been efficient in planning and implementation process while the GP's had excelled in accessing engineering skills in post implementation stages. There was no specific model that could be termed at the best one rather adopting a 'situational approach' was considered as the best option (Water and Sanitation Program, 1999).

Though several programs were implemented over the years, its organizational structure and implementation arrangements were different across the different programs (Rajashekar and Veerashekarappa, 2003). The World Bank programs created village level organizations under their programs while local elected bodies represented the line departments at various levels. The organizations were assigned functions and were provided assets to undertake the functions. The study examined the functions, assets, processes, and development outcomes of the local organizations. Experiences, progress, problems and lessons learnt shared by representatives of 10 World Bank supported projects on RWS in Asia. It was observed that although the objectives and components of these projects were same, the project design adopted were different with respect to technical designs, procurement procedures, cost sharing arrangements, site selection criteria, disbursement methods and community training methodologies.

Institutional aspects are highlighted in several studies. e.g, Saleth (1996) highlights on one institutional option open to us is the establishment and administration of a water rights system. Under this system, water quotas are legally established as part of water rights system so as to limit both individual and collective water withdrawals from both surface and subsurface sources. The durable approach for addressing this supply gap of water and its attendant use/user conflicts lies not in creating additional potential but in promoting the use efficiency and conservation of the already developed water resource potential. Obviously, this approach requires fundamental changes in

current institutions (water policy, water law and water administration) governing water resource development, distribution and use. As long as ground water continues to be a common property, or open access resource and surface water a public good, it is not at all possible to create the individual and collective economic incentives which are feasible only under a private and transferable property rights system where the availability of water at the individual and collective levels are quantitatively limited.

Although the focus has been to evolve the most effective and sustainable institution at village level for delivery of RWS services, there is a complex relationship between two village-level organizations and it may not be an 'either-or' situation but rather a 'both'. In this backdrop, the experiences of the success stories throws light upon the intricacies in the process observed, possibly overlooked by the government schemes.

Four Success Stories

1. The Yanegudde Experience

Yanegudde with 70 houses is a coastal village of Katapadi Grama Panchayat of Udupi district in Karanataka. It had faced severe scarcity problem owing to saline water sources and unsafe for drinking and usage. Scarcity was severe during the summer with the salinity levels going high. People had to walk between 1 to 1.5 kms to fetch water depending on the location of their households. During the year 2000, the village was connected with piped water supplies (PWS) and has made all the difference to the people in terms of availability and accessibility to clean and sufficient water. The PWS is totally the effort and involvement of the people with the right leadership of developing an institutional set-up for sustainable and effective implementation.

Triggers

Initiative of the local minister- People in this village have sufficient access to drinking water and much more to meet their daily requirements, which resulted out of a combined effort by the then the State Cabinet Minister of Fisheries Mr. Vasanth Salian, Malnad Development Authority and the philanthropic attitude of Mr. Devdas Alwa who donated the land. "Sampath Multi-purpose Co-operative Society" was thus formed making people from every household as members. The objective of the society was to spread its activities to various sectors (like marketing fish, agricultural produce etc) apart from bringing about effective water supply. Thus, a planned and joint effort resulted in the installation of a pipeline from the open well from where people used to collect water. It was considered important to involve all the households in managing the system. So informing and involving people at every stage was focused upon meticulously resulting in awareness about the functioning of the society, its roles and functions.

Members of the society had agreed to contribute and the minimum contribution was fixed at Rs.2500 irrespective of the economic background. All households paid the money. However, some economically better households contributed more. An overhead tank of 50,000 litres capacity was built by digging an open well, 7.5 h.p pumpset is fixed to pump water to the over head tank. Another unique feature was providing

pipeline connection to seven households, which were alienated from the village by a river indicating their meticulous efforts.

The society has appointed the water fee collector based on volumetric basis, for which the society has installed water meters to all households. Owing to defunct meters, households have ended up paying water fee of Rs. 60/month/household. Though, meters were installed in all houses, due to frequent floods during the rainy seasons, the meters were rusted. Repairs are currently being carried out. Delay in payments is acceptable up to 3 months and after that a warning notice (printed format) is issued to the defaulter reminding him to pay failing which the water supply will be cut.

The governing body of the society looks into the details of the functioning of the system and meets every month. All members attend the annual meeting where the accounts are explained to the people and future plans are discussed and suggestions are welcome. Members vouch for the transparency and accountability in funds collection and expenditure. The formats used are simple and are understandable by a common person. Future plans of developing other dimensions towards development of fisheries or other income fetching ventures are discussed in the meetings. Gram Panchayat, Taluk Panchayat and Zilla Panchayat (District Council) have no role to play in water supply in this village as it was executed and maintained by the society on its own.

Management:

- Waterman is in charge of supplying water to 3 different segments of the village using the valve system. Water is supplied for 45 minutes between 6.30 to 9.30 a.m every day to all 70 houses.
- Houses (25) have built a sump and placed a plastic overhead tanks (500 litres capacity). with 1 h.p. pump.
- Waterman is also in charge of collecting bills.
- Rules are clear on payment schedule and penalties.
- Households are not expected to waste water and will be fined if deviant.
- To take care of motor burning and or repairs, an additional pumpset was purchased by the society.

Positive impacts: a) Water is supplied adequately and timings are maintained and people are highly satisfied; b) LPCD among the sample households indicated that 17 out of 20 households accessed more than 70 lpcd and the rest between 40 to 70 lpcd; c) Unique achievement has been to lay a pipeline under water to reach the households separated from the other households on the other bank of the river. These 7 households also are connected with PWS with household connection; d) People are aware about the whole process. Everybody in the village is clear about the functioning of the system. They have absolutely no complaints about the society formed. . Everybody follow rules and there has been no problem. If there are defaulters, others immediately object and complain to the authorities who warn the respective households immediately, which is uncommon; e) Users are totally aware of their roles and responsibilities. Users have been involved right from the beginning of the plan and are aware of the whole process. They attend the meetings regularly.

2. The Zaadshapur Experience

Zaadshapur village is comfortable with water supply levels and accessibility. Source and quality was not a problem either. Mainly owing to efficient implementation by the Zilla Panchayat (ZP), good management by Gram Panchayat (GP) and co-operation by the people, water resources have been managed efficiently. ZP's co-ordination with the Lion's Club implemented the Accelerated Rural Water Supply scheme by involving local people at every stage. With completion, GP has taken over the operation and maintenance and is managing effectively. The GP conducts Grama sabhas regularly (once in 6 months), repairs are followed up immediately, regular water supply (total of 4 hours, 2 in morning and 2 in evening). The gram panchayat secretary and the president are approachable to follow up on any matter. It is interesting that people are also involved, are aware about the schemes, co-operative with respect to paying water charges (except for 10-15 households who delay), no wastage and misuse is reported.

Zaadshapur village with 176 houses in Desur Gram Panchayat belong to Belgaum district of Karnataka. Earlier, groundwater was extracted from open well at 15 feet depth. After introduction of piped water supply (PWS), people get water largely from public standposts and at times from the borewells.

Triggers

Problem free village yet people are co-operative and involved:

- The village has one open well which was the main source of water supply for the whole village. There was sufficient water except during summer and people would go to fetch water from private open wells situated few meters away. The water supply was upgraded with the introduction of BWHP, MWS followed by PWS at different points of time.
- Majority of the households are willing to pay between Rs.50-100/month, although they do not have household connection.
- People are keen on adopting alternative strategies like roof water harvesting, if initiated, 85 percent were not willing to spend. They were willing to co-operate if the GP would spend for the same, but were willing to contribute in terms of labour.
- Lions Club involvement was crucial in creating awareness. Willingness to pay is high in this village, factors for good co-operation may be attributed to the initiatives taken by the Lions Club and also the small size of the village where it is much easier to congregate and discuss issues. Apart from the above, water supply has never been a problem and up gradation meant more convenience, which was welcome.
- However, the usage was around 55 lpcd. A few did not require even 40 lpcd. People in this village (10 households) were not keen on bathing everyday although they had access to plenty of water. People expressed that they were used to having bath twice in a week and did not feel the need to bathe everyday.
- People are willing to pay more and co-operate if there is a need to increase the charges. People were very involved and personally took turns to supervise the construction of the overhead tank. They perceived that it is for their own benefit and feel very responsible towards the resources of the village.

Simplified management: There is one waterman in the village and is paid a salary of Rs.1000. There are 3 hand pumps, which is in use. Hand pumps are placed in 3 different streets. There is one MWS tank in the village and placed conveniently. Water is let every day for 4 hours in all the street taps. There is one PWS in the village connected to a borewell with a depth of 200 feet. The capacity of the tank is 50,000 liters and a 5 H.P motor is installed. Water is filled once in 2 days into the tank and requires 9 hours to fill the water. Water is pumped through a borewell into the overhead tank and let twice in a day for two hours through the public stand posts. The stand posts are placed in 4 streets. Each stand post has 2 taps fixed to it. The stand posts are well placed at the center of the street, as it is apt in terms of fairness and convenience. People are able to access as per their requirement. There are no household connections. 92 households have signed an application requesting for household connection and have agreed to pay Rs. 300 deposit and Rs.20/month. The process is on for the same. Water overflow from the overhead tank is directed into the open well situated beside the tank to avoid wastage.

Good co-ordination: Grama Sabhas are conducted regularly with prior information and 70 percent of the people attend it. Women are more vocal and attend GS's, women mostly ask for loans and other problems, as they do not face any water problem. People pay the water charges regularly. GP maintains the accounts in accuracy. As mentioned earlier, it was interesting involvement during the construction of the overhead tank in monitoring indicated a strong sense of ownership. Although the village does not face any scarcity problem, they are aware about the depletion of ground water and are keen to adapt to alternatives and conserve water if initiated. They are aware about the scarcity problems faced in other neighboring villages. None of the households in this village have household connections. GP is in the process of planning to provide household connections after fixing the deposits and monthly water charges. GP is in-charge of repairs and maintenance of water supply. GP has no problems in this regard. GP is collecting water tariff as a part of property tax and have adopted a different methodology to charge. For example: If the house tax of a particular household is fixed as Rs. 100, the water charges would be fifty percent of the same which comes to Rs.50 annually. A total of Rs.150 will be charged to the household annually. This was an age-old method followed and presently the GP has received orders to charge Rs.120 per annum as water charge, which will be adopted by the GP soon. The GP is yet to inform the people about the change. All the households in the village are supposed to pay Rs.120 while the households with in-house connection will have to pay more, which is not yet finalized.

People in this village have always abided by the rules and have been responsible in managing their resources. GP had no problems in dealing with the people of the village so far and the people have no complaints about the GP managing water supply. 70 percent of the households attended gram sabha while only 30 percent have not attended. As the village has no problem with respect to water supply, the issue discussed has mostly been with respect to procuring household connections, deposits to be paid and monthly charges. Both men and women attend gram sabha in this village and gram sabha is held regularly. Gram sabha is held initially at the village where the gram panchayat is situated and on the same day it is held in this village in the evening

highlighting co-ordination of timings. In short, there is good co-ordination and co-operation amongst the people and the GP in this village.

Huligaaru village: a unique effort towards water conservation

Huligaru village case interestingly has achieved remarkable goals within a very short span. This village carries forward simple but effective measures practiced practically among the village folk. Largely, the success could be pointed at the triggering efforts of collective action in highlighting Huligaru as a model village, backed by education, awareness levels and culture of the people.

Huligaaru village with 125 houses belong to Kandika gram panchayat in Sagar Taluk, Shimoga district of Karnataka. Majority of the households belong to upper caste. 41 per cent are school educated. Water source and quality has never been a problem, except during the summer where a few open wells would go dry (6 on an average) and water levels would go down in few others. Households having cattle use approximately 1000 litres of water while households without cattle use 300 litres per day. Average lpcd ranges from 135 to 150 lpcd per day. Laborers use around 70-80 lpcd and the reasons could be due to their practices, they do not swap their houses everyday.

Triggers

High awareness levels, people's positive attitude and culture of cleanliness:

People are generally well aware about various factors happening around with respect to the water situation. This could be attributed to the education levels where people are systematic, organized and adopt a planned approach while addressing issues. Various instances indicate focus on their systematic efforts on conducting regular meetings, maintenance of records, documentation of news paper clippings and similar ones during the explanation of various measures undertaken. People are basically enthusiastic and are open to new ideas. They have mutually agreed to look at any issue in a positive attitude and solve the differences. Irrespective of the differences they feel it is important to get together and solve problems while undertaking development activities.

People in this village generally worked hard and kept themselves busy throughout the day. Although the activities pertaining to the main crop arecanut determines their timings and seasonal pressures, people are generally engaged in keeping the surroundings clean and tidy. Irrespective of size, class and caste of people, the households in the village seem to have a culture of cleanliness.

Peoples' co-operation: People in general are very co-operative and work in cohesiveness. . As majorities of the people are having a positive attitude, convincing the few others who are not keen seems less difficult. Tackling indifferences by writing in a slip of paper as a rule seems to be an appealing approach, as opined by one of the members, most of the negative criticisms get filtered by the time they write. Culture of treating the lower caste and the poor with care and respect has been a culture in this village. These have helped them to vibe well with the lower strata of people and seek their co-operation.

People's interaction: Interaction during various meetings, which are regularly held on schedule, provides a platform for positive interaction of ideas promoting developmental activities. It also provides motivation and interest among other people as they observe the success of similar groups and spread effect to take up new activities. For instance – Due to their co-operative attitude, one of the enterprising women took up a contract of peeling arecanuts supplied from other villages. This provided employment to the local people during their free time and added to their income levels apart from providing a small enterprise to her. As a resultant effect of this, huge piles of arecaunut husk were getting collected. This interested women attended the training on using husk to make briquettes to be used as firewood and the project is underway.

Promoting organic farming: As people are associated with Krishi Prayoga Pariwara (an NGO), they have understood the importance of organic farming and have adopted various practices promoted by the organization. The spread effect seems to be faster with respect to adopting vermi composting, using less of pesticides etc. Their vision of changing gradually (by the end of the year) to adapt to complete organic farming was interesting. Awareness levels with respect to the do's and don'ts of every aspect were clear among majority of the people.

Strategy adopted by the motivator: Krishi Prayoga Pariwara is an organization working on promoting various agricultural practices that are good to the farmers. One of the persons in the village was a member of KPP since ten years. It was Guruji's wish to convert one village in every taluk into a model village. The idea was presented in front of the village folk and everyone agreed to it.

- The first step was to focus on water conservation. Mr. Anand who was the key initiator and organizer of the programme explained to the crowd the importance and need for water harvesting and conservation.
- The second step was to understand the basic details of the village and collecting information covering various aspects. A questionnaire was formulated and details were collected from every household in the village.
- Information was collected from the households using the questionnaire by involving 16 people forming a group of 4.
- Twelve people joined together and sorted the data and made a compiled report.

Conducive strategies adopted: The section on strategies defines in detail the ways adopted in convincing people (through a religious guru in the local region), creating awareness initiatives, regular follow up, meetings with focus, simple and cost effective methods, planning, implementation which have acted as key factors for such effective results in a short period to time. Long term planning and vision is clear among the people. This long-term vision helps the people in understanding what they need to focus on and develop further additions and initiatives. The details of their future plans have been dealt in a separate section above. Planning fine details has helped them to implement the activities in an effective way.

Data collection, report writing and documentation: The data collected has been well planned, documented and reported in a systematic way. The compiled report is presented during the meetings, which helps the people in the village to understand the

purpose of the survey. The monthly progress and effects of the steps undertaken is a great and positive effort to motivate the people and make them understand where they stand and thus spreads further positive actions and spread effects. Documentation adopted by the self-help groups are planned and focused.

People painstakingly maintained accountability and transparency in detail and documented it. This was explained to everyone and any one could have access to it. This they believed curtailed differences. Added to the above, good understanding amongst the core members and their sense of motivation was strong. The discussions would go on in a very positive and planned way focusing on progress and development at every stage and every meeting. Majority of the people in the village were interested in progress and were less political. When the issue was development for common good, everyone joined hands irrespective of the party they belonged to.

Water management practices: Simple but effective measures (like roof water harvesting in most of the households, digging pits to store water in common areas, harvesting and directing rainwater to specific ponds to improve groundwater table) were undertaken in a co-coordinated way with respect to awareness and action. As the initiator rightly opines, 'digging the pits is not difficult but to make people dig these simple pits is the challenge'.

Follow up activities: Follow up on various activities has been a challenge in most of the developmental activities which dies out as the motivator or the intervening organization withdraws leading to non sustainability of the programmes. The foundation for sustainability seems to be laid out in an effective way as focus has been multi-dimensional addressing various factors like awareness creation, cost effective measures, persuading involvement, group efforts- all done simultaneously with stress on follow up of every activity.

Funds mobilization: Simple ways of pooling money and resources with transparency and accountability has helped in reducing burden on single individuals and need for donors remains unnecessary. However, for major programmes donors have come forward to pool in. With the above-mentioned strategies, efforts towards decentralized institutions in the form of groups at various levels and activities under the AJA has proved to have worked in an effective way in a very short term of two and a half months.

Women's active involvement: Women were generally very involved and active and keenly participated in every activity. Women's enthusiastic efforts in various dimensions have led to multiplier effect in helping them to start new ventures. Although they started their work in a small way, ideas given by a local religious guru in promoting their products motivated them to expand their business. Their plans to expand their work and business are shaped during the regularly held meetings. Women are basically interested in learning and doing new things. They are keen on attending training programmes that would bring in more income and also development to the village as a whole. Women were very excited that their effort were being praised and was adding on their motivation further.

Women are very hospitable, a culture of the village as mentioned by everyone in the village. The culture has added on to the attitude in working together in a cohesive way. Women humbly opined that the men have been co-operative. Otherwise, it would be hard for them to attend the meetings and be involved in various activities. However, they also opined that they do not neglect the household activities but plan it well. There are no inhibitions in expressing their views during the meetings, which was a remarking feature.

It was appealing to watch the gardens wholly managed by the women folk. Their love for plants was seen as the plants flourished with flowers and vegetables. They maintained the gardens very well amidst their daily routine. Vegetables grown would meet the household requirements while the flowers added to the beauty. When questioned, their answer was simple, gardening made them feel nice.

Keen to learn: People in this village are comparatively better off economically. They do not face serious unemployment and crop failure problems unlike other villages which is an added advantage. Educational levels are high comparatively and culture of the people also adds on to the attitude and thereby progress. The village is small in terms of households and easy to communicate and bring about positive development. The population is very less which is another positive factor. Five self-help groups belonging to both men, women and youth are active in the village and meet regularly which is one of the strengths of this village, which promotes collective action and group efforts.

Hosangadi Experience

Hosangadi village has introduced meters to households who have obtained household connection through the PWS scheme and are charged accordingly. People faced scarcity during summer and had to walk long distances to collect water. With the introduction of piped water supply under the Sector Reforms Programme, the Village Water Supply and Sanitation Committee formulated this idea to bring about accountability and efficiency in the service. With accessibility to water within households made it convenient to the people, charging for the service has made the scheme sustainable.

Hosangadi village is situated in Dakshina Kannada district at a distance of 20 kms from Belathangadi taluk. The village has 625 households. The houses in this village are settled in clusters, while some remain as scattered individual houses. The cluster households are all placed together mainly because they have been given government land where they have built houses. There are 2 clusters situated in different places at a distance of 1 km between these clusters. The people residing in clusters mostly are labourers, while very few are petty businessmen or employees. The households situated independently are landowners having many acres of land and practicing agriculture. People of different caste groups live in this village – Jains, Shetty's, Poojaris, Gowdas, Muslims, SC's and ST's.

Situation in the past revealed that water was mainly drawn from open wells. While the rich had their own open wells, the poor had common wells. During summer, as the water table would deplete, people would go from one open well to

another in search of water which would be situated at around 2-5 kms distance. Later, Borewell with hand pump (BWHP) was introduced followed by Mini Water Supply (MWS) and Piped Water Supply (PWS). Even to this day, water supply is no problem in this village except during summer as majority of the open wells goes dry. People access water from BWHP, MWS and Piped water supply. There are 2 BWHP, which is working and people, use this water for drinking purpose, There is 1 MWS with 2 cisterns which is also used for drinking purpose. There are 2 PWS schemes. People have obtained individual house connections in 130 houses.

Triggers

Metered connections and costs – a remarkable headway: As the houses in this village are partly scattered and some closely-knit, households belonging to these clusters were addressed in understanding water supply. Water charges are based on meter readings unlike many other villages where meters are fixed but charged on flat charge. The total installation cost for one household was Rs.700. The beneficiaries were involved in laying the pipelines, trench and other labour work, as they could not bear the total cost. Each household contributed Rs.300 in terms of rupees and Rs.400 through labour. Water is supplied for 2 hours in a day (morning and evening). Sometimes, it is let for more time, on average water is let for 3 hours. As the land is uneven, accessibility of water varies depending on the location of the households. Plans are under progress to improvise the situation by placing control valves.

Strong Institutional backing proves sustainability successful: VWSC has been formed as per the guidelines of Sector Reforms Programme. The village has adopted the metering system. The meter reading started after all the beneficiaries were given household connection. It required more time because the households are scattered and laying pipes in undulated land was difficult.

- Household connections are given to households that can be easily accessed in terms of distance.
- Meters are placed at the entry point to the house and not in private lands to avoid misuse of water.
- One of the hurdles is with regard to pressure as the land is uneven, and hence takes time to reach households situated at the upper reach.

Financial discipline: The bill collector issues bills to individuals to households based on meter reading every month. The minimum charges are fixed at Rs.40 upto 8000 litres and _ a paisa per litre, which adds up to Rs.5/1000 litres. Each household paid a sum of Rs.1000 as initial deposit and to make a fair deal, Rs.100 extra will be added every year as and when new connections are taken (Rs.1000 in the first year, Rs.1100 in the second year and so on). Penalty of Rs.10 is the minimum fixed and 10 percent of the total amount – whichever is higher is charged. The committee plans to charge for public taps at Rs.20/month. This is difficult for the VWSC to implement because these public taps were installed during the previous schemes (NRWS). Old connections (public) already exist and will lead to controversy.

Reserve funds are being considered to meet the sudden expenditures like burning of motors, breaking of major pipelines etc. So far, the committee has generated Rs.40,000 as reserve fund. This was saved from beneficiaries' contribution under

RGDWM scheme. Operation and maintenance charges are not sufficient to meet consecutive expenditure in the future. Water fee collector is paid Rs.2000/month, water man is paid Rs.900/month. It requires 4 person days for reading meters and collecting water fee.

Beneficiaries: There are two colonies – Janatha colony and Ashraya colony. 5 cents of land was given to needy people by the government where 50 houses are located while 30 houses are in Ashraya colony. Majorities of them belong to the middle class and the lower middle class. Open wells cannot be dug in this area because there is no place. Household connections are useful to these people. The other houses in the village are scattered and have their own open well. Only 30 percent to 40 percent population requires this water. Landlords make their own arrangements. People are WTP as per the meter charges and have understood that water is not a social good but economic good if service has to be provided.

Sub-groups for effective monitoring: The committee has formulated sub-groups, for which 10 members have been identified among the beneficiaries and group leaders are also identified. The group leader is charge of managing his group. His responsibilities include: a) Avoid wastage of water; b) To see that meters are working properly; c) To see that meters are not misused; d) Collection of water charges. The group leader will be made the Committee member. This system is in planning stage and the objective is to make the beneficiaries more responsible and for easy administration. This method is not mentioned in the guidelines and is an innovative idea.

Role clarity: There is confusion in planning between VWSC and GP. ZP officials have mentioned to the GP that if VWSC fails, everything will become GP's responsibility. This means to say that they themselves are not confident about VWSC's working. Interlink between GP members and VWSC members are less, so there was real confusion in understanding roles and responsibilities. Although there was no intervention made by the NGO as per the IEC a component of the SRP programme, village has thrived ahead with respect to awareness levels.

Key interventions and commonalities

It is important to address some of the common features practiced and observed in these four villages. This would help in grasping key aspects from their approaches and experiences.

Interventions	Yanegudde	Zaadshapur	Huligaru	Hosangadi
Institution as the backbone	Independent setting of institution with specified guidelines involving people at every stage	Gram Panchayat functioned well as an institution	Independently setting up an institution with guidelines and norms. Involved people at all stages	VWSC functions well as an institution
Initiatives and involvement	Own initiative	Gp's commitment and people's commitment	Own initiative	VWSC functions with innovative methods
Leaders as motivators	Initiative taken by political leader, also a local resident	Local leaders are strong and motivated to maintain orderliness	Motivator is a local saint and other local leaders followed up	VWSC President is innovative, strong and well informed
Charging for water	Charges were compulsory and paid regularly	Charges were paid regularly	Charges absent as people used their own open wells but followed water conservation	Charges were compulsory and paid regularly
Paying for what one uses	Introduced Meters	No meters	Not applicable	Charged according to meter reading were
Rules and regulations in usage	Well framed and organized	Well framed and organized	Awareness creation was given prominence in using limited water and avoiding wastage	Well framed and organized
Promoting awareness	Evident and prominent	Evident	Evident and prominent	Evident and prominent
Transparency and Accountability	Evident and prominent	Evident and prominent	Evident and prominent	Evident and prominent
Community involvement and participation	Evident and prominent	Evident	Evident and prominent	Evident
Promoting water conservation	Not addressed	Not addressed	Evident and prominent	Not addressed
Avoiding wastage	Addressed	Addressed	Evident and prominent	Evident owing to metered use

Some lessons

- Setting up strong institutions by involving people at every stage was common across all villages. Involvement enabled better awareness of the situation.
- Irrespective of the type (GP, VWSC or Local initiatives), all had strong leaders to motivate and organize. However, the leaders worked towards setting up institutions and were not leader oriented which highlights sustainability.
- Initiatives and approaches varied between villages but all worked towards strengthening institutions by laying acceptable rational rules and conducted regular meetings giving voice to majority of the people.
- Transparency and Accountability at every stage made it simpler and easier to manage. Documentation was done meticulously and available for anyone to witness.
- Water conservation was not the focus in all the villages but as the institutional set up was strong, it made it easier to add on other dimensions.
- Bring about the a change in the mindset of the people in accepting water as a priced good in place of social good and a non-renewable resource was attempted largely in all the villages. Highlighting on avoiding wastage added on to the positives.

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Aperçu des dynamiques de précarisation hydraulique en oeuvre dans le monde de l'irrigation paysanne.

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IRD Ur044 Dynamiques sociales de l'irrigation

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Résumé

Dans les régions irriguées du monde, qui représentent un sixième des terres cultivées mais la moitié des bases alimentaires de la planète, les ressources en eau sont objet d'appropriation locale et donnent lieu à des formes très diverses de gestion. Nous distinguons trois pôles d'organisation des accès et des partages des eaux et nous allons examiner pour chaque pôle quelles sont les mécanismes d'intégration ou d'exclusion des familles paysannes disposant de ressources limitées (figure 1).

Le pôle communautaire correspond à un territoire hydraulique délimité, dans lequel des institutions locales fonctionnent autour de considérations particulières sur l'identité des groupes et sur celles des personnes disposant d'un droit d'accès aux ressources. Si leur système hydraulique vient d'être établi, ces sociétés reflètent l'esprit des pionniers à la conquête d'un espace de vie dont il faudra partager les ressources selon des conceptions à la fois équitables et proportionnelles aux efforts consentis. Si leur système hydraulique est un héritage d'un passé hydro-agricole plus ou moins profond et mythique, ces sociétés fonctionnent en jouant sur la tradition (droits hérités) et la modernité (nouveaux besoins) et vont connaître des phases où des partisans d'innovation s'opposent aux conservateurs du cadre ancien. Les sociétés hydrauliques locales à base communautaire peuvent être comprises par les jeux d'exclusion et d'intégration. Pour accéder aux ressources, il faut être reconnu comme membre dans les règles constitutionnelles. Il y a donc une exclusion sociale importante, comme en témoigne la mise en place des associations syndicales d'irrigation en France au XIXe siècle qui ont exclu d'emblée les non-propriétaires fonciers. La conservation d'un statut de membre de droit est révocable en cas de non respect des règles opérationnelles communes pour tous les membres de la communauté. Réciproquement, le respect des règles par une population paysanne renforce sa légitimité dans un groupe composite d'utilisateurs des eaux. Le processus d'accaparement existe et peut aboutir à une féodalisation de l'eau, si une partie de la population se soumet au potentat local. Mais si l'exercice du pouvoir est contesté, la précarisation excessive des paysans peut remettre en cause les relations de coopération et la participation commune aux travaux d'entretien du système hydraulique. Ainsi, de nombreux auteurs ont montré que des territoires hydrauliques anciens se structurent sur l'équilibre des pouvoirs, la symétrie des situations avec une traduction spatiale (organisations de quartiers hydrauliques). La précarité hydraulique dans ce type de sociétés rurales proviendrait de dissymétries provoquées par le recours à de nouvelles technologies ou par des redécoupages de quartiers et de droits au profit des puissants. Des décalages sont observés entre les règles annoncées et pratiques réelles, conduisant périodiquement à des crises sociales et à la redéfinition de corps de règles : on assiste alors à une inclusion des plus précaires ou au contraire à leur exclusion définitive à chaque cycle institutionnel.

Le pôle étatique de gestion de l'eau se structure autour des pouvoirs politiques et hydrauliques. Il englobe généralement plusieurs régions et systèmes hydrographiques sur lesquels il impose une administration lourde pour gérer les ressources, contrôler les populations locales qui accèdent aux terres et aux eaux. Dans ces régions du monde, le processus de précarisation a toujours opéré par la soumission, condition nécessaire pour qu'une famille paysanne se voit attribuer un lot de colonisation des terres aménagées. L'histoire hydraulique contemporaine des offices d'irrigation témoigne du clientélisme de l'Etat pour intégrer ou rejeter certaines populations à la marge du système hydraulique. Mais les formes de gestion centralisée et bureaucratique ont échoué après quelques décennies de fonctionnement à marche forcée. La précarité des familles paysannes des grands périmètres irrigués publics s'accroît avec l'endettement excessif, la rentabilité limitée des investissements lourds, l'inadéquation des réseaux aux demandes locales en eau, la mise en place de quotas pour faire face à un élargissement imprudent des surfaces dominées par les réseaux publics qui ne peuvent plus approvisionner correctement les mailles hydrauliques. Les bailleurs de fonds internationaux ont imaginé que la gestion participative de l'irrigation allait résoudre les problèmes de recouvrement. En réalité, les charges de structures et les nouvelles corruptions des allocations d'eau ont rendu très aléatoire la régularité des accès. Figer les réseaux établis à partir de grands barrages donne lieu aujourd'hui à des processus contradictoires qu'on pourrait qualifier de nouvelle pauvreté hydraulique : concentration de l'information technique et des outils de gestion à distance des réseaux, mise en place d'institutions locales de participation sans vrai pouvoir et capacité d'autonomie, mise en place de facturation individuelle d'eau consommée selon des procédures dont la fiabilité est parfois limitée. Dans cette dynamique, la paupérisation apparaît en zone irriguée comme le produit de plusieurs précarités successives et superposées : foncière, hydraulique, sociale, économique et juridique.

Le pôle privé industriel de la gestion de l'eau en agriculture est encore peu développé, mais il se structure progressivement avec les nouvelles technologies de distribution des eaux. Il semble que de nouveaux opérateurs industriels de l'eau s'intéressent au gisement d'activités potentiel dans le domaine de la reprise en main des grands offices d'irrigation déficitaires. On peut simplement signaler les risques encourus par des populations paysannes marginales, qui, comme dans

des quartiers urbains périphériques, se trouveraient exclus des accès soit par le renchérissement de l'accès lui-même (facturation de bornes, souscription de contrat), soit par le paiement de volumes consommés trop difficile à assumer compte tenu des trésoreries et des revenus des petits producteurs. La précarité hydraulique se traduirait alors par la diminution des contrats souscrits et, sur le terrain, par la dislocation des espaces irrigués, avec le maintien d'îlots d'entreprises capables de payer le service de l'eau, et l'abandon des zones interstitielles.

Quelque soit le mode de gestion collectif de l'eau, communautaire, étatique ou industrielle, les coordinations hydrauliques s'avèrent souvent difficiles et les difficultés de régulation et de satisfaction des utilisateurs les plus puissants les ont poussé à opter pour des solutions individuelles de pompage d'eau dans des nappes souterraines. Malgré quelques tentatives de régulation, le phénomène se développe, même si les ressources s'épuisent. Lorsque les accès privés individuels représentent la part principale de l'accès à l'eau, la précarité hydraulique reflète simplement la précarité économique : le creusement d'un puit profond et son équipement dépasse les possibilités économiques de familles paysannes.

Comme ces formes d'accès et de gestion se combinent dans les différentes régions irriguées du monde, on peut penser que deux phénomènes contradictoires s'opèrent : soit les différentes formes de précarité et d'exclusion s'ajoutent les unes aux autres, aboutissant à une exclusion plus rapide et des crises sociales plus critiques. Soit les précarités hydrauliques diffèrent et les paysans exclus d'un réseau trouvent la manière de ne pas être exclu d'un autre réseau, en jouant sur des relations sociales plus fortes : création de nouvelles communautés avec appui politique, accès illicites aux eaux dans les réseaux étatiques, regroupement autour d'une borne privée ou création d'un puit partagé.

Dans les régions irriguées du monde, qui représentent un sixième des terres cultivées mais la moitié des bases alimentaires de la planète, les ressources en eau sont objet d'appropriation locale et donnent lieu à des formes très diverses de gestion. Nous distinguons trois pôles d'organisation des accès et des partages des eaux et nous allons examiner pour chaque pôle quelles sont les mécanismes d'intégration ou d'exclusion des familles paysannes disposant de ressources limitées (figure 1).

Comparaison des trois grands types de gestion de l'irrigation dans le monde				
type	gestion administrative étatique	gestion communautaire	gestion industrielle/privée	
droits d'eau	droits d'eau non clairement définis, droits fonciers parfois précaires	droits d'eau définis pour les membres de la communauté d'irrigants, transmissibles	droits d'eau abolis ou sans objet ; eau considérée comme un facteur de production échangeable	
paiement de l'eau	redevances par hectare (parfois, part fixe de récolte) ou paiement indirect de l'eau à travers l'économie de l'Etat	contributions par quotas en argent ou en travail (conditions de l'exercice des droits d'eau)	paiement par souscription libre et consommation	
problématiques récurrentes	crise financière et bureaucratique	décalage entre les règles et les pratiques	stratification sociale et économique accélérée, exclusion des plus pauvres	
dynamiques actuelles	expérience de la gestion participative de l'irrigation	besoins de renouveler les institutions locales	risques de régression des activités d'irrigation (par manque de souscriptions)	

Figure 1. Ruf, 2000

La gestion administrative étatique occupe depuis longtemps une place centrale dans les politiques économiques, avec sa justification historico-politique chez Wittfogel (1957) et son déploiement géographique et économique significatif dans la deuxième moitié du XXe siècle. Fondée sur l'économie dirigée, cette forme connaît actuellement diverses mises en cause du fait de sa contribution à l'endettement public et à ses dommages environnementaux et sociaux. On la trouve dans presque tous les pays, même si certains d'entre eux ont conservé ou développé d'autres formes de gestion. Parmi les exemples connus, on peut citer les offices d'irrigation du Mali et du Sénégal (voir annexe), mais aussi au Maroc, au Pérou, en Equateur ou encore en Egypte, au Pakistan et en Inde sans oublier la Chine ou l'Indonésie. Partout la crise financière sur les projets étatiques a amené les bailleurs de fonds internationaux à proposer des réformes structurelles, en terme de gestion participative, dont nous examinerons plus loin le sens et l'impact social.

A l'opposé de cette conception dirigiste et centrale de l'hydraulique agricole, on trouve... deux modèles qui s'avèrent très différents, bien que parfois présentés comme des formes de gestion privée. En réalité, l'une est bien basée sur des structures économiques privées avec des entreprises pourvoyeuses d'eau tandis que l'autre réserve l'accès aux eaux aux membres de communautés d'usagers reconnus comme des ayant-droits, sous condition de respecter des règles communes. Les entreprises privées capitalistes sont présentes dans certains pays du Nord et opèrent dans de nombreuses régions du sud dans le domaine des eaux et de l'assainissement urbains mais elles sont encore assez rares dans le domaine hydro-agricole. Il n'est pas inutile de citer le cas du périmètre du Souss en amont d'Agadir, où se déroule notre rencontre, qui constitue un terrain expérimental de gestion déléguée de l'eau agricole à une société privée.

La gestion communautaire est probablement la plus fréquente dans le monde. Elle domine largement les sociétés de montagne, les sociétés oasiennes et plus généralement les espaces d'irrigation anciens comme une grande partie du bassin méditerranéen, de l'Asie, de l'Amérique latine et même de l'Amérique du Nord où les droits d'eau reviennent aux organisations d'usagers (avec une forte distinction entre les eaux des réserves indiennes des eaux des agriculteurs héritiers des conquérants pionniers).

Nous allons donc tenter de cerner les liens entre pauvreté, hydraulique, crise sociale qui nous rassemblent à Agadir, en distinguant sous quelles formes de gestion englobante se combinent ces éléments. Pour aborder ces quatre mots associés, j'en introduirai d'autres, en particulier l'exclusion sociale et la précarité hydraulique.

1. Exclusion sociale dans les sociétés gérant l'eau sur des bases communautaires.

Le pôle communautaire correspond à un territoire hydraulique délimité, dans lequel des institutions locales fonctionnent autour de considérations particulières sur l'identité des groupes et sur celles des personnes disposant d'un droit d'accès aux ressources (Hunt, 1988, 1989, Ostrom, 1992, Uphoff, 1998, Groenfelt 1998).

Partout dans le monde, au Nord comme au Sud, en Orient comme en occident, on relève des sociétés hydrauliques de ce type, en particulier dans des systèmes où le travail en commun ont joué un rôle fondateur et jouent toujours un rôle significatif pour entretenir les réseaux. Jaubert de Passa en a dressé au XIXe siècle un tableau assez complet et, même si certaines sociétés ont été réformées et sont passées au cours du XXe siècle aux autres modes de gestion, il reste un ensemble considérable de sociétés hydrauliques héritières des principes

communautaires. Citons quelques exemples en partant de l'Extrême-Orient. Les sociétés mélanésiennes gérant les tarodières (Bonnemaison, 1984), les communautés Subak de l'île de Bali en Indonésie (Jha, 2001), et bien d'autres systèmes similaires au Japon (*Von Verschuer*, 2003), en Thaïlande, au Népal (Aubriot 2004), en Inde et au Sri Lanka. Les systèmes malgaches ont été décrit notamment par Bonnemaison (1976), Mathieu (1993) et Blanc-Pamard, Rakoto Ramiarantsoa (2000). On trouve des organisations locales d'irrigation dans tout le Bassin Méditerranéen, quelques éléments historiques très connus au Sud dans les oasis égyptiennes du désert libyque, le Sud tunisien où le Tafilalet marocain. Au nord, de multiples exemples montre la permanence des organisations communautaires issues de l'expansion hydraulique médiévale, comme les juntas de aguas ibériques, les associations syndicales en France, les organisations de drainage de l'Europe du Nord. Dans ce rapide parcours des communautés d'irrigants structurées, nous n'oublierons pas de signaler les organisations andines en Amérique Latine mais aussi les systèmes nord-américains qui ont aussi été structurés par la notion de biens communs (cf. les travaux de Wilkins-Wells, 2001).

D'une manière générale, lorsque le système hydraulique vient d'être établi, ces sociétés reflètent l'esprit des pionniers à la conquête d'un espace de vie dont il faudra partager les ressources selon des conceptions à la fois équitables et proportionnelles aux efforts consentis. Ceci pose immédiatement des problèmes d'inégalité des accès, car on trouvera souvent dans ce contexte un groupe plus déterminé et actif qu'un autre. Lors de l'établissement des règles définitives, certains pourront faire valoir leur participation pour disposer de droits supplémentaires et en conséquence minorer les droits des moins actifs et exclure des habitants du territoire qui n'ont pas coopéré à l'ouvrage. Cette inégalité est acceptée par la génération qui a vu construire l'ouvrage, mais les générations suivantes peuvent contester l'exclusion (voir Boelens, Davila 1998, conceptions de l'Équité dans les sociétés andines).

Nous avons constaté deux cas d'exclusion des accès à l'eau dans le cas équatorien. Sur le rio Chambo, au nord-est de Riobamba, un canal public a été creusé dans les années 1980 avec une forte participation des populations d'une dizaine de village. Les journées de travail ont été inscrites dans des registres tenus par les organisations paysannes indiennes et, lorsque l'administration de l'eau a voulu mettre en eau le canal, les paysans ont décidé d'assurer eux-mêmes la gestion à travers leur principe d'accès : l'eau a été octroyée aux personnes inscrites dans les registres. Mais, cette région fut particulièrement touchée par la migration, les plus pauvres ne pouvant subvenir aux besoins familiaux avec l'agriculture familiale, si bien que les hommes migraient de manière saisonnière, sans pouvoir participer aux chantiers communs. Les travaux de construction du canal durèrent 15 ans, si bien que d'autres familles, résidentes sur place, doutèrent de leur aboutissement. Elles réduisirent leur contribution quand elles n'abandonnèrent pas simplement la partie qu'elles estimaient trop hasardeuses. En définitive, la communauté des constructeurs dûment établie se répartit les fruits de son labeur commun en excluant tous les « mauvais contributeurs ». Le débit était capté dans la rivière était pourtant abondant et l'eau courrait entre les villages sur 20 kilomètres sans desservir tous les habitants et leurs parcelles. Dans des conditions économiques désastreuses pour les familles pauvres de la région, la règle de départ communautaire simple et admise par tous se retourne contre les plus faibles. L'institution de gestion du canal, la junta de aguas, dépositaire des droits d'eau, a du faire face à une certaine contestation de cet exclusion, et a admis le principe de réintégration des familles peu ou pas contributives, mais en exigeant le paiement des journées de travail qui n'avaient pas été fournies dans les années de construction. Ces quantités converties en argent représentaient des sommes considérables or de portée des familles sans ressources (enquêtes et entretiens personnels).

Si leur système hydraulique est un héritage d'un passé hydro - agricole plus ou moins profond et mythique, ces sociétés fonctionnent en jouant sur la tradition (droits hérités) et la modernité (nouveaux besoins) et vont connaître des phases où des partisans d'innovation s'opposent aux conservateurs du cadre ancien. Les sociétés hydrauliques locales à base communautaire peuvent être comprises par les jeux d'exclusion et d'intégration. Pour accéder aux ressources, il faut être reconnu comme membre dans les règles constitutionnelles. Il y a donc une exclusion sociale importante, comme en témoigne la mise en place des associations syndicales d'irrigation en France au XIXe siècle qui ont exclu d'emblée les non-propriétaires fonciers. La conservation d'un statut de membre de droit est révocable en cas de non respect des règles opérationnelles communes pour tous les membres de la communauté. Réciproquement, le respect des règles par une population paysanne renforce sa légitimité dans un groupe composite d'utilisateurs des eaux. Le processus d'accaparement existe et peut aboutir à une féodalisation de l'eau, si une partie de la population se soumet au potentat local. Mais si l'exercice du pouvoir est contesté, la précarisation excessive des paysans peut remettre en cause les relations de coopération et la participation commune aux travaux d'entretien du système hydraulique (Ruf, 2000). Ainsi, de nombreux auteurs ont montré que des territoires hydrauliques anciens se structurent sur l'équilibre des pouvoirs, la symétrie des situations avec une traduction spatiale (organisations de quartiers hydrauliques – voir Aubriot 2004). La précarité hydraulique dans ce type de sociétés rurales proviendrait de dissymétries provoquées par le recours à de nouvelles technologies ou par des redécoupages de quartiers et de droits au profit des puissants. Des décalages sont observés entre les règles annoncées et pratiques réelles, conduisant périodiquement à des crises sociales et à la redéfinition de corps de règles : on assiste alors à une inclusion des plus précaires ou au contraire à leur exclusion définitive à chaque cycle institutionnel (Ruf, 2002).

2. Exclusion sociale dans les sociétés gérant l'eau sur des bases administratives publiques

Le pôle étatique de gestion de l'eau se structure autour des pouvoirs politiques et hydrauliques. Il englobe généralement plusieurs régions et systèmes hydrographiques sur lesquels il impose une administration lourde pour gérer les ressources, contrôler les populations locales qui accèdent aux terres et aux eaux (Wittfogel 1957). Dans ces régions du monde, le processus de précarisation a toujours opéré par la soumission, condition nécessaire pour qu'une famille paysanne se voit attribué un lot de colonisation des terres aménagées. Un des premiers exemples contemporains se trouve en Egypte où le Vice-Roi Mohammed Ali, après s'être débarrassé de l'ancienne élite foncière mamlouk en 1811, a procédé à des remaniements hydrauliques sans précédent et installés sur des lots normés de 5 feddans (2,2 Hectares) des familles paysannes disposant d'usufruit des terres et d'accès à l'eau d'irrigation obtenues au prix de l'installation de machines d'exhaure gouvernementale (Ruf, 1988). Les paysans inclus dans l'un des premiers projets de développement intégré du monde, avaient pour obligation de suivre un plan de culture fondé sur le cotonnier, dont la filière de commercialisation était entièrement contrôlé par l'Etat Egyptien moderne. Plusieurs facteurs conduisirent à l'appauvrissement de ces familles pionnières : des difficultés s'accumulent sur les plans agronomiques, économiques et politiques. Elles conduisirent à une crise du modèle directorial : tandis que les puissances occidentales circonscrivent la puissance éphémère du Vice-Roi en 1840 et ruinent largement son économie agro-exportatrice, celui-ci fit une large distribution des terres des villages appauvris à de grands concessionnaires issus de l'armée égyptienne ou de l'administration publique. Après l'étatisation forcée, la privation des droits sur les ressources communes trouve sa place. Le mode d'exclusion des terres irriguées s'est donc surtout manifesté sur un plan collectif, du fait de l'incapacité de communautés

villageoises à payer les taxes fiscales trop lourdes. Ce processus d'éviction prendra par la suite des formes plus individuelles, notamment dans les offices modernes du XXe siècle où la pratique de déplacement autoritaire de population devint progressivement inacceptable par les populations elles-mêmes (le déclin des travaux corvéables en fut sûrement le premier aspect).

D'une manière générale, l'histoire hydraulique contemporaine des offices d'irrigation témoigne du clientélisme de l'Etat pour intégrer ou rejeter certaines populations à la marge du système hydraulique. Un exemple ancien mais combien pédagogique a été conservé dans les archives départementales des Pyrénées-Orientales. En l'an 1400, La Charte du Roi Martin démontre avec précision combien les abus de concession publique ont pu au XIVe siècle provoquer une crise économique et sociale si grave que les autorités publiques acceptent, 70 ans après la construction du Canal Royal de Perpignan, de revenir sur les règles constitutionnelles et opérationnelles du canal et donner raison aux représentants des villageois spoliés (Ruf, 2004). Les débats sur les institutions de l'eau en Europe au XIXe siècle en témoignent également (Jaubert de Pasa, Naudault de Buffon), comme ce qui ressort des expériences de gestion administrée des périmètres irrigués dans la deuxième partie du XXe siècle dans les pays en développement. Dans la plupart des pays, les formes de gestion centralisée et bureaucratique ont échoué après quelques décennies de fonctionnement à marche forcée. Deux exemples d'évolution ancienne des grands périmètres irrigués au Mali et au Sénégal sont synthétisés dans les encadrés 1 et 2.

La précarité des familles paysannes des grands périmètres irrigués publics s'accroît avec l'endettement excessif, la rentabilité limitée des investissements lourds, l'inadéquation des réseaux aux demandes locales en eau, la mise en place de quotas pour faire face à un élargissement imprudent des surfaces dominées par les réseaux publics qui ne peuvent plus approvisionner correctement les mailles hydrauliques. Ces éléments touchent ainsi le Maroc qui s'est engagé sur une politique d'aménagement d'un million d'hectares irrigués comme axe essentiel du développement agricole et qui doit aujourd'hui affronter non seulement une crise climatique mais aussi une refonte de son modèle. Comme autrefois en Egypte, les périmètres irrigués ne produisent plus les effets économiques attendus et l'endettement s'accroît, au point de mettre tout l'édifice en porte-à-faux. La riziculture du Gharb est réduite, non pas par le manque d'eau mais par le manque de riziculteurs souhaitant se maintenir dans la filière. Dans le Tafilalet ou le Dra, la crise est plus directement liée au déficit hydrique, mais les réponses paysannes diffèrent selon les possibilités de prélever à bas prix des eaux souterraines douces. L'exclusion liée au double phénomène de la centralisation de la gestion autour des barrages-réservoirs et de la précarisation locale des accès conduit à une fragmentation géographique méso - régionale et locale. Ainsi, le Tafilalet se présente aujourd'hui comme un espace discontinu où certains villages disposent encore d'eaux pérennes et d'autres où l'incertitude est trop grande pour espérer vivre encore d'une culture irriguée. Si on aborde une échelle plus grande, ces tendances se retrouvent entre quartiers hydrauliques d'un terroir irrigué villageois et entre les champs et parcelles d'un quartier. Dans le Haouz de Marrakech, on retrouve ces combinaisons différenciées d'accès à l'eau de l'Etat, à l'eau privée des forages et éventuellement à l'eau contrôlée par une communauté spécifique autour d'un ouvrage ancien comme une khattara ou une seguia. D'une certaine manière, on pourrait considérer que la précarité hydraulique subie sur un réseau pourrait être compensée par l'accès à d'autres ressources. Cette question est difficile à traiter. Certes, la compensation existe. Plusieurs agriculteurs endettés ont été exclus de l'accès à l'eau des bornes de l'office d'irrigation, ou bien ont choisi eux-même de s'en exclure pour éviter certaines tracasseries. Profitant de ressources privées et d'eau plus adaptée à leur système de production, ces « usagers compensateurs » relèvent plutôt de catégorie économique riche. Pour autant, leur nombre

croissant génère une forme de pauvreté hydraulique que nous pourrions définir par deux phénomènes : le premier est l'appauvrissement réel de l'office de gestion des eaux qui, par le manque de programmation et de consommation des eaux qu'il contrôle, voit son produit d'exploitation diminuer à un niveau critique. C'est l'histoire du « non arroseur non arrosé ». Le deuxième phénomène est l'appauvrissement du capital social du groupe de producteurs autrefois solidaires dans un même bloc hydraulique, aujourd'hui dispersé entre divers utilisateurs non contigus des ressources en eau. Chaque réseau pourrait s'avérer perdant.

Les bailleurs de fonds internationaux des grands projets étatiques d'irrigation ne sont surtout intéressés à l'équilibre financier des opérateurs publics, et, face aux difficultés de paiement de l'eau contrôlée, ils ont imaginé que la gestion participative de l'irrigation allait résoudre leurs problèmes de recouvrement. En réalité, les charges de structures et les nouvelles concessions ou allocations des eaux ont rendu trop aléatoire la réalité des accès.

En définitive, figer les réseaux établis à partir de grands barrages donne lieu aujourd'hui à des processus contradictoires qu'on pourrait qualifier de nouvelle pauvreté hydraulique : concentration de l'information technique et des outils de gestion à distance des réseaux, mise en place d'institutions locales de participation sans vrai pouvoir et capacité d'autonomie, mise en place de facturation individuelle d'eau consommé selon des procédures dont la fiabilité est parfois limitée. Dans cette dynamique, la paupérisation apparaît en zone irriguée comme le produit de plusieurs précarités successives et superposées : foncière, hydraulique, sociale, économique et juridique.

3. L'Exclusion sociale dans les sociétés gérant l'eau sur des d'entreprises privées ou via une marchandisation de l'eau agricole.

Le pôle privé industriel de la gestion de l'eau en agriculture est encore peu développé, mais il se structure progressivement avec les nouvelles technologies de distribution des eaux. Il semble que de nouveaux opérateurs industriels de l'eau s'intéressent au gisement d'activités potentiel dans le domaine de la reprise en main des grands offices d'irrigation déficitaires. On peut simplement signaler les risques encourus par des populations paysannes marginales, qui, comme dans des quartiers urbains périphériques, se trouveraient exclus des accès soit par le renchérissement de l'accès lui même (facturation de bornes, souscription de contrat), soit par le paiement de volumes consommés trop difficile à assumer compte tenu des trésoreries et des revenus des petits producteurs. La précarité hydraulique se traduirait alors par la diminution des contrats souscrits et, sur le terrain, par la dislocation des espaces irrigués, avec le maintien d'îlots d'entreprises capables de payer le service de l'eau, et l'abandon des zones interstitielles.

Trois exemples illustrent les difficultés provoquées par la privatisation.

Dans la vallée du Vinalopo, dans l'arrière pays d'Alicante en Espagne, deux villages irriguent une partie de leur terroirs situés en bordure du fleuve qui, au Moyen-Âge, permettait d'arroser en aval la palmeraie d'Elche : Aspe et Novelda (Cabaret, 1999). Ces implantations en amont ont permis aux habitants de structurer pour chaque village un noyau ancien d'irrigation ibérico-romain qui, dans la période arabe, s'est étendu à un espace continu arrosé le long de canaux gravitaires captant les eaux superficielles du Vinalopo et de sources afférentes. Les institutions de gestion des eaux subsistèrent après la reconquête et évoluèrent quelque peu sous forme de communautés d'irrigants. Une forme originale d'ordonnancement des tours

d'eau fut adopté, celle d'enchères publiques silencieuses dont la tenue chaque soir permet de régler la répartition pour toutes les parcelles des membres des communautés, branches par branches. Le silence était requis pour éviter que les plus riches influencent outrageusement l'enchère.

Au début du XXe siècle, les deux villages vont se lancer dans la course aux forages et étendre considérablement le domaine irrigué, d'abord sur les pourtours du périmètre ancien, répondant d'une certaine manière à des besoins sociaux, démographiques et économiques. Mais, la course s'engageait bien au delà de la régulation socio-foncière et de grandes entreprises agricoles se constituèrent dans ce qui était autrefois que des parcours secs et rocailleux. L'histoire des deux villages diverge par la suite, avec l'apparition de sécheresse rendant très difficile l'arbitrage des allocations par les enchères. Novelda s'enquit de renouveler ses ressources en eau, puisque désormais, les prises en rivière n'avaient plus rien à capter. La communauté resta dirigée par les anciens irrigants qui réussirent à contrôler en leur faveur une nappe d'eau souterraine située dans l'amont du bassin. Conduisant l'eau pompée jusqu'en tête du réseau ancien, l'institution perpétue la distribution et, par la grande régularité de l'approvisionnement, limite les effets néfastes des enchères quotidiennes. Tous les habitants possèdent un lopin de terre cultivé en vigne qui leur donne un revenu complémentaire. La pauvreté est sans doute présente en termes fonciers, pas en termes hydrauliques

Du côté d'Aspe, le pouvoir sur l'eau passa aux nouveaux entrepreneurs dont la volonté d'extension vers les zones sèches allaient bien au delà des possibilités données par le petit affluent du Vinalopo pourvoyeur des principales eaux disponibles en superficie. Si quelques forages furent établis par des individus, la plupart des infrastructures nouvelles furent décidées de manière collective en s'appuyant sur le régime de société agricole privée. Celle-ci réalisa de nombreux forages, réservoirs et systèmes de distributions cimentés, et l'eau souterraine finit aussi par devenir exclusive, vendue chaque jour à un tarif permettant à l'entreprise d'équilibrer ses comptes. Or, l'extension des champs produit une demande si importante que l'extraction appauvrit la nappe sur une période de 10 ou 15 ans. Pour maintenir les activités des uns et des autres, les forages ont été surcreusés jusqu'à atteindre et dépasser 400 mètres de profondeur. En Espagne du Sud, ce ne sont plus les rivières qui s'alimentent sur le déversement des nappes via des sources mais les nappes qui assèchent les rivières avec des sources qui marchent à l'envers... Voici donc une nouvelle dimension de la pauvreté hydraulique. Il va sans dire que les producteurs les plus pauvres ne peuvent plus suivre la course. Sur le plan économique, l'eau est deux fois plus chère qu'à Novelda, malgré le système d'enchère.

Dans un pays méditerranéen proche, la Tunisie, la question de la privatisation de l'eau fut évoquer au début du XXe siècle dans les oasis du Sud. Penet, en 1913, montrait que l'instauration des marchés de l'eau à Tozeur risquait de provoquer des désordres hydrauliques, car la distribution autrefois gentille, mailles hydrauliques par mailles hydrauliques, allait s'opérer de manière inégale en dotation et surtout de manière inefficace en distribution. Les riches pouvaient acheter des noubas et modifier le fonctionnement général de l'oasis, sur le plan social et environnemental. Ce débat sur le mariage de l'eau à la terre ou sa séparation est permanent au Maghreb.

Nous souhaitons enfin évoquer les exemples latino-américains qui expérimentent des modèles de gestion privée de l'eau depuis diverses périodes historiques. En Equateur, l'étatisation de l'eau a été décrétée de manière tardive en 1972 après plusieurs siècles où la possession privée

dominait, à côté de possessions communautaires elles - aussi reconnues. On ne s'attardera pas ici sur les inégalités foncières provoquées par le régime de l'hacienda coloniale, qui, on pouvait s'en douter, se doublait d'une inégalité hydraulique réelle : la domination des eaux et des terres donnèrent aux grands propriétaires une supériorité écrasante sur les communautés paysannes indiennes ou métis, ce qui motiva la réforme de 1972. Mais, dans le centre des Andes équatoriennes (voir aussi la communication de S.Girard), la mise en place des réseaux remontent à plusieurs siècles avec diverses phases de construction et de contrôle social et institutionnel. A côté des eaux communes villageoises dont l'accès relève du fonctionnement communautaire, il existe des eaux achetées (aguas compradas) dont la gestion répond à l'origine aux initiatives d'entrepreneurs privés qui construisirent à la fin du XIXe siècle de vastes canaux privés en les finançant par des parts sociales de capital et par l'emprunt auprès de banques internationales. Après une cinquantaine d'année d'exploitation de plus en plus difficile, ces entrepreneurs firent faillite et les canaux furent finalement récupérés par la puissance publique qui les confia en gestion directe à des associations d'usagers représentant tous les détenteurs de droits d'eau, la plupart d'entre eux de possédant que des heures ou des minutes d'accès. La pauvreté hydraulique touche désormais tous les petits possesseurs de droits par la pression extrême de milliers d'usagers partageant une ressource très limitée. C'est donc ici une précarité socialement construite, pour laquelle l'Etat équatorien n'a pas trouvé de solutions. Les propositions de nouvelles lois sur l'eau entre 1994 et 2004 ont porté sur diverses formes de privatisation des eaux selon le modèle chilien, mais elles ont été rejeté par divers mouvement sociaux et politiques (voir l'intervention de Ivan Cisneros).

4. Des éléments empiriques sur la précarisation hydraulique et l'exclusion social à un aperçu plus théorique de l'économie de l'eau agricole.

Les eaux dont une société a besoin doivent être comprises comme des biens économiques dont les formes de consommation et les formes d'exclusion sont diverses. Classiquement, on distingue des biens dont la consommation est identifiable avec des entités séparables ou non et dont l'exclusion est facile ou non. Ainsi, certains biens dont la consommation est individualisé et l'exclusion simple à établir sont des biens privés dont les accès se règlent par les marchés (ex : les pains vendus par un boulanger). Les biens dont la consommation est collective, commune à plusieurs personnes simultanément et dont l'accès est clairement défini sont des biens généralement régis par des droits de péage, avec une régulation selon des quotas (par exemple l'entrée dans un parc). D'autres biens sont des entités séparables et identifiables mais leur accès n'est pas clos. La régulation s'opère par des institutions qui édictent des règles et définissent qui et comment des personnes peuvent accéder ou être exclues (par exemple, une prairie ouverte à divers troupeaux). Enfin, certains biens ne sont pas facilement identifiables par des mesures de consommation fiables et sont difficiles à réguler (comme l'air que l'on respire). On aborde alors le partage de l'accès par une gouvernance établis entre acteurs parties prenantes de la qualité et de la quantité du bien. Les questions de pauvreté hydraulique nous ramènent à la manière dont l'eau est qualifié en tant que bien économique, dans une société donnée, et singulièrement quand une partie de cette société pratique l'agriculture irriguée et devient le principal consommateur des biens hydriques.

L'eau est-elle Bien Public, bien commun, bien privé, voire bien à péage ? Tout dépend de la manière d'appréhender l'espace et le réseau dans lequel circule le bien considéré. A l'échelle du bassin versant d'une rivière, on considère souvent que la ressource peut être en accès libre ou difficilement contrôlable et que sa consommation est globale et générale. L'eau est perçue

par ceux qui veulent gérer le bassin comme un bien public qui exige une administration rigoureuse. Une certaine forme de précarisation hydraulique naît de cette vision.

Si on porte le regard de manière empirique sur les niveaux locaux, nous retrouvons les trois autres formes de biens économiques théoriques.

La 1^{re} vision considère que la ressource est en accès beaucoup plus limité et borné du fait des réseaux d'irrigation en place et des limites techniques et pratiques de sur-consommation. Si l'eau est relativement abondante dans le réseau, elle apparaît comme une ressource accessible facilement selon un système de péage individualisé. Proposer d'autres solutions pour restreindre les usages constitue en soi une précarisation hydraulique inutile, qui entraîne un appauvrissement économique et de fait une exclusion sociale dont la société aura à traiter les conséquences en termes de marginalité ou de crise (exode rural).

La 2^{ème} vision joue sur l'aspect concurrentiel des consommations d'une masse d'eau mise à la disposition des usagers du réseau. L'eau devient alors un bien commun qu'il faut attribuer selon des règlements adéquats, d'autant plus exigeants que la ressource semble rare. Dans ce cas, le processus est politique. La restriction des usages peut être justement répartie entre tous les utilisateurs ou bien introduire des règles nouvelles d'exclusion.

La 3^{ème} vision locale vise à établir des services privés de distribution de l'eau en lui donnant tous les caractères du bien privé : une consommation individuelle identifiable mais concurrentielle, dont la régulation se fait par les incitations des marchés et les réactions des entreprises.

Le bien économique que représente l'eau prend des formes différentes : publique, privée, commune et sous forme de droit de péage. Toutes les formes sont présentes en même temps même si l'une peut dominer les autres à un certain moment de l'histoire.

Leçons des comparaisons : vers quelle précarité hydraulique évoluent les sociétés sous l'impulsion des réformes politiques et économiques mondiales ?

Quelque soit le mode de gestion collectif de l'eau, communautaire, étatique ou industrielle, les coordinations hydrauliques s'avèrent souvent difficiles et les difficultés de régulation et de satisfaction des utilisateurs les plus puissants les ont poussé à opter pour des solutions individuelles de pompage d'eau dans des nappes souterraines. Malgré quelques tentatives de régulation, le phénomène se développe, même si les ressources s'épuisent. Lorsque les accès privés individuels représentent la part principale de l'accès à l'eau, la précarité hydraulique reflète simplement la précarité économique : le creusement d'un puit profond et son équipement dépasse les possibilités économiques de familles paysannes.

Comme ces formes d'accès et de gestion se combinent dans les différentes régions irriguées du monde, on peut penser que deux phénomènes contradictoires s'opèrent : soit les différentes formes de précarité et d'exclusion s'ajoutent les unes aux autres, aboutissant à une exclusion plus rapide et des crises sociales plus critiques. Soit les précarités hydrauliques diffèrent et les paysans exclus d'un réseau trouvent la manière de ne pas être exclu d'un autre réseau, en jouant sur des relations sociales plus fortes : création de nouvelles communautés avec appui politique, accès illicites aux eaux dans les réseaux étatiques, regroupement autour d'une borne privée ou création d'un puit partagé.

Conclusions

Les sociétés humaines cherchent à définir les accès aux ressources communes disponibles dans les territoires qu'elles occupent, en tenant compte des types de ressources, des lieux d'abondance ou de rareté et des techniques connues pour les employer. L'histoire, les valeurs, les religions, les expériences d'action collective, le capital social donnent à chaque certaine spécificité. Ainsi différent d'une communauté à une autre, les arrangements institutionnels, c'est à dire l'ensemble des règles constitutionnelles établies au niveau local, les choix de règles collectives et la mise en place de règles opérationnelles. L'analyse de la précarité hydraulique et de l'exclusion sociale doit tenir compte de ces dimensions locales et globales.

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Encadré 1

La vallée du Sénégal

(Stratégies et comportements des agriculteurs les plus pauvres dans les grands périmètres irrigués sahéliens, (Ruf T., 1995 - Bulletin « Gestion Sociale de l'Eau, n°4)

Les deux rives du fleuve Sénégal ont connus depuis 1950 toute une série d'aménagements hydro-agricoles comprenant des grands périmètres irrigués d'État, des petits périmètres villageois, des grands périmètres agro-industriels sucriers privés et des aménagements rizières intermédiaires plus récents. Contrairement à l'Office du Niger, ce vaste mouvement de transformation du milieu ne repose pas sur un peuplement allochtone. Le peuplement de l'espace irrigué préexistait, la vallée faisant l'objet d'une exploitation coutumière des différentes zones naturelles (LERICOLLAIS, 1981).

Un milieu anthropisé et des accès codifiés aux différentes ressources de la vallée.

Avant la mise en place de systèmes irrigués, la vallée comprenait des zones basses appelées Walo soumises à l'alternance de crue et de décrue où les agriculteurs cultivaient principalement du sorgho dans le cadre de communautés villageoises hiérarchisées, en particulier chez les halpulaar : l'aristocratie foncière dispose des terres de décrue et les fait cultiver par des dépendants, captifs ou affranchis (SCHMITZ, 1986). Les terres hors de portée des hautes eaux sont des formations dunaires appelées dieri et cultivées en sec comme dans le reste du Sahel. Le fleuve permet la pêche artisanale ouverte à tous les habitants en saison de crue et réservée aux professionnels reconnus dans les cuvettes après la crue. L'élevage utilise tous les espaces non cultivés, les berges, les terres de walo non semées et l'ensemble des résidus de culture après les récoltes. La vallée connaissait ainsi un système agro-halo-pastoral qui va évoluer sous l'effet concomitant de sécheresses, des migrations et des effets de retour, de la régularisation des débits du fleuve, de l'aménagement hydro-agricole imposé par la Société nationale d'aménagement et d'exploitation des terres du delta du fleuve Sénégal (SAED) dans certains secteurs de la vallée, adopté dans d'autres situations avec l'intervention d'organisations non gouvernementales puis de la SAED elle-même. Environ 56.000 hectares ont été aménagés, chiffre à comparer avec les 100.000 hectares de terres de walo susceptibles d'être cultivées après une bonne crue.

Les transformations postérieures aux sécheresses des années 1973 à 1983.

La sécheresse a entraîné une baisse du débit moyen du fleuve. La force et la durée des crues diminuant, les cultures de walo ont été réduites, tandis que celles du dieri devenaient trop aléatoires. La ressource en poissons connaît une crise sévère amenant les habitants de la vallée à consommer du poisson d'eau de mer. Les pasteurs gardant les troupeaux ne trouvent plus de fourrages à proximité du fleuve dans le Dieri et les aménagements hydro-agricoles vont limiter l'accès aux terres de walo et même des berges du fleuve.

Le recentrage des activités sur la riziculture.

La politique d'aménagement de la SAED a consisté à développer la riziculture irriguée encadrée économiquement par l'État. Les rapports sociaux traditionnels ont été bouleversés. Le modèle d'attribution foncière est normatif, en fonction des capacités de travail familial. Dans les sites auparavant non cultivés comme dans le delta du fleuve, le droit foncier coutumier correspondait à des droits de pâture entre éleveurs nomades. Ils ne pèseront rien vis-à-vis des aménagistes. En revanche, dans la vallée, sur chaque rive, l'État sénégalais comme l'État mauritanien rencontrent de fortes oppositions là où les terres de walo étaient fortement appropriées (LESERVOISIER, 1994 ; SCHMITZ, 1986). Selon les cas, les dirigeants politiques et les fonctionnaires de la SAED composeront avec les anciens maîtres des terres pour ménager leurs privilèges fonciers. L'exode rural se trouve enrayé par la dynamique rizicole, puisqu'une partie des paysans les plus pauvres peuvent prétendre recevoir une terre dans un casier officiel ou bien encore trouver un arrangement avec les anciens détenteurs fonciers sous forme de métayage par exemple. Mais le salariat ne se développera que dans des situations particulières de périmètres sucriers ou d'entrepreneurs du delta.

La réactivation des rapports sociaux traditionnels face au désengagement de l'État.

Le désengagement de l'État se traduit par l'arrêt des activités d'encadrement de la SAED, la fin des subventions, et les essais de cession de la gestion aux associations villageoises sur les 11000 hectares aménagés par l'État. Parallèlement, il s'est créé dans la vallée et le delta entre 1985 et 1989 plus de 1200 groupements d'intérêts économiques, seule façon d'accéder aux crédits pour mettre en valeur de nouvelles terres (16.000 hectares de manière spontanée dans le delta), de financer la mécanisation (les récoltes en particulier) et de préfinancer la campagne (gaz oil, semences, engrais, etc.) (LE GAL, 1994).

L'adoption de la riziculture a diminué les risques climatiques, mais l'aléa n'a pas pour autant disparu. Les risques sont à court terme économiques, à plus long terme écologiques. Les crédits d'équipement ou de campagnes sont remboursés avec difficultés. La ressource en eau reste abondante, il suffit de la pomper, mais l'entente des riziculteurs pour assumer les charges et l'entretien des réseaux est loin d'être générale. L'endettement est tel et les remboursements si bas que le crédit agricole est au bord de la faillite en 1995.

La viabilité des aménagements reste une question centrale pour les observateurs (YUNG, 1992). Pour rentabiliser et entretenir les projets publics d'irrigation, la SAED a tenté d'imposer la double culture annuelle, mais dès que la pression administrative baisse, les paysans reviennent à une seule culture, plus sûre pour eux. La dégradation des aménagements sommaires est prévisible et l'absence de drainage conduit à pratiquer une espèce de riziculture itinérante au fur et à mesure de la salinisation des terres, facilitée en cela par l'imprécision des attributions foncières au GIE et par la stratégie d'occupation foncière des paysans souhaitant plutôt disposer d'accès à plusieurs lots dans différentes mailles hydrauliques qu'intensifier une parcelle par la culture de contre-saison (BELIERE, 1992 ; BOIVIN *et al*, 1995 ; GRET, 1995). En outre, le processus d'intensification dans un périmètre irrigué nécessite une coordination des acteurs en amont et en aval de la filière de production, mais aussi un ensemble complexe de décisions individuelles et collectives des producteurs en matière de gestion de l'eau, du matériel, des mises en cultures et des récoltes (LE GAL, 1994).

La réactivation des anciens pouvoirs fonciers dans la vallée et la stratégie de marquage des terres du delta par des paysans mais aussi des néo-ruraux entrepreneurs et investisseurs vont-ils permettre aux paysans les plus pauvres de trouver de nouvelles activités ?

Notons que durant les vingt dernières années, face aux schémas de développement étatiques normalisés, un mouvement d'innovations techniques et sociales a permis de multiplier les formes de contestation puis d'organisation des habitants de la vallée. DIDIER LAURENT *et al*, soulignent en 1985 l'émergence d'organisations paysannes qui se veulent un contre-pouvoir telles la fédération des paysans de Bakel. Dix ans plus tard Yung reprend l'idée de stratégies offensives déterminantes dans la constitution des groupements d'intérêt économique, mais pose également la question des rapports entre l'économie de marché, l'emprise foncière, la recherche du pouvoir et le rôle régulateur d'un État démocratique. Que se passera-t-il quand la terre cultivable ou l'eau disponible deviendront plus rares ?

Encadré 2

L'office du Niger au Mali.

Stratégies et comportements des agriculteurs les plus pauvres dans les grands périmètres irrigués sahéliens, (Ruf T., 1995 - Bulletin « Gestion Sociale de l'Eau, n°4)

Pour un million d'hectares envisagés par les promoteurs de l'Office du Niger au Mali (carte ?) dans les années 1920-1930, seulement 50.000 hectares ont été aménagés et réhabilités déjà plusieurs fois. Le peuplement de l'espace irrigué s'est fait par le colonat forcé à l'époque coloniale, strictement encadré après l'indépendance du Mali (1960). A la fin des années 1960, après l'abandon du coton et l'obligation de cultiver exclusivement du riz, et après l'échec des régies mécanisées, le colonat doit assumer le travail de préparation des rizières avec la traction attelée. La gestion du cheptel de traction va devenir une clé importante de l'évolution de l'Office du Niger. L'élargissement des familles contribuait, pour celles qui gardaient une forte cohésion, à maintenir et accroître le nombre de paires de boeufs. A l'inverse, la rupture de la famille élargie à la suite du décès du chef de famille mettait en cause la stabilité foncière, la propriété du cheptel et la réussite économique.

Une fondation difficile, des dizaines d'années d'encadrement économique.

Le poids du passé dans les périmètres irrigués africains, en particulier à l'Office du Niger, est immense, du fait de l'oppression et la dureté des années de la fondation des canaux, avec l'usage du travail forcé dans la construction et du déplacement autoritaire de populations afin de peupler la région aménagée. En plus de la dépendance foncière caractérisée par une précarité annuelle, les paysans ont connu des dizaines d'années de cultures obligatoires et de dépendances commerciales, de soumission au système de crédit, de police économique. Les paysans, soumis à l'interdiction de vendre leur production en dehors des circuits étatiques, n'ont généralement jamais connu d'expériences de négociations économiques libres (YUNG, TAILLY-SADA, 1992). En revanche, ils ont essayé de détourner une partie des productions pour la vendre dans des conditions illicites, et ont connu différentes formes de corruption.

Le risque permanent de l'éviction.

Pendant toute la période d'encadrement strict des colons, de 1950 à 1985, un système de sanction a prévalu, touchant ceux qui n'atteignaient pas le rendement nominatif fixé par l'Office. Dans un premier temps, on réduisait les terres concédées et la part d'autoconsommation. Faute de moyens de subsistance, le colon vendait ses boeufs s'il en avait encore. Le processus de paupérisation et d'exclusion jouait pleinement et l'importance des taux d'exclusion le montre : certaines années, 10% des attributaires ont été évincés, les terres ainsi libérées étant attribuées à de nouveaux bénéficiaires, souvent grands commerçants et même fonctionnaires de l'Office.

Le contournement du projet.

Malgré l'encadrement extrêmement serré des colons soumis à une police économique pour éviter qu'ils ne vendent leur riz en dehors du circuit étatique (jusqu'en 1985), ont afflué des candidats au statut de colon, alors que les terrains aménagés, 50.000 hectares en 1965, n'ont pas changé. En fait, en marge des casiers officiels de l'Office, s'est développée une riziculture dite "hors casiers" représentant jusqu'à 10.000 hectares de rizières alimentées par les eaux de drainage (FRESSION et al, 1985).

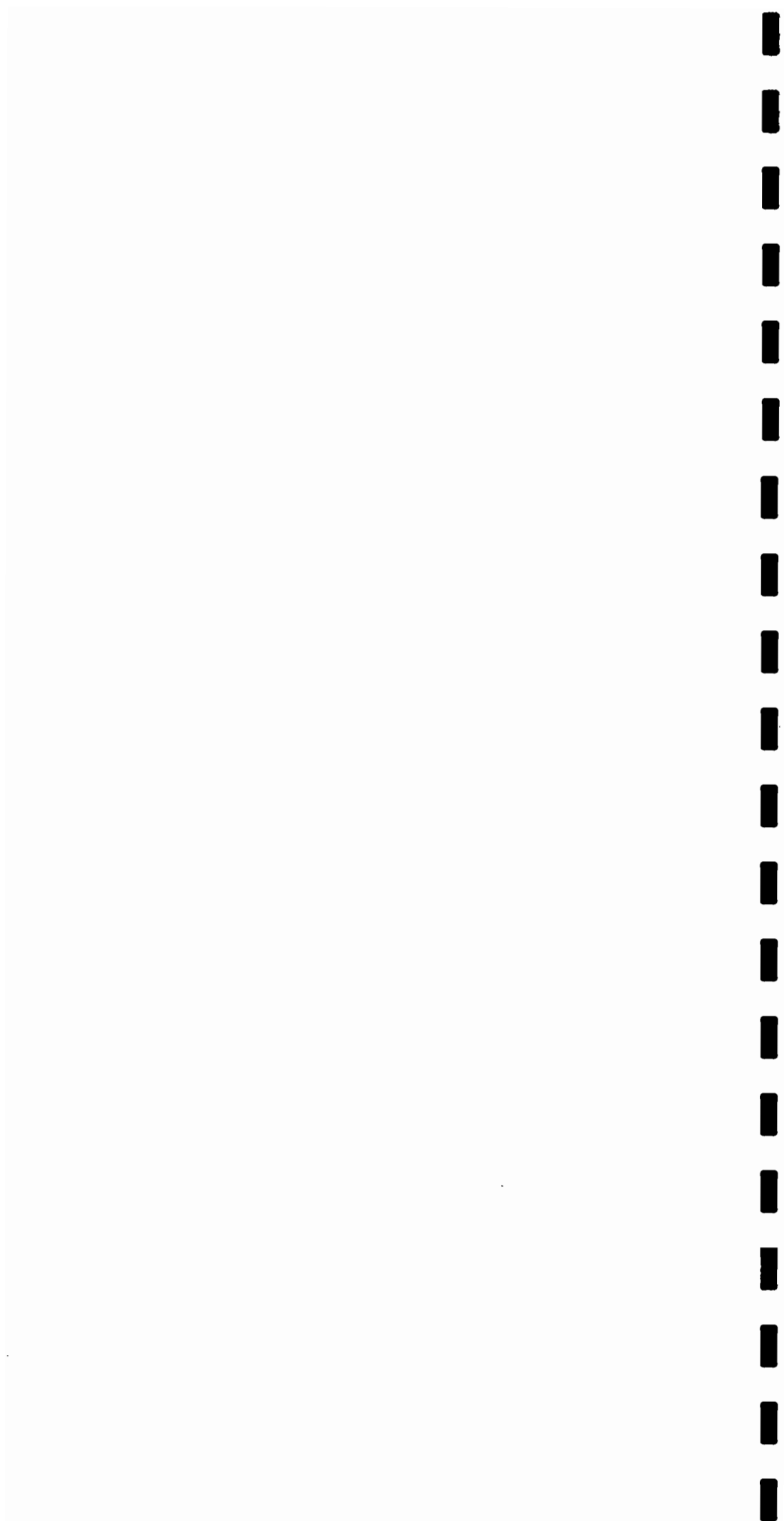
La dernière tentative autoritaire ?

A la fin des années 1980, arrive le dernier cycle de réhabilitation sur un secteur limité du périmètre appelé Retail, prévoyant un réaménagement hydraulique complet, une redistribution foncière systématique avec une réduction importante du ratio hectare/travailleur agricole. L'un des objectifs est de montrer que la riziculture africaine peut atteindre des performances similaires à celles de la riziculture intensive de l'Asie du Sud-Est. Une nouvelle fois, le registre de l'obligation est employé. Les attributaires devront repiquer et pratiquer la double culture pendant trois ans. Malgré l'intention de donner en priorité les attributions de terres aux riziculteurs résidents dans le périmètre, on constate que le tiers des lots réaménagés du secteur Retail est très vite contrôlé par des personnes non résidentes (DEVEZE, 1992). Enfin, la promesse de sécurisation foncière reste très marginale avec seulement quelques dizaines de permis d'exploitation agricole reconnus touchant 0,4% de l'ensemble des 10000 colons actuels et valable seulement 50 ans (JAMIN, DOUCET, 1994).

La diversité des agriculteurs de l'Office du Niger.

Le colonat de l'Office du Niger est devenu extrêmement hétérogène après 50 ans d'histoire d'interventions extérieures et de dynamiques sociales et économiques entre les colons. Plusieurs typologies de familles ont été dressées (RUF, 1985 ; IOV, 1992 ; YUNG, 1992 ; JAMIN, 1994) qui montrent l'importance des familles de paysans aisés, souvent anciennement installés, disposant de terres officielles et de terres hors casiers, représentant le tiers des colons et les deux tiers des superficies irriguées. En général, ces familles exploitant entre 10 et 50 hectares de rizières ont d'autres activités dans l'élevage, l'artisanat et le commerce. L'intensification de la riziculture n'est pas exclue dans ce groupe qui comprend aussi des non-résidents, fonctionnaires ou militaires ayant obtenu un accès aux terres aménagées. Elle est plus volontiers choisie par les paysans sécurisés dans leurs moyens de production à la suite des dernières réhabilitations, et par ceux qui ont pu maintenir leur système de production et leur autosuffisance alimentaire dans les zones non réaménagées. Enfin, un tiers des colons se trouve en situation de pauvreté, sans produire assez de riz pour la famille, endettés auprès de l'Office du Niger, engagés dans la spirale de l'exclusion après la perte ou la vente de leurs boeufs de traction, ce qui peut rapidement les décourager du processus d'intensification.

Dans l'entourage des colons vit un groupe hétéroclite de personnes sans statut de colons, ouvriers journaliers attirés par le bassin d'emploi, anciens esclaves du nord, paysans ruinés par la sécheresse des environs ou migrants à contre-courant du sud sahélien. On trouve aussi un certain nombre de colons évincés qui ont choisi de rester sur place en vendant leurs capacités de travail, et des bergers chargés de conduire les troupeaux des riziculteurs sur les parcours disponibles. Les statistiques sur ces personnes n'existent pas dans la mesure où leur mobilité est grande.



MECHANISMS OF IMPOVERISHMENT OF THE RURAL POOR IN CONTEMPORARY EGYPT

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ABSTRACT

Prevailing poverty and culminating social crises in Egypt are the final products of development failure in the last 50 years, first in the context of state control and then the restructuring of uncontrolled capitalism. This bad mixture has ended up with less accumulation of all forms of capital assets and an uneven access to those assets, which resulted in deprivation of the absolute majority and hence less opportunities, less freedom and low level of well being.

The market-led strategies and policies, adopted gradually since 1974, and reached a peak in the early 1990s, have drastically affected both urban and rural poor. The majority of the population is politically and socially excluded. However, most of the poor live in rural areas and are engaged in agriculture. The access to land and water is vital for sustainable livelihood in rural communities. This basic human right has been seriously threatened by redistributing the land, and consequently the water, in favor of the big landlords.

Now, it became very obvious that the poor are excluded from active participation in political and social institutions and are deprived from any share in the decision-making process.

The costs of the market-oriented reform package on rural population were tremendous. These included growing unemployment, falling real wages, higher prices for basic goods and services and loss of economic and social security.

There are justified speculations that the ultimate goal of this impoverishment strategy is to push down many small farmers into a status of laborers or push them out of agriculture and perhaps the rural areas altogether.

This paper tries to examine the main mechanisms of impoverishment of the rural poor that took place in the last 30 years. Particular emphasis will be given to the new land tenancy law of 1992, and the progressive privatization of the management of water resources and the attempts to transfer the burden of water management to the poor farmers without even asking the legitimate question: are they able to pay?.

INTRODUCTION

Poverty in Egypt represents a serious social, economic and political problem. In spite, or perhaps because, of the economic liberalization and structural adjustment policies that aim (as claimed) at sustainable economic growth and increased employment, poverty remains a wide-spread phenomenon that increases over time. A recent review of the best available current statistical studies on poverty (Assaad and Rouchdy, 1998) concluded that at least one quarter of Egypt's population is poor by any standard and another quarter lives on the margins of poverty. The same review observed, however, that few signs that poverty alleviation ranks among the top concerns on the broad national agenda as evidenced by its absence as a question for everyday discussion by the country's political and intellectual leadership, or in the press and the mass media.

Poverty in Egypt is wide-spread everywhere. However, "some animals are more equal than others." So, poverty is more concentrated in Upper Egypt than in Lower Egypt, in rural areas than in urban ones, among women than men. Therefore, small farmers households living in rural areas in Upper Egypt, particularly female members, are having the greatest level of deprivation.

Like everywhere else, poverty in Egypt is man-made. Prevailing poverty and culminating social crises in Egypt are the final products of development failure in the last 50 years, first in the context of state control and then the restructuring of uncontrolled capitalism. This bad mixture has ended up with less accumulation of all forms of capital assets and an uneven access to those assets, which resulted in deprivation of the absolute majority and hence less opportunities, less freedom and low level of well being.

The market-led strategies and policies, adopted gradually since 1974, and reached a peak in the early 1990s, have drastically affected both urban and rural poor. The majority of the population is politically and socially excluded. However, most of the poor live in rural areas and are engaged in agriculture. The access to land and water is vital for sustainable livelihood in rural communities. This basic human right has been seriously threatened by redistributing the land, and consequently the water, in favor of the big landlords.

Now, it became very obvious that the poor are excluded from active participation in political and social institutions and are deprived from any share in the decision-making process. The costs of the market-oriented reform package on rural population were tremendous. These included growing unemployment, falling real wages, higher prices for basic goods and services and loss of economic and social security. The consequences are terrifying. The social and economic sustainability of the country are seriously threatened and the nation's security in the future is doubtful.

On The Meaning of Poverty

Poverty should be defined, particularly if the aim is to eradicate it, in terms of less freedom and less capabilities. Poverty is about the freedoms the poor do not have, as Prof. Amartya Sen nicely put it. In his book, *Development as Freedom* (1999), he talks about several distinct types of freedom: economic entitlements, political rights, social opportunities, transparency guarantees, and protective security. So, poverty is not about material deprivation, but it is mainly about entitlements of all people in a well-being.

If poverty eradication is "development freedom" as Sin rightly argues, then it is not enough to talk about poverty reduction, as most international and national institutions propose.

When poverty is defined as deprivation of all kinds of capital assets: material, financial, human and social, only then it is possible to uncover the processes of producing and re-producing poverty and hence to find the right strategies and policies for poverty eradication.

Unfortunately, most poverty research, and to a greater extent, poverty measurements are stressing the definitions based on the income / expenditure or poverty line. This approach is not covering all dimensions of poverty and more importantly it does not deal with the mechanisms that reproduce poverty, and, therefore, fails to offer sound measures enough for poverty eradication. This approach can only suggest some measures for poverty reduction through safety nets. It should be noted that this safety is for the rich and powerful, not for the poor or for the society. It is worth remembering that certain levels of poverty offer advantages to the rich, and it is, therefore, convenient to treat them as normal without questioning their own role in generating poverty.

No doubt that poverty eradication in Egypt and in many other developing countries, will be a long term and difficult task, but the alternative of spreading and intensifying poverty, is certainly a disaster that should be avoided, whatever the costs might be.

The first step to formulate a sound workable strategy for poverty eradication, is to reconsider the current circumstances and admit that they offer the good soil for poverty seeds to germinate and flourish.

The second step is the existence of political will to change the current circumstances for the sake of poverty eradication and sustainable development. When the will is there, then, we should have the capacity to induce the required reforms. This asks for a very comprehensive approach and consistent attacks on all fronts of the political economy of the country. Otherwise, all generations of the programmes and institutions for poverty reduction will remain as instruments for spreading and intensifying poverty.

Mechanisms for Generating Poverty

Understanding and identifying the causes and mechanisms for generating poverty are pre-requisites for formulating an effective strategy for poverty eradication. Prevailing poverty in Egypt, for example, is the final product of the development failure in the last 50 years. First, in the context of state control, and then, in the restructuring of uncontrolled capitalism. This bad mixture has ended up by less accumulation of all forms of capital: material, financial, human and social, and more importantly, an uneven access to those assets, which resulted in deprivation of the majority and hence less opportunities, less freedom and low level of well being.

The monopoly of the state contributed to a slow economic growth through inefficiency and distorted prices for goods and services. The structural adjustment that followed contributed to spreading poverty further. Reducing public expenditures resulted in the deterioration of services and infrastructure. Privatization, on the other hand, did not improve the efficiency, but brought about higher prices. It is only a private monopoly substituted state monopoly. This brought about uncontrolled inflation, unemployment and less real wages, and finally the spread of poverty.

It should be noted here, that with the kind of structural adjustment implemented now in Egypt, the opportunities for poverty eradication are almost nil. In the framework of uncontrolled capitalism, the private sector is considered the engine of all economic activities and the capital is favored above labor. Those who own the capital are the minority, but the labor is the main source of income for the absolute majority. This ends up, especially with the prevailing stagnation, with widespread unemployment and less and less human capabilities.

The free markets are closed on the face of the poor (less access to information, unfair competition, bureaucratic procedures, corruption, and less ability to avoid risks). On top of that, institutional reforms are not in the agenda of structural adjustment. Institutional reform is in conflict with the interests of the ruling minority that owns the capital assets. Their wealth accumulates often by purchasing public enterprises. The income and power mal-distribution grows on itself and makes waves after waves of stagnation and ever growing gap between the rich and the poor. In all societies, the deprivation of all kinds of capital and the growing inequalities are the main direct causes of poverty.

Deprivation of quality education and health are the first steps to poverty. Education and health are equal to work opportunity. This is vital for the poor who earn their living from their labor. When the social safety nets are weak, the poor families cannot afford the high costs of private education and health care.

On the other hand, the poor have no access to credit, particularly subsidized formal credits. They have to bear higher costs to get informal credit, which in turn intensifies their poverty.

On the other hand, the rich investors enjoy many advantages, e.g., exemption from paying taxes, obtaining the land and infrastructure at very low prices, and full freedom to fire laborers and send their huge earnings abroad. Their political and social ties allow them to get information at the right time to enter the markets and make profits.

The majority of the poor are politically and socially weak and excluded. Most of them live in rural areas and are engaged in agriculture. The access to land and water is vital for sustainable livelihood in rural communities. This basic human right is threatened by redistributing the land, and therefore, the water in favor of the big landlords. Finally, the poor are excluded from active participation in political and social institutions and any chance to affect the decision-making process. This represents the extreme deprivation, which promotes the main reasons behind poverty. In fact, it deprives the poor from their ability to escape the poverty trap and from their basic right in full citizenship. This is the issue here.

Let me now examine the details of some of the intended mechanisms for impoverishment of the poor, particularly in rural Egypt.

Distribution of Land Holdings

The agrarian reforms implemented in 1950s and 1960s allowed a maximum land holding of 100 and then 50 feddans and distributed what exceeds that limit to landless families. However, these reforms did not significantly correct the already very skewed distribution of land holdings. Even after the full implementation of the land reform acts, more than 50% of all agricultural land was still in the hands of less than 7% of all farmers. In 1990, more than 70% of holdings were less than one feddan

(Table 1). A significant proportion of the agricultural work force, which totaled 4.3 million workers still remains without any land at all.

Table (1) Distribution of Land Holdings in Egypt in 1990

Holding category	No. of holders (1000)	% of total holders	Area held (1000 feddan)	% of total area
< one feddan	2696	69.2	1060	18.2
1 -	501	12.9	658	11.3
2 -	266	6.8	603	10.3
3 -	163	4.2	530	9.1
4 -	107	2.7	434	7.4
5 -	89	2.3	565	9.7
10-	44	1.1	571	9.7
20-	21	0.5	534	9.2
50-	7	0.2	376	6.5
> 100	2	0.1	498	8.5
Total	3896	100.0	5829	100.0

One feddan = 4200 m²

Source. (CAPMAS, 1992) Statistical Year Book

After the implementation of the counter-reform in 1997, the situation has been made much worse. The number of landless was much higher and the big landlords got back more land.

Nevertheless, the effect of Nasir's agrarian reforms was mainly the regulation of agricultural wages and land rents. Rent contracts were fixed on a permanent basis and at annual rate of seven times the land tax. The permanent rent contracts were even inheritable and allowed their holders profit from the services of the agricultural cooperatives and subsidized credits and inputs. Above all, the tenants were secured and felt that the land was theirs and were willing to invest in conserving it.

This era was ended with the invasion of Structural Adjustment Programs (SAPs) and adopting the free market economies. In 1992, the Egyptian parliament passed a new law governing owners-tenants relations. The law allowed a 5 year transition period during which the rent of the land was increased three folds to be 22 times the land tax. As from 1997, land owners regained full control over their property. They became completely free to cultivate the land themselves or leave it barren or let it to anyone who is willing to pay the rent demanded.

In less than 15 years, the average rent has been changing as follows:

- Before 1992 EGP 200/feddan/year
- 1992-1997 EGP 600/feddan/year
- After 1997 EGP 3000-4000/feddan/year

Although the data available so far on the numbers of affected small farmers are neither accurate nor consistent, the number of tenants families who had to give the land back to the owners were estimated to range between 3 million to 5 million.

The counter land reform of the 1990s intended to fully liberalization of agricultural sector and encourage a trend toward land concentration due to many small tenants abandoning their plots since they cannot afford the new rent. It deprives the small poor farmers the only material asset left to them and turns them to agricultural workers struggling to sell their working power against very low and unfair price.

Moreover, land tenure new arrangements, encouraged farmers to neglect investing in land conservation, trying to maximize their returns in the short run at expense of the long run sustainability of the resources. Furthermore, with the uncertainty about future access to agricultural land, farmers lost access to credit as well (El-Gaafarawi, 1998). For more details about this big policy shift and its consequences, see the comprehensive collection of papers edited by Hopkins and Westergaad (1998). See also Bush (1995); Mitchel (1995); Fletcher (1996); and Saad (1998).

Water Demand Management Through Pricing of Irrigation Water

With the diminishing opportunities to increase water supply, far grater emphasis is given to demand management. This approach included several direct measures such as regulations, technology, pricing, shifting cropping patterns, marketing incentives and public education. While water demand management is the only alternative when increasing supply is not possible, some approaches in the demand management need to be treated with caution. Water Pricing is one of the principle tools for managing demand. Its devastating effects on the poor farmers are predictable.

In the context of economic liberalization and adopting the market mechanisms, irrigation water pricing, which was previously a taboo, is discussed now openly and even practiced in Egyptian agriculture without due considerations of the socio-economic impacts on the small poor farmers who are representing more than 80% of all farmers.

These policy trends were clearly expressed by the Minister of Water Resources and Irrigation in a recent paper (Abuzeid, 2001) on "Water Pricing in Irrigated Agriculture". The Minister starts by saying "Access to water is viewed as a basic human right, a social necessity and a critical environmental resource". Very soon, however, he gives several statements against what was just said, statements like the following:

"Water service charges are potentially important and useful, as they are expected to contribute to the recovery of costs from beneficiaries, which will relive the government of a financial burden and provide revenues to support the operation and maintenance of the water supply system".

"If water charge for the sustainability of services are not sufficient to induce the desired level of water conservation, it will be necessary to impose an additional component of water pricing assigned specifically to the water users".

Although the Minister states that "in many cases, irrigation rates do not have a significant impact on irrigation efficiencies because they represent such a small proportion of total production costs" it seems that the Minister's solution for low irrigation efficiencies, is to increase the irrigation water charges to represent a considerable proportion of total production costs, when he suggests that "The costs to be considered involve many categories, including design, construction, operation, maintenance and the cost of revenue collection".

The Minister continues saying "for any water pricing policy to succeed, it must be acceptable to the water users", However, in practice, the Ministry did not try to question weather its pricing policy is acceptable to water users or not, let alone the most important question of weather the poor farmers can afford to pay any extra cost for irrigation water or not.

Shrinking Wages and Explosion of Inputs Prices

The distribution of land leaves many villagers with no resources beside their work. Because of growing mechanization and shortage of work opportunities, the rural capitalists are reaping greater benefits by paying lower wages to their workers. In the absence of a set of minimum wage and a system of patronage, policing and surveillance in rural Egypt that prevent the "poor folks" from protesting or organizing to change their conditions, the poor wage earners are exploited without any mercy (Mitchill, 1998).

This apply also to the small farmers who cultivate too small plots to absorb the family working force. This combined with the huge jump in the land rent and the removal of government subsidies on credit, fertilizers and all other inputs and services, left the small farmers highly vulnerable and extremely impoverished.

For example, as an outcome of the deregulation of the fertilizer sector and withdrawal of state subsidies, the price of chemical fertilizers rose by between 350 percent and 667 percent in a short period of only 6 years (1987-1993).

Table(1): Fertilizer Price Increase, 1987-1993 (EGP/ton)

Type	Price in 1987	Price in 1993
Urea	149	505
Ammonia	58	301
Gypsum	48	250
Potassium	57	380
Superphosphate	75	400

Source: Abou Mandour (1996)

Very similar trends apply to the prices of all other agricultural inputs, i.e. seeds, pesticides, and of course the land rent. There has been only one input which did not witness any increase in its price, that is the agricultural work. In the contrary, the real wages for agricultural works dropped 60% between 1985 and 1991, according to Abou Mandour (1996).

To cope with this stressful situation, the poor have adopted strategies that promote impoverishment from which it is rather difficult, or perhaps impossible, to recover.

Deteriorated Standards of Living and Retarded Human Development

Official data, based on a series of Household Income and Expenders Surveys (HIESs) covering a relatively long time period (1958-1995) trace the poverty in Egypt over the last three decades. Examining these data reveals that between 1991 and 1996 one can see that the real income has declined, on average, by 14% in the cities and 20% in the countryside. Real household expenditure, on the other hand, declined substantially by 20% in urban areas and almost 25% in rural areas (Firgany, 1997).

Moreover, in the same period real per capita expenditure on food was estimated to have declined by 13% in rural areas and 8% in the cities. This reduction is mainly attributed to the reduction in real wages and the subsidies to food commodities. This leads to the conclusion that the quantities of food stuffs consumed per person must have decreased considerably in the last years. This is a most serious sign of deterioration of the standard of living in the country in short time of about five years since the implementation of SAPs.

One serious consequence of poverty is that it aborts the potential for development in a country that is rich only in human resources.

The details in HIESs reveal a frustrating stories. In 1992, a full quarter of Egyptian children were estimated to be stunted. Stunting (low height for age), ascribed to chronic inadequate food intake, is serious because it is hardly reversible. Its deleterious effect produce physical impairment, preclude development of mental faculties and curtail learning abilities.

Stunted children in 1996 rose to 30% and they were 40% in rural Upper Egypt. After analyzing these phenomena, Fargany asks, "Would such Egyptian, weak of body and mind, constitute the basis of Egypt's" competitiveness in the fierce global markets of tomorrow? (Fergany, 1998).

Fargany, in the same paper analyzing poverty and unemployment in Egypt, discusses, the deterioration of human capital of the poor. For example, exclusion from basic education is strongly selective of the poor households, especially girls. Reasons for the poor exclusion, include the institution of "cost recovery" for government services in SAPs, and the rising cost of education because of inflation in general and education-related costs such as private tutoring. In addition, quality of education is low and deteriorating. The output of education mismatches the labor market. The poor quality education hits the poor in particular for the rich could afford expensive private schools and private lessons.

Concerning health, it is understood that to be in good health is tantamount to being able to work. This is especially so in case of the poor who often engage in physically demanding activities. Since earning, i.e. income from work, represent the mainstay of livelihood of the vast majority of the poor, sickness can compound poverty through deprivation from income. Sickness is thus a major road into poverty, no matter how defined.

There are many indications that poor households are increasingly unable to afford the cost of health care. With stronger privatization of services, and increasing poverty, the affordability of health care by the poor is diminishing.

A glance on the official figures reported on the Egypt Human Development Reports, will clearly reveal several symptoms and indices of the impoverishment of the majority of Egyptian people in urban as well as rural areas.

Table (2) Profile of Human Deprivation in Egypt in the 1990s.

Index and year	Egypt	Urban	Rural
Population without access to Piped Water (1995)	10,633	833	9,456
Population without access to Sanitation (1995)	10,211	826	9,375
Infant mortality rate (per 1000 live births) (1991)	36.2	34.8	37.0
Children dying before age 5 (1993)	73,1		
Malnourished children under 5 (1995)	1,037	321	679
Children not in basic or secondary school (1994)	2,361		
Illiterates (10+) (1996)	17,347	5,245	12,102
Unemployed persons (15+) (1995)			
Total	1,911	901	1,010
Female	919	452	467
Poor persons			
Total	13,638	5,820	7,817
Ultra poor	4,294	1,970	2,324
Total Population (1994)	57,849	24,875	32,974

Source: INPE (1996)

While these figures are certainly underestimated, they did not show the huge disparities between the rich and the poor and between Lower Egypt and Upper Egypt. However, they are tilling part of the story.

Coping with Poverty and Impoverishment

It is needless to say, that the majority of rural population, particularly the landless, the small farmers and the women, are living and working almost all the time, under stress. They often face the reduction in yields, the high production costs, and political, economic and social exclusion, by adopting several coping strategies. Among others, the following were documented in many studies (see Push, 1998 and Kishk, 1994):

- Producing large families
- Diversifying income sources
- Spending less, eating less and saving less
- Using more family work (children and wife)
- Taking the children out of school (starting by girls then boys)
- Migrating temporarily to urban centers or abroad
- Borrowing and borrowing again to pay previous debt or just to eat
- Selling assets, starting with small animals, then big animals, and finally pieces of their tiny land.
- When there is nothing left they can only sell themselves, both body and soul. Begging, theft, small crimes and prostitutions. are observed everywhere. Recently, there have been reported cases of people selling parts of their bodies or selling one of their children or killing somebody for just few pounds or committing suicide.

It is obvious that all coping strategies of the poor are destructive ones, if not terminating them, they will deprive them from their current and future productive assets (education, health and even land) and therefore tend to keep them caught in the poverty trap.

Observing and carefully analyzing what is happening in Egypt, Bush in 1998 suggested that the challenge of economic reform is now threatening the ability of small landholders to continue their conditions of rural existence, and that unless this is recognized, there will be impoverishment and political mobilization to an extent not previously experienced in rural Egypt.

However, in the spheres of IFI, the Government of Egypt, and Egyptian private sector, what is happening to the small farmers or even the whole middle class of Egyptians is not recognized and the process of impoverishment is accelerating. To many observers, these changes will bring about a greater polarization between the rich and the poor in rural areas (and indeed all over the country) as the rich will use their political influence and social skills to dominate the situation, and especially to acquire additional rights over land (and water and other resources) at the expense of small farmers. If they are successful in doing this (there are evidences that they are very successful), then the logic suggests that many small farmers will be pushed down into a status of laborers or pushed out of agriculture and perhaps the rural areas altogether (Hobkins and Westergaard, 1998). It seems that the ruling minority finds it easier and more convenient to eliminate the poor instead of eradicating poverty.

Now in 2005, we can clearly see that these are not just speculations. There is every evidence to show that this is the intention. It seems that the ruling powers did not

care of what happens to the poor, or even to themselves and to the whole country. When the collapse happens, they should be only sure that their plains are waiting for them to leave immediately and forever to enjoy their accumulated wealth somewhere else.

In the last twenty years or so, there has been alarming, very clear culmination of violence in Egyptian society. All forms of violence: official violence against people that is usually met with people's violence against each other and against the symbols of authority, and vice versa. Agrarian counter reforms have played an obvious role in creating this violence, (Toth, 1998).

The alarming sings of violence, crimes and all sorts of corruption, has been solely faced by police force. The ruling powers turned deaf ears and blind eyes to the people. They can only see and listen to their stupid never satisfied greed's.

Conclusions and Recommendations

It was clearly shown that the costs of the market-oriented reform package on the poor and particularly on rural population were tremendous. These included growing unemployment, falling real wages, higher prices for basic goods and services and loss of economic and social security.

People in the streets, researchers, activists and thinkers have been repeatedly saying all what should be said. What I can say now that growing polarization of the Egyptian society is extremely dangerous. The ruling powers should listen to the voices of the poor or there will be no future.

The Egyptian poet Salah Abd El Sabour once said:

"The country in which poverty is relaxing like a snake in the sand, has no future"

"The country in which woman has to take off her clothes in order to eat, has no future"

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Inégalités face à la ressource et pauvreté hydraulique en Tunisie Le cas des populations rurales de la Jeffara (Sud-est tunisien)

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Introduction

La modestie du potentiel hydrique de la Tunisie confère à la gestion de la ressource un rôle de levier essentiel au développement économique et social. Avec des disponibilités de l'ordre de 450m³ par habitant et par an, ce pays fait face à des risques de pénurie conjoncturelle, qui nécessitent des formes d'ajustements en vue de sécuriser l'approvisionnement des secteurs de consommation. Jusqu'aux années 1990, celles-ci se sont appuyées en priorité sur un renforcement progressif des volumes mobilisés et une stratégie de transferts interrégionaux destinés à réduire les disparités géographiques. Depuis, les politiques de l'eau se déclinent autour d'une inflexion de la croissance de la demande, la recherche d'une valorisation maximale du m³ et la mobilisation optimale de l'eau avec des formes d'appoint liées au recours aux ressources non conventionnelles (Khanfir et al., 1998). Les efforts importants consentis permettent à la Tunisie d'afficher au début du XXI^{ème} siècle des résultats encourageants (taux de desserte très élevé, maîtrise des eaux distribuées en quantité et qualité,...). Par ailleurs, les interventions des pouvoirs publics effectuées dans le cadre d'un modèle "d'Etat providence", garant d'une prospérité économique "partagée", ont abouti à la réduction massive de la pauvreté depuis les années 1970 (Boukhari, 1999). Aussi, sur ce dernier plan comme en matière de gestion des ressources en eaux, la Tunisie apparaît comme un modèle dans le Monde Arabe, ce qui pourrait questionner la pertinence d'une approche visant à associer pauvreté en eau et pauvreté sociale dans ce pays.

Pourtant, la question des contraintes qui tournent autour des ressources en eaux offre bien une clé de lecture intéressante des conditions de développement économique dans les espaces ruraux tunisiens. En effet, l'application de politiques de gestion de la demande déplace la problématique de l'eau d'une approche "conventionnelle" tournée autour de la viabilité et la durabilité du dispositif de gestion de la pénurie à la prise en compte de l'impact socio-économique des modalités d'arbitrage et de régulation de l'accès et de l'usage de la ressource. Or, les nouvelles orientations, qui portent en leur cœur la contrainte financière comme mode de régulation de la demande à travers la tarification et la recherche d'une efficacité économique de l'allocation, nous interrogent légitimement sur les implications qui en découlent dans les zones rurales tunisiennes. Les populations rurales, au détriment desquelles se sont souvent exacerbées les formes de concurrences intersectorielles malgré le poids prédominant que conserve le secteur agricole dans l'utilisation des ressources, restent caractérisées par une certaine vulnérabilité et une dépendance importante aux programmes d'aides publiques. Elles sont d'autant plus concernées par l'évolution des politiques de l'eau que le secteur agricole est principalement visé par la mise en place de règles juridiques, de mesures techniques et d'un système de tarification destinés à favoriser la transition vers une agriculture "performante" et durable.

La question de la pauvreté hydraulique des populations rurales tunisiennes s'articule donc autour des contraintes liées à l'eau, qui portent non seulement sur les modalités d'accès, mais aussi sur les aspects institutionnels, juridiques, économiques et environnementaux qui permettent ou non aux populations de pouvoir disposer effectivement des ressources hydriques et de les valoriser. Elle intègre, en outre, une analyse sur les formes d'équité des

secteurs d'activités et des populations devant la ressource. Nous illustrerons notre propos à travers l'analyse de la situation du Sud-est tunisien, et plus particulièrement de la plaine de la Jeffara. Dans cet espace aride, la fragilisation des activités agropastorales et la précarité des revenus extra-agricoles confrontent les ménages ruraux à la nécessité d'un recours plus intensif aux ressources en eaux pour étendre et intensifier la production agricole. Dans un contexte de réaffirmation des priorités accordées à l'eau potable et au secteur touristique dans l'allocation des ressources, à quelles formes de contraintes liées à l'eau les populations de la Jeffara font-elles face ? Les pouvoirs publics parviennent-ils à associer une approche sociale de la rareté de l'eau à la préservation des ressources et aux exigences de valorisation économique ?

L'objectif de cette communication est moins d'évaluer l'ampleur de la situation de pauvreté hydraulique que d'illustrer la diversité de ses facettes et la complexité de ses fondements. Ces éléments renvoient à la confrontation des logiques diverses qui entourent la gestion de la ressource en eau et à la difficulté de concilier développement des activités économiques, équité sociale dans le partage de l'eau et durabilité de l'exploitation des ressources.

Dans une première partie, nous retracerons succinctement les politiques appliquées dans le Sud-est tunisien pour remédier à l'inégale répartition des ressources et la croissance des besoins. Puis nous analyserons successivement, dans une deuxième et troisième partie, les différentes dimensions de la pauvreté hydraulique et la question des inégalités croissantes face à l'eau en nous basant sur des recherches effectuées dans les zones rurales de la plaine de la Jeffara.

I] POLITIQUES DE L'EAU ET GESTION DE LA RARETE DE LA RESSOURCE DANS LE SUD-EST TUNISIEN

Le Sud-Est tunisien est une région aride où la précarité de la situation hydrique est renforcée par la médiocre qualité des aquifères souterrains et une certaine inadéquation spatiale entre ressources et besoins. Autrefois régulée par une faible emprise anthropique et l'élaboration d'activités peu consommatrices en eau, elle s'est accentuée progressivement au cours des dernières décennies en lien avec la croissance démographique et le développement des activités économiques.

I.1) Une ressource inégalement répartie et disponible à laquelle les sociétés ont appris à s'adapter

Le Sud-est tunisien présente plusieurs faciès géomorphologiques et des nuances pluviométriques (carte n°1) qui ont favorisé un système hydrogéologique complexe, basé sur une forte complémentarité entre des ressources en eaux de surface limitées et des nappes souterraines plus abondantes.

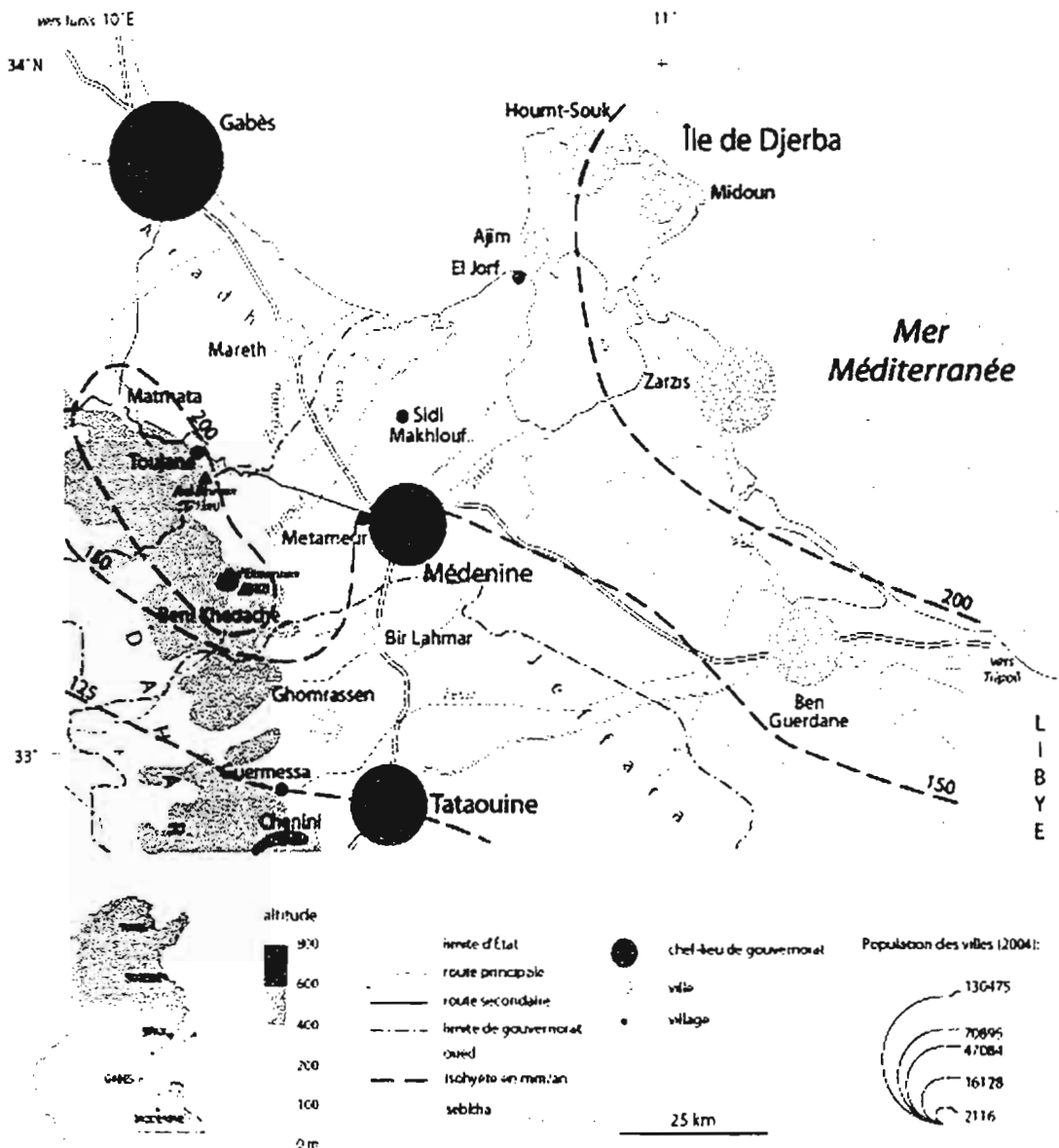
Les potentialités en eau de surface sont directement dépendantes de l'apport faible et irrégulier des précipitations qui s'échelonnent entre 100mm et 200mm par an en moyenne. Les cours d'eau sont marqués par un écoulement intermittent alimenté souvent par des crues violentes qui entravent leur maîtrise. Bien qu'excentrée par rapport à la localisation des vastes nappes sahariennes, le Sud-est tunisien est relativement riche en formations aquifères, qu'on divise habituellement en nappes phréatiques et nappes profondes. Les premières, constituées de nappes de sous-écoulement d'oued et de nappes côtières, sont tributaires de l'infiltration des eaux pluviales et de ruissellement, et dans certains cas, du soutien de niveaux sous-jacents. Elles constituent des ressources facilement disponibles mais limitées en volume et qualité et susceptibles de fortes altérations.

Les nappes profondes sont divisées en plusieurs aquifères plus ou moins connectés, dont les principaux sont les nappes de la Jeffara et des Grès de Trias. La première est alimentée par le Continental Intercalaire via la faille d'El Hamma, et dans une moindre mesure par les eaux d'infiltration. Son taux de salinité très élevé en aval de la faille de Medenine, le long de la bordure côtière, pose des limites importantes à sa valorisation. En revanche, dans sa partie libre, en amont, l'infiltration a favorisé la présence d'importantes réserves en eau

douce (nappe de Zeuss-Koutine) au sommet de la nappe. De même, la nappe des Grès de Trias qui se situe plus au Sud présente des différences très importantes en terme de qualité entre une fraction d'eau douce liée aux apports d'infiltration des oueds descendant du *jbel* et des réserves plus profondes et saumâtres. Ainsi les ressources les plus douces sont essentiellement situées dans le sous-sol de la plaine centrale.

La problématique de l'eau dans le Sud-est tunisien est donc marquée par de fortes disparités spatiales en terme de disponibilité et se pose autant sur le plan qualitatif que quantitatif.

Carte n°1 : Présentation géographique du Sud-est tunisien



Au cours de l'Histoire, l'absence de cours d'eau permanents, la rareté des sources naturelles et l'irrégularité spatio-temporelle des faibles précipitations ont amené les groupes sociaux à adapter leurs modes de vie et d'occupation de l'espace à la médiocre disponibilité des ressources en eaux. Etroitement associé à l'occurrence des pluies et leur répartition spatiale, le calendrier des activités des sociétés, qui conjuguait une céréaliculture épisodique à un

pastoralisme prédominant, était rythmé par des cycles saisonniers de déplacements (Guillaume & Romagny, 2004). La profusion de techniques de collecte des eaux pluviales et de ruissellement destinées à l'eau potable (citernes pluviales de type *majel* et *fesguia*) ou à l'irrigation (*jessour*, *tabias*) permettait le maintien d'une population plus dense en montagne et dans la bordure littorale par le développement d'une agriculture plus intensive. Par ailleurs, l'utilisation de puits de surface avait permis l'éclosion de quelques oasis peu étendues dans les zones d'affleurement des nappes phréatiques.

1.2) Croissance de la demande en eau et adaptation des politiques

Les mutations socio-économiques amorcées à partir de la mise en place du Protectorat français (1881) et accélérées depuis l'Indépendance tunisienne (1956) ont modifié profondément la répartition des populations et leurs rapports au milieu. Bien que la dispersion des habitats sédentaires et le développement de l'agriculture se soient surtout appuyés sur l'extension des aménagements dits "de petite hydraulique" à l'ensemble de la région, la période du Protectorat a ouvert la voie à une intensification de l'exploitation des ressources souterraines à travers la création de nouveaux besoins et le recours à des formes modernes de mobilisation de l'eau, telles que le forage profond. A partir des années 1960, la croissance démographique et urbaine et le développement rapide du secteur touristique dans la bordure littorale vont s'effectuer à des rythmes très élevés, entraînant une pression accrue sur les ressources en eaux.

Face aux limites des potentialités des nappes souterraines alors identifiées, les pouvoirs publics décident, dès les années 1960, de hiérarchiser les priorités en accordant aux secteurs « stratégiques » (eau potable, tourisme et industrie) les ressources les plus douces à travers la création d'un système de transfert des eaux de la nappe de Zeuss-Koutine vers la bordure littorale et insulaire. Ce dispositif, conforté dans le cadre de l'application du Plan Directeur des Eaux du Sud au cours des décennies 1970 et 1980, s'appuie sur une limitation de tout développement de l'agriculture irriguée à partir des nappes profondes afin de préserver la qualité de l'aquifère. Le processus de mise en valeur agricole étant alors essentiellement tourné vers l'extension d'une oléiculture en sec, et dans une moindre mesure sur la création de petits périmètres irrigués (*souani*) à partir de nappes phréatiques, ces choix en matière hydraulique procédaient davantage du soutien à des activités naissantes (le tourisme notamment) que d'une volonté délibérée de marginaliser les populations d'agropasteurs de l'arrière-pays littoral. Néanmoins, ils les ont privés d'un recours à l'intensification agricole au cours d'une période caractérisée par le déclin des jardins irrigués de la bordure littorale et l'expansion formidable des zones oasiennes dans les autres régions méridionales de la Tunisie (Abaab, 1981). En outre, le partage de la ressource a laissé apparaître de fortes inégalités sectorielles, mais aussi spatiales, aux dépens de ces espaces de plaine en plein boom démographique (Abaab, 1983).

Le changement de stratégie hydraulique intervient vers la fin des années 1980 à mesure que s'impose, pour des raisons financières et environnementales¹, le modèle d'une gestion de l'eau par la demande (Romagny et al., 2004). Centrés autour de l'utilisation et la valorisation optimale des ressources disponibles, les objectifs de la nouvelle politique de l'eau s'accompagnent de réformes importantes sur le plan institutionnel (promotion des associations d'usages, décentralisation de la gestion de l'eau...), juridique (principe "pollueur-payeur" et "usager-payeur") et économique (objectif d'une "vérité des prix", limitation des interventions de l'Etat...). Parallèlement à l'application de ces mesures dans le courant des années 1990, la mise à jour de nouvelles nappes souterraines et le recours au

¹ Les années 1980 sont marquées par la signature du programme d'ajustement structurel (PAS) qui favorise un processus de désengagement et de décentralisation des compétences de l'Etat tunisien. D'autre part, la dégradation de la situation hydraulique, caractérisée par l'apparition de situation de surexploitation des nappes souterraines, favorise une prise de conscience de la nécessité d'adopter des mécanismes de régulation de l'exploitation des ressources.

dessalement des eaux saumâtres ont ouvert de nouvelles opportunités par l'augmentation du stock de ressources "utiles".

L'amélioration des conditions de fourniture de l'eau et l'éloignement des risques de pénurie au cours des dernières années témoignent de l'évolution favorable de la situation de l'eau à l'échelle de notre région d'étude. Celle-ci est toutefois en partie liée au maintien des contraintes d'accès à l'eau pour le secteur agricole, dont le développement s'est surtout exprimé tout au long du XX^{ème} siècle par l'extension de l'emprise arboricole et le maintien des activités agropastorales.

Tableau 1 : Relations entre types de ressources et usages sectoriels de l'eau dans le Sud-Est tunisien (situation en 2005)

Usages \ Ressources	Eaux de surface (pluies et ruissellement, oueds)	Eaux souterraines		Ressources non conventionnelles
		Nappes phréatiques	nappes profondes	
AEP urbain (habitat dense)	Citernes enterrées (majels, fesguias)		Réseau SONEDE (compteurs privés)	Dessalement eau de mer (d'ici 2010)
AEP rural (habitat dispersé)	Citernes enterrées (majels, fesguias)		GIC eau potable (potences, bornes fontaines ou compteurs privés)	
TOURISME (hôtels)			Réseau SONEDE + forages privés (irrigation)	Dessalement des eaux saumâtres
INDUSTRIE			Réseau SONEDE	
AGRICULTURE pluviale	Aménagements de CES (jessours, tabias)	Achats d'eau auprès des GIC ou de points d'eau privés pour l'irrigation d'appoint		
AGRICULTURE irriguée		Puits de surface privés	forages privés ou publics gérés en GIC	Eaux usées traitées (GIC d'irrigation)

Source : Romagny et al., 2004, modifié par S.Palluault, Octobre 2005

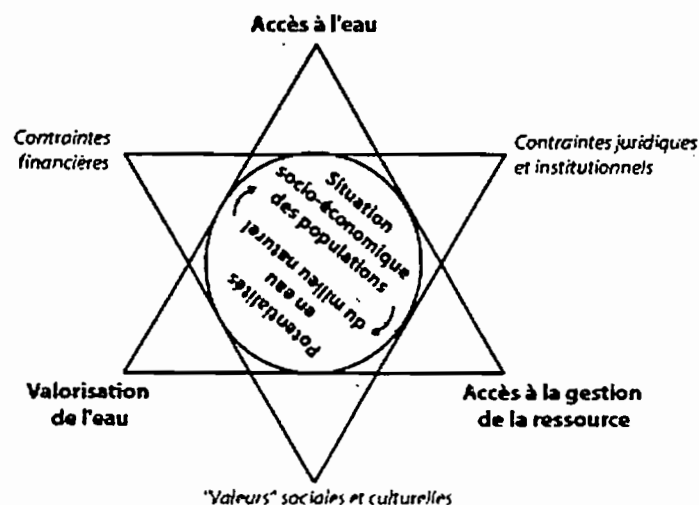
Bien que l'agriculture soit devenue une source de revenus secondaires pour les ménages ruraux, elle constitue un recours non négligeable en matière de subsistance, de revenus et de gestion des risques, en particulier à travers l'élevage et l'irrigué. Elle reste aussi un référent culturel et patrimonial vivace (Romagny et al, 2005). Migration et pluriactivité extra-agricole contribuent amplement au maintien des exploitations agricoles, mais s'accompagnent de formes de précarité dans la constitution des revenus (Sghaier & al, 2003). Dans ce contexte, le devenir des populations rurales est en partie associé au desserrement des contraintes autour de l'eau et aux possibilités d'intensification de l'agriculture, d'où l'intérêt d'un examen des formes de pauvreté hydraulique dans cet espace.

II] LA PAUVRETE HYDRAULIQUE DANS LA PLAINE DE LA JEFFARA

Le concept de pauvreté hydraulique ("*water poverty*") est défini habituellement par l'articulation entre trois dimensions qui sont l'accès effectif – c'est-à-dire tant technique que financier- à une ressource en quantité et qualité suffisante, l'accès à la gestion des processus de décisions concernant le partage et les modalités de valorisation de la ressource, et enfin la pauvreté sociale des populations analysée notamment à travers leurs capacités financières.

Dans l'argumentation que nous allons développer, nous allons axer successivement notre propos sur les modalités d'accès à l'eau, les contraintes liées à la gestion de la ressource et les difficultés de valorisation de son usage (figure n°1). La situation socio-économique des populations et les conditions du milieu naturel forment dans notre cas d'étude des composantes centrales de l'analyse de la pauvreté hydraulique.

Figure n°1: Les dimensions de la pauvreté hydraulique dans le Sud-est tunisien (élaborée par S.Palluault)



II.1) Les contraintes d'accès à l'eau

Les contraintes d'accès à la ressource hydrique en milieu rural concernent à la fois l'eau potable et l'eau agricole.

Grâce aux efforts très importants déployés par l'Etat au cours des dernières années, la desserte en eau potable en milieu rural a dépassé les 90% dans les deux gouvernorats de Medenine et Tataouine, si bien qu'une infime minorité de la population rurale doit encore recourir exclusivement à des formes privées d'approvisionnement. Toutefois, l'amélioration de la desserte n'a pas résolu les disparités en terme de qualité de service entre le milieu rural et les zones urbaines où le branchement direct aux foyers est la règle (tableau n°2).

Tableau n°2 : Taux de desserte et de branchement pour l'eau potable dans le Sud-est tunisien

Gouvernorat	Taux de desserte en %			Taux de branchement en %		
	Milieu urbain	Milieu rural	Total	Milieu urbain	Milieu rural	Total
Medenine	100	95,4	98,9	91,5	35	78,9
Tataouine	100	98	99,2	94,4	53,8	78,1

Source : ODS, 2003, d'après des chiffres de la Sonede

Dans les espaces ruraux, de multiples opérateurs tels que la Société Nationale d'Exploitation et de Distribution de l'Eau (Sonede), le Génie Rural ou les groupements d'intérêt collectif (GIC) interviennent, engendrant un chevauchement des attributions assez flou. Le Génie Rural s'occupe théoriquement de l'approvisionnement en milieu rural, mais son rôle s'amenuise au fur et à mesure de l'extension du réseau Sonede dans les campagnes tunisiennes. Les GIC, qui sont des groupements d'usagers d'eau, achètent l'eau à la Sonede ou bien gèrent directement les installations publiques du GR, se chargeant de revendre ensuite la ressource aux usagers.

L'amélioration technique des conditions de fourniture permet une certaine complémentarité dans l'accès à l'eau potable fondée sur le maintien des systèmes de collecte des eaux pluviales et le recours à l'achat d'eau via la Sonede ou aux groupements d'usagers d'eaux de type GIC. Toutefois, les ménages ruraux ont tendance à recourir de plus en plus aux formes marchandes d'approvisionnement afin de répondre à l'augmentation de leurs besoins domestiques mais également agricoles dans le cadre du processus d'intensification de l'arboriculture en plaine (Romagny & Guillaume, 2004). Au-delà des avantages liés à la desserte à proximité ou directement dans les habitations, ces possibilités offertes en matière d'achat d'eau constituent une "soupape de sécurité" pour faire face aux situations prolongées

de déficit pluviométrique, mais confrontent aussi les familles les plus défavorisés au paiement d'une facture d'eau qui représente en moyenne 5 à 7% des dépenses d'un ménage (Sghaier et al., 2003) et à de nouvelles formes d'inégalités devant la ressource sur lesquelles nous reviendrons.

Les contraintes d'accès à l'eau d'irrigation dans la plaine de la Jeffara résultent à la fois de l'agencement et la nature des ressources hydriques et du cadre juridique.

Le principal frein au développement du recours à l'irrigation concerne les leviers institutionnels et juridiques dont dispose l'administration pour réguler l'extension de cette activité. Le creusement des points d'eau dépassant 50 mètres de profondeur est ainsi soumis à autorisation préalable de l'administration et toute activité d'irrigation est formellement interdite ou contrôlée dans les périmètres d'interdiction, comme c'est actuellement le cas pour la presqu'île de Jorf et l'île de Jerba². Compte tenu du caractère stratégique des nappes profondes de la plaine pour l'alimentation en eau potable du Sud-est tunisien et la médiocre qualité des ressources du littoral, le creusement de forages pour l'irrigation a été très limité jusqu'au début des années 1990³. En théorie, l'extension de l'agriculture irriguée est donc réduite aux aires d'écoulement des nappes phréatiques, dont le taux de salinité parfois élevé limite les rendements et la diversité culturale.

Tableau n°3 : Evolution de l'exploitation des nappes phréatiques et accès aux ressources dans le bassin-versant de Zeuss-Koutine

Nappes	Année 1980				Année 2000			
	Nb. puits équipés	Salinité (g/l)	Exploitation (Mm3/an)	Taux (%)	Nb. puits équipés	Salinité (g/l)	Exploitation (Mm3/an)	Taux (%)
Metameur	20	1,5 - 5	0,20	31,7	114	1 - 7	0,79	125,4
Smar	35	1,5 - 7	0,60	54,5	298	2 - 8	2,50	179,9
El Fjè	1	1,5 - 7	0,09	19,1	89	3 - 8	0,56	119,1
Jorf	33	1,5 - 7	0,50	55	259	3 - 12	1,63	179,1

Source : DGRE, in Romagny et al, 2004

Peu utilisées en dehors d'une activité agricole traditionnelle dans l'île de Jerba et les petites oasis de la plaine, les nappes phréatiques ont connu une exploitation de plus en plus intensive au cours du XX^{ème} siècle au fur et à mesure de l'emprise croissante des agriculteurs dans la plaine et la reconversion des terres collectives en bien privé ("melk"). Mais c'est surtout le remplacement des techniques d'exhaure traditionnelles par le recours au pompage à partir de la fin des années 1970 qui a permis un accès plus effectif à ces ressources. Cependant, la concentration des ouvrages et l'intensification de l'exploitation ont entraîné rapidement l'apparition de phénomènes de surexploitation, qui se sont caractérisés par un rabattement plus prononcé du niveau piézométrique des nappes au cours de la saison estivale et surtout par une élévation de la salinité des eaux (tableau n°3).

La détérioration de la situation des nappes phréatiques a conduit à l'approfondissement des ouvrages hydrauliques jusqu'au second aquifère, ou parfois à leur abandon par les propriétaires⁴ lorsque les capacités financières ont fait défaut et que le taux de salinité a

² Ces périmètres ont été établis au cours des années 1980 et 1990 pour permettre un meilleur contrôle des phénomènes de surexploitation des nappes phréatiques dans ces espaces. La réglementation des périmètres de protection est particulièrement stricte puisque est interdite la création de nouveaux puits ou forages, tandis que sont soumis à autorisation, selon les cas, les travaux de réfection voire l'exploitation même des ouvrages hydrauliques (Palluault, 2003).

³ Les principales réalisations ont concerné la mise en exploitation de forages publics dans la bordure littorale, au cours des années 1960 et 1970, dans le cadre du développement avorté d'une agriculture intensive basée sur la production de fourrages, de sorgho ou d'asperges.

⁴ L'évolution de l'exploitation à partir de puits de surface dans la presqu'île de Jorf illustre bien cette évolution contradictoire. Entre 1979 et 1984, le nombre de puits de surface équipés de pompe est

éloigné toute perspective de valorisation ultérieure. Elle a nécessité de la part des agriculteurs, des stratégies de redéploiement vers les bordures des oasis et un changement des pratiques culturales en faveur d'espèces plus résistantes au sel. Cette évolution, particulièrement défavorable aux espaces littoraux explique en grande partie les reconfigurations territoriales des périmètres irrigués à l'échelle régionale qui s'expriment par leur "déplacement" de la frange littorale et insulaire vers la plaine intérieure.

Au-delà de la qualité des aquifères, la profondeur des nappes, qui croît vers l'intérieur des terres, nécessite une plus forte capacité de financement et une prise de risque que ne peut assumer la majorité des ménages ruraux, bien que les techniques de forage à moins de 50m soient désormais devenues financièrement accessibles à certaines catégories d'acteurs relativement aisés (Palluault, 2003). Les restrictions juridiques et la détérioration des conditions naturelles se doublent de contraintes financières, qui sont très élevées dans les périmètres irrigués sur forage public où la tarification de la ressource, qui s'élèvent jusqu'à 0,120DT est jugée très excessive par les exploitants compte tenu de la faible rentabilité de l'eau agricole dans cet espace aride.

II.2) Les GIC : structure de gestion collective de l'eau ?

La gestion communautaire de l'eau procède de traditions anciennes en Tunisie, bien que l'absence de système oasien fondé sur le partage d'une source d'eau dans notre région d'étude ait limité sa portée à la gestion des aménagements de petite hydraulique en montagne et des points d'eau destinés au cheptel dans la plaine. Par exemple, le renouvellement des *jessour* était assuré depuis de nombreux siècles par l'application de règles collectives établies autour du partage des eaux (Ben Ouezdou & Troussset, 2002). Toutefois, celles-ci se sont progressivement délitées avec l'affaiblissement du système tribal, l'apparition de nouveaux rapports (notamment monétaires) à la ressource, le recours à des formes coûteuses d'approvisionnement et le renforcement de l'acteur étatique dans le domaine hydraulique (Braham, 2003).

Considérée comme un élément essentiel de la faisabilité des projets de développement rural et de rationalisation de l'usage des ressources en eaux, la promotion des structures de gestion collective de l'eau s'appuie sur une refonte du statut des associations d'intérêt collectif en 1987. Celle-ci devait inaugurer de nouvelles formes de responsabilisation des usagers à travers la création de structures compétentes dans le domaine de la gestion des ouvrages hydrauliques publics et de la vente de l'eau potable et agricole. Objet d'une politique de promotion particulièrement active de la part des pouvoirs publics, ces groupements d'usagers se sont rapidement multipliés en Tunisie. On compte actuellement plus de 130 groupements d'intérêt collectif (GIC) dans le Sud-est tunisien, répartis entre des structures destinées à l'alimentation en eau potable ou à l'irrigation de périmètres irrigués à partir d'un forage public ou d'eaux usées traitées.

Dotés d'une personnalité juridique, d'un budget autonome, et dirigés par un conseil d'administration élu parmi les bénéficiaires, les GIC sont présentés comme l'instrument institutionnel d'une gestion sociale de l'eau. Dans les faits, le fonctionnement de ce modèle associatif se révèle plutôt défaillant, le GIC étant rarement un lieu de dialogue et de négociation. Les représentants, parfois élus par les usagers, mais souvent indirectement désignés par l'administration, souffrent d'un manque de légitimité et d'autorité pour conforter le GIC dans un rôle d'arbitre lors des situations de conflits. Le volontariat, la compétence, et la disponibilité des acteurs au sein d'un GIC sont des conditions d'autant plus difficiles à tenir que l'omniprésence de l'administration de la création de la structure à sa gestion au quotidien lui confère aux yeux des usagers le rôle prédominant. D'ailleurs, les responsables associatifs tout comme les usagers se tournent "naturellement" vers les autorités locales ou

passé de 33 à 98, mais dans le même temps le nombre d'ouvrages abandonné a augmenté 45 à 107 puits, en raison notamment de la salinisation des points d'eau (Mzabi, 1993).

les responsables de la cellule GIC⁵ pour toutes les décisions importantes. Les difficultés rencontrées dans l'attribution collective ou individuelle des points d'eau entraînent parfois retards de paiement et fermeture des points d'eau (Nasr, 2002 ; Palluault, 2002), et d'une manière générale, le branchement direct à la Sonede est perçu comme une revendication légitime dès lors qu'elle améliore la qualité de la desserte et signifie un prix moins élevé du m³. Par ailleurs, le rôle de ces groupements, limité essentiellement à l'exploitation des systèmes d'eau publics⁶ et *in fine* à l'application d'une tarification souvent élevée de la ressource, les maintient dans une simple fonction d'opérateur, ce qui n'incite pas au renforcement de l'implication des usagers.

D'autre part, la viabilité de ces structures reste souvent tributaire d'un appui financier de l'Etat en dehors des charges courantes. La spécificité des GIC de la Jeffara tient à la faiblesse du nombre de bénéficiaires en comparaison de l'équipement dont ils ont la charge. La dispersion de l'habitat et les faibles densités de population nécessitent la mise en place d'une infrastructure relativement lourde et détermine un coût de la ressource qui est très élevé si on le rapporte au nombre d'usagers. Dans ce contexte, la recherche d'une autonomie financière sans appui des pouvoirs publics est particulièrement difficile.

Tableau n°4 : Bilan financier des GIC d'irrigation de la plaine de la Jeffara
(Gouv. de Medenine, chiffres présentés pour l'année 2004*, en dinar tunisien)

GIC d'irrigation	Année début d'exploitation	Recettes et dépenses prévues	Recettes effectives	Dépenses effectives	Solde de l'exercice 2004	Solde total
Amra	2001	5943,188	1720,20	2233,829	1148,198	2522,978
Bou Hamed	1994	4816,781	2551,75	2633,99	-82,24	435,695
Hezma II	1991	6226	400	371,600	28,24	1268,362
Hezma IV	1999	7296	1970,200	2004,576	-34,376	2773,382
Hezma V	1999	5928,45	7063,100	3344,824	3718,276	7451,900
Oum Zessar	1990	10610,200	4625	4578,373	46,627	932,745
Lassifer	2001	4853,600	2311,08	2320,144	-9,064	81,287

* sauf pour le GIC de Lassifer (année 2003)

Source : cellule GIC / CRDA Medenine

L'analyse des GIC d'irrigation aboutit à la même constatation. Les objectifs définis par les agents des cellules GIC en terme de vente d'eau (et qui permet de calculer le tarif de la ressource) sont surestimés et rarement atteints. Les groupements ne parviennent pas toujours à couvrir leurs dépenses de fonctionnement (tableau n°4). Les bénéfices réalisés ne tiennent souvent pas compte des dépenses à venir pour le remplacement de l'équipement hydraulique, si bien que la situation financière tend à se dégrader progressivement, comme l'indique la situation des GIC les plus anciens dans le gouvernorat de Medenine. L'intervention des pouvoirs publics à travers l'octroi d'une subvention exceptionnelle, est alors nécessaire, comme ce fut le cas pour le groupement de Lassifer pour l'exercice 2003. Par ailleurs, à l'instar du GIC Hezma II en voie d'abandon ou de celui d'Hezma V dont 30% des volumes achetés en 2004 ont été distribués à partir de la potence⁷, une bonne situation financière du GIC peut masquer une dégradation de la situation du périmètre irrigué et un faible taux d'intensification des terres agricoles. Néanmoins la dépendance des GIC d'irrigation vis-à-vis des ventes d'eau attribuée pour l'irrigation est étroite. Or, confrontés au coût de la ressource et aux difficultés diverses qui tournent autour du développement de ce

⁵ Au sein des Commissariats régionaux au développement agricole (CRDA), une cellule est chargée du suivi financier des GIC et joue le rôle d'interlocuteur entre les usagers et les pouvoirs publics.

⁶ C'est-à-dire concrètement à la maintenance du matériel hydraulique et à l'emploi d'un pompiste.

⁷ Vendu 0,500Dt le m³ au lieu de 0,70Dt, la vente à partir de potence destinées à l'irrigation d'appoint permet une marge bénéficiaire nettement supérieure. Elle traduit cependant une faible intensification à l'intérieur du périmètre public et induit le plus souvent une faible rentabilité du m³.

type d'agriculture, la plupart des exploitants agricoles répondent par une minimisation des investissements et une faible intensification, diminuant ainsi les recettes potentielles du GIC. La situation difficile des GIC à l'heure actuelle (et parallèlement des périmètres irrigués à partir de forage publics) aboutit à un changement régulier de leur statut visant à renforcer leur autonomie financière par une diversification accrue de leurs revenus. Tel est le sens du remplacement en cours des GIC d'irrigation par les groupements de développement agricole (GDA⁸). Dans le secteur d'approvisionnement pour l'eau potable, compte tenu des difficultés que rencontrent de nombreux GIC dans la gestion des systèmes d'alimentation et des problèmes de coordination inter-institutionnelle, la Sonede pourrait à moyen terme s'imposer comme l'unique opérateur dans les campagnes tunisiennes (Romagny & Guillaume, 2004).

II.3) La question de la valorisation de l'accès et l'usage de l'eau en agriculture

En dehors de l'accès effectif aux ressources et des modalités de participation des populations, la pauvreté hydraulique se lit à travers les contraintes qui entourent l'usage final de la ressource. En effet, si les modalités d'accès pour l'eau agricole se sont quelque peu assouplies depuis le début des années 1990 en lien avec une politique de promotion de l'agriculture irriguée et la création de nouveaux forages, les productions restent limitées et le secteur conserve une certaine marginalité. Les stratégies d'adaptation des producteurs sont empreintes de formes de précarité et permettent de mesurer tout le problème lié à l'eau agricole, au-delà de la seule question de la fourniture. Ce faible développement du secteur irrigué s'explique par le grand nombre de contraintes (conditions naturelles, structures d'exploitations, organisation des filières agricoles en amont et aval, capacités financières des exploitants...) qui entourent la production agricole dans le Sud-est tunisien. L'intégration du Sud-est tunisien à l'espace national et l'absence de spécificité régionale en terme de productions ou de période de mise sur le marché exposent les petits périmètres irrigués à la concurrence des produits de régions plus productives où ces conditions sont moins contraignantes. En outre, on doit replacer les difficultés qu'éprouvent les agriculteurs dans le contexte d'un passage récent de l'agriculture en sec à une activité d'irrigation qui exige un encadrement et une maîtrise technique particulière.

Cette situation est particulièrement criante dans les périmètres irrigués autour de forages publics, créés pour la plupart depuis le début des années 1990. Destinés à améliorer les volumes de production agricole pour l'approvisionnement des centres urbains et offrir de nouvelles opportunités en termes d'emplois aux populations locales dans un espace transfrontalier où l'implantation de niches de vie demeure stratégique (Kassah, 1995), ces périmètres sont constitués autour d'un forage et d'un réseau hydraulique créé par l'État et gérés par un GIC. Les parcelles sont le plus souvent délimitées selon le canevas foncier existant et affectées aux bénéficiaires qui en sont propriétaires. Or, malgré la mise en place par les pouvoirs publics d'un panel de mesures de soutien et d'incitation à l'intensification, le taux d'exploitation des ressources accuse un niveau d'utilisation de l'ordre de 25% dans le gouvernorat de Tataouine seulement, et il est encore plus faible dans la région de Medenine. Cet état de fait ne semble pas lié à un seul facteur en particulier, mais à un contexte général (volatilité des prix, conditions de production, situation financière des usagers,...) qui prédispose l'irrigant à des comportements de gestion des risques. Écartant le principe d'un recours aux prêts bancaires et soucieux de se prémunir des incertitudes touchant à la fois leur production et la volatilité des prix du marché, une grande partie des producteurs opte pour un investissement minimal, aussi bien financier qu'en terme de temps de travail. Cette stratégie visant à percevoir un revenu plus faible mais relativement sûr explique la prépondérance d'une arboriculture fruitière développée en semi-intensif (Belhouchet, 1997). La valorisation de l'opportunité d'un accès à l'eau s'effectue dans l'ensemble par une

⁸ Cette nouvelle organisation devrait remplacer les GIC à partir de 2006 afin de permettre une prise en charge collective des activités agricoles en amont et aval de la production (services d'approvisionnement en intrants, transports, organisation de l'écoulement...) et une diversification des sources de revenus essentielle à l'autonomie financière de ces structures.

diversification accrue des productions vivrières et des tentatives plus ou moins heureuses de cultures destinées principalement au marché (tomates, pastèques, melons...). Ces formes de gestion des risques se traduisent finalement par un faible degré d'intensification, l'abandon d'un certain nombre de parcelles et une forte flexibilité.

Cette situation renforce la position de ceux qui mettent en avant la nécessité d'intégrer le concept d'"eau virtuelle" à la gestion régionale des ressources en eaux. Cela reviendrait à assumer la dépendance alimentaire du Sud-est tunisien en produits agricoles et orienter l'allocation des ressources aux activités qui tendent à mieux la valoriser, notamment le tourisme.

III] INEGALITES ENTRE ACTEURS RURAUX ET STRATEGIES DE CONTOURNEMENTS

La situation de pauvreté hydraulique que nous venons de décrire s'accompagne de formes d'inégalités croissantes au sein même de cet espace rural, en lien avec la marchandisation de la ressource et un desserrement très sélectif des modalités d'accès aux nappes profondes douces depuis la fin de la décennie 1990.

III.1) Les inégalités devant la ressource : le cas des pratiques d'achat auprès des fournisseurs d'eau potable et d'irrigation

Comme nous l'avons vu précédemment, le recours aux achats d'eau constitue le moyen pour les ménages ruraux de se préserver des pénuries d'eau potable lors des épisodes secs, mais aussi de recourir à une irrigation d'appoint nécessaire pour étendre la mise en valeur agricole aux espaces encore "vierges" et qui se caractérisent par une plus faible adaptation aux techniques traditionnelles de *dry farming* (faiblesse de la pluviométrie, absence de pente...). Si la marchandisation des eaux souterraines, tant pour les usages domestiques qu'agricoles, confronte les populations rurales à de nouvelles contraintes financières, les différences tarifaires pratiquées par la Sonede, les GIC et les prestataires privés mettent en avant des inégalités importantes devant la ressource. Ces derniers s'approvisionnent principalement auprès des GIC d'eau potable ou des propriétaires de points d'eau privés. C'est le prestataire qui décide le plus souvent du lieu de fourniture suivant plusieurs critères parmi lesquels le prix, la qualité de l'eau, et surtout la distance entre le point d'approvisionnement et le lieu de consommation.

Tableau n°5 : Disparités tarifaires pour l'eau potable selon les opérateurs

	Sonede (1)*								GIC (1,2) **	Privés (3)	Prestataires (1,2)***
	Clas. 1	Clas. 2	Classe 3		Classe 4		Classe 5 (ou tourisme)		-	-	-
Volume en m3	0-20	0-40	0-40	40-70	0-70	70- 150	0-150	> 150	-	-	-
Tarif en DT/m3	0,135	0,215	0,215	0,430	0,430	0,650	0,650	0,790	0,600 à 1,000	0,500 à 0,600	1,200 à 6,000

* montant calculé pour une consommation trimestrielle pour un branchement direct, sauf classe 1

** approvisionnement effectué à partir de potences, bornes-fontaines ou compteurs privés

*** transporteurs d'eau (citernes tractées)

Source : Romagny et al., 2004 (1) ; Palluault, 2002 (2) ; Palluault, 2003 (3)

Si les volumes d'eau achetés par les populations sont relativement faibles en dehors des années sèches, les populations maintenant en état un réseau dense d'aménagements de collecte des eaux pluviales⁹, ceux-ci augmentent fortement lors de périodes consécutives de sécheresse pour pallier la diminution des réserves dans les citernes pluviales. Ainsi, au cours des années de sécheresse, 63% des exploitants déclarent avoir recours à des

⁹ La déprise rurale, qui s'accélère comme en témoigne le dernier recensement de la population en 2005, s'accompagne toutefois de l'abandon de certaines citernes destinées à l'irrigation d'appoint.

pratiques d'achat d'eau pour les besoins domestiques et agricoles, avec une moyenne d'environ 100m³ par ménage (Sghaier et al, 2003).

Comme l'indique le tableau n°5, les différences de tarification sont très importantes. Les GIC d'eau potable vendent une eau à un tarif élevé, qui se rapproche voire dépasse celui pratiqué par la Sonede pour les "gros" consommateurs¹⁰. Quant aux prestataires privés, ils appliquent une tarification qui place le prix du m³ à des seuils largement prohibitifs. Par exemple, au sein de la zone couverte (en théorie) par le GIC d'Allamat-Machlouch, le prix d'une citerne de 5m³ peut varier de 6 à 17DT (Palluault, 2002). Ailleurs, et dans des cas extrêmes, il peut atteindre jusqu'à 30dt. Ce coût élevé de l'eau, qui est difficilement acceptable pour un usage agricole, pose surtout le problème de l'arrosage des arbres en saison sèche, comme l'a démontré la mort de nombreux jeunes arbres au cours de la période consécutive de sécheresse 1999-2002.

Les mêmes types de disparités se retrouvent au niveau des GIC d'irrigation. Dans le cadre d'une recherche de la "vérité des prix" de l'eau agricole, les responsables administratifs qui fixent le tarif de l'eau prennent en compte l'amortissement des aménagements hydrauliques financés par l'Etat, à raison de 0,10% pour le point d'eau, 2,5% pour l'équipement et 0,50% pour l'infrastructure de génie civil. L'objectif réel n'est pas de rentabiliser à terme les investissements publics consentis mais de responsabiliser progressivement les usagers dans le financement du remplacement des équipements. Compte tenu des frais engagés, mais aussi du nombre modeste d'usagers et des superficies en jeu, le tarif de l'eau est généralement élevé mais surtout très inégal, variant du simple au triple d'un GIC à un autre (tableau n°6). Si il peut paraître raisonnable à Bir Amir, qui est le plus vaste périmètre irrigué du Sud-est tunisien, il est prohibitif dans les petits périmètres publics du gouvernorat de Medenine. Certains exploitants paient ainsi le m³ aussi cher que certains usagers de la Sonede pour l'eau potable.

Tableau n°6 : Coût de revient et tarif de l'eau dans certains périmètres irrigués (GIC)¹¹

GIC	Estimation du coût de revient d'un m ³ d'eau en Dt			Tarif du l'eau en Dt/m ³	Nombre d'usagers	Superficie irrigable (ha)
	Coût fixe	Coût variable	total			
Bou Hamed	0,043	0,018	0,061	0,060	11	15
Lassifer	0,095	0,024	0,119	0,100	32	44
Amra	0,067	0,042	0,109	0,100	24	36
Oued Moussa	0,022	0,034	0,056	0,60	30	69
Hezma IV	0,061	0,051	0,112	0,120	12	35
Hezma V	0,035	0,029	0,065	0,120	9	15
Oum Zessar	0,040	0,039	0,079	0,080	27	27
Bir Amir	?	?	?	0,040	98	501

Source : CRDA Medenine et Tataouine (Arrondissement GR / Cellule des GIC)

L'application d'un tarif aussi élevé accentue les formes d'inégalités au sein même des périmètres publics entre les exploitants qui peuvent se permettre de payer la ressource et ceux qui ne peuvent assumer une telle dépense. A Oued Moussa, seulement trois exploitants, qui disposent de revenus extra-agricoles réguliers, parviennent à irriguer l'ensemble de leur parcelle. Ils supportent par ailleurs à eux seuls près de la moitié de la facture d'eau du GIC alors que ce groupement compte plus de trente bénéficiaires. La situation est similaire dans de nombreux autres GIC et conduit finalement au renforcement d'une agriculture à deux vitesses fondée en grande partie sur les disparités entre exploitants agricoles en terme de capacités financières.

¹⁰ On ne tient pas compte de la facture d'assainissement que les autres secteurs supportent, mais que les ménages ne paient pas en raison de l'absence d'un tel réseau en milieu rural

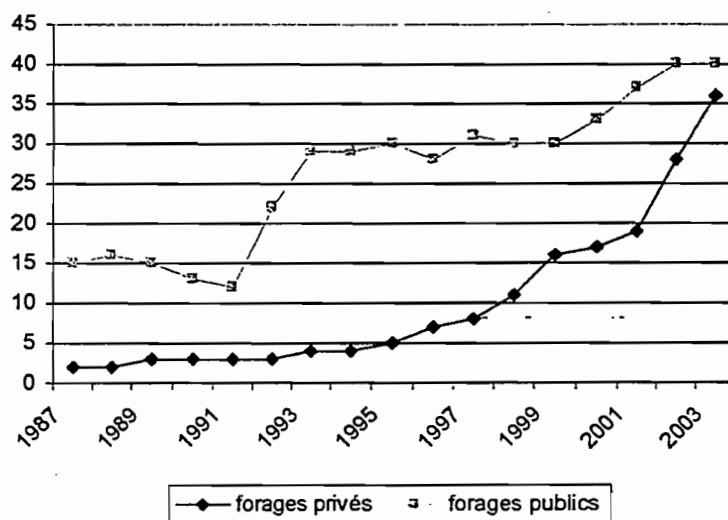
¹¹ Le tarif de l'eau comprend une part fixe qui prend en charge l'usure du système hydraulique et les frais constant du GIC (main d'œuvre par exemple) et une part variable qui correspond au coût de l'énergie directement proportionnelle aux volumes d'eau qu'il est prévu de vendre.

III.2) Les inégalités d'accès à l'eau d'irrigation et desserrement des contraintes d'accès aux nappes souterraines

Au-delà de la contrainte tarifaire, les inégalités autour de l'eau sont exacerbées par l'apparition de périmètres irrigués à partir de forages privés. Ceux-ci sont le fait d'une nouvelle catégorie d'acteurs qui a bénéficié d'un desserrement des contraintes entourant l'accès aux nappes profondes (Palluault, 2003). Succédant à une phase de développement des périmètres irrigués à partir de forages publics au cours des années 1990 dont l'échec en matière d'intensification est clairement ressenti par les pouvoirs publics, l'octroi d'autorisation de forages privés à fin d'irrigation s'explique par la pression croissante exercée par les populations et certains décideurs politiques sur les responsables administratifs chargés de contrôler l'exploitation des ressources en eaux (arrondissement "Ressources en Eaux" des CRDA). La perspective d'une diminution de l'exploitation des nappes profondes les plus douces en lien avec la mise en service des stations de dessalement a semble-t-il accentué cette pression, encourageant un certain optimisme à l'égard de l'équilibre entre ressources et besoins à l'échelle régionale.

Le phénomène de création de forages privés à fin d'irrigation reste encore très limité. Le nombre de forages privés en exploitation a néanmoins doublé entre 2001 et 2003, passant de 16 à 32 ouvrages, et devrait s'accroître rapidement puisque plus d'une centaine d'autorisations a été délivrée depuis 1998 dans les deux gouvernorats (figure n°2).

Figure n°2 : Evolution du nombre de forages destinés à l'irrigation de périmètres agricoles selon leur statut dans le Sud-est tunisien



Source : d'après DGRE, *Annuaire des nappes profondes, 1987-2003*

Conscients de la limite naturelle des potentialités des nappes douces de la Jeffara, les responsables des arrondissements de l'eau n'ont accordé des autorisations qu'au compte-goutte et principalement dans les secteurs où se logent de petites nappes de moyenne profondeur peu utilisées pour l'eau potable. Dans le gouvernorat de Medenine toutefois, la création de plusieurs périmètres irrigués d'une taille relativement importante (jusqu'à 45ha) dans les zones de captage de l'eau potable des nappes de grès de Trias illustre de nouvelles formes de concurrence inter-sectorielle mais pose surtout la question de l'impact de cette agriculture très intensive sur l'évolution d'une nappe actuellement surexploitée.

Soumis à des exigences d'augmentation des productions agricoles et de préservation des ressources souterraines, les responsables du CRDA ont défini des règles strictes pour l'obtention d'une autorisation de forage à plus de 50 mètres. Le requérant doit ainsi justifier d'une formation agricole ou d'une expérience dans l'irrigué et respecter l'utilisation des

techniques d'économie d'eau (goutte à goutte). Mais c'est bien le critère économique qui est le plus déterminant. Aussi seule une nouvelle catégorie d'exploitants agricoles, généralement urbains et disposant de revenus substantiels acquis dans le secteur des services ou de réserves de financement obtenues grâce à des apports familiaux, présente la crédibilité nécessaire pour répondre aux exigences des pouvoirs publics. Ils sont en effet les seuls à prétendre supporter les frais inhérents à l'équipement moderne d'un périmètre (forage profond électrifié, réseau d'irrigation localisée, équipement mécanique, fort recours aux intrants...) et au développement progressif de leur activité. En quelques années, ces exploitants ont constitué quelques grands périmètres irrigués, axés sur des spéculations à haute valeur ajoutée destinées au marché et à un fort degré d'intensification.

En dehors de la création d'emplois pour une main d'oeuvre féminine très bon marché, la population d'agropasteurs de la Jeffara devrait rester totalement à l'écart des nouvelles opportunités liées au desserrement des contraintes autour de l'eau. Cette marginalisation est renforcée par les difficultés de contourner les contraintes qui pèsent sur l'accès et l'utilisation des ressources. Alors que dans les autres régions du Sud-est tunisien, l'essor des forages illicites se généralise, l'absence d'une organisation sociale traditionnelle fondée sur l'exploitation des eaux d'irrigation et le contrôle sans doute plus étroit des autorités sur les nappes profondes de la Jeffara n'a pas permis l'émergence d'un tel phénomène dans notre région d'étude. Les pratiques illicites sont essentiellement représentées par les tentatives d'irrigation intensive à partir d'achat d'eau potable à la Sonede, comme c'est le cas des activités sous serres du village de Mazraa Ben Slama ou bien l'approfondissement des puits dans les périmètres de protection. Dans un pays où l'Etat se veut le garant d'une certaine justice sociale, les populations les plus défavorisées bénéficient néanmoins du renforcement de certains programmes de développement rural qui intègrent une forte dimension à l'eau (chantiers C.E.S, programmes d'électrification de puits de surface) et l'octroi de nombreuses subventions destinées à maintenir les assises d'une agriculture familiale largement vivrière. La préservation du patrimoine agricole et des capacités d'autoconsommation des ménages ruraux en produits vivriers répond à des besoins sociaux qu'il convient en effet de ne pas négliger. Aussi ces politiques s'accompagnent-elles d'une certaine bienveillance à l'égard des factures régulièrement surestimées donnant lieu à subvention ou le recours de plus en plus systématique au marché parallèle pour l'approvisionnement en outillage et matériel agricole. Ce sont là les contradictions d'une politique libérale qui ne peut faire l'impasse sur des objectifs de justice sociale ou la nécessité de préserver les formes de revenus des populations les plus modestes. Cela pose en définitive la question des rapports entre l'administration et les sociétés locales, et l'interprétation des mesures nationales par les pouvoirs publics locaux.

Conclusion

La situation de pauvreté hydraulique des populations du Sud-est tunisien illustre les contradictions inhérentes à l'application de politiques cherchant à concilier une approche libérale sur le plan économique, une gestion durable de la ressource et un minimum de justice sociale ou d'équité. Dans le contexte d'une faible disponibilité des ressources qui nécessite des arbitrages entre secteurs économiques et usagers, les populations rurales de la plaine de la Jeffara restent donc confrontées à un ensemble de contraintes importantes en terme d'accès, de gestion et de valorisation de l'eau, bien que la situation régionale sur le plan de l'eau comme sur celui de la réduction de la pauvreté se soit améliorée. L'augmentation du coût de l'accès et de l'usage de l'eau accroît ainsi les inégalités entre usagers, et contraint les plus défavorisés à renoncer à l'utilisation agricole d'une ressource symbole d'autonomie et de sécurité face à l'aléa. D'autre part, si l'avenir agricole de la plaine intérieure reste étroitement lié aux marges de manœuvre dégagées sur le secteur de l'alimentation en eau potable par un recours accru aux ressources non-conventionnelles (dessalement de l'eau de mer), la focalisation des pouvoirs publics sur la valorisation économique du m³ accompagne une marginalisation croissante des populations rurales et aboutit à un contrôle des eaux d'irrigation les plus favorables par une poignée d'exploitants

agricoles. La faiblesse des structures associatives d'usagers et l'absence d'une gestion concertée à l'échelle des bassins-versants ne permettent pas, de ce point de vue, de formuler une vision d'ensemble du développement régional qui intégreraient l'intérêt de chacun des groupes de consommateurs. Sur ce plan, une approche globale intégrée et d'équilibre, s'appuyant davantage sur des rapports de complémentarité entre les secteurs et les régions semble nécessaire.

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Unrestrained quest for groundwater vs migration, socio-economic dependency and crisis about tanks use as answers from the more vulnerables.

Cases from Tamil Nadu and Pondicherry, South India.¹

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Agriculture in India has irrigation as its central factor, especially since the Green Revolution: it lets agriculture less dependent on rainfall which has great temporal fluctuations, it gives better yields and offers the possibility to cultivate crops such as wheat, paddy and sugarcane that have a minimum selling price. There is then a stress among farmers to get access to irrigation, especially groundwater. Surface water availability is indeed not always secured, being more or less dependent on rainfall and linked to collective irrigation systems. Whereas groundwater - which received a lot of governmental incentives for its use - requires individual techniques, is less dependent on rain and enables farmers to intensify their cropping pattern up to 3 crops a year. But, access to groundwater is now facing a serious problem of groundwater level depletion. The temporal fluctuation in water availability (surface and ground water) that varies between years, between season and even within a season has pushed the farmers to vulnerable conditions. The recently known issue in India is the suicide of farmers, deriving a core cause of water, that leads to varied multifaceted reasons and transcend into socio-political issues. Such an outcome could define one aspect of water-poverty.

The examples we will give in this paper do not reach that level of water crisis and are not belonging to the more deprived regions of India. They relate to irrigated zones (40 to 80 % of the cultivated area) where "tanks", several century-old lake-reservoirs are numerous, and they refer to two different environmental contexts due to geological characteristics: in the alluvial area, villages have a "good" access to the groundwater (the term has to be defined); whereas in the rocky zone, villages have little groundwater available and are therefore perceived, especially in comparison to the adjacent alluvial zone, as having a poor, even dry agriculture.

In the context of Indian agriculture, for which groundwater (GW) became the first source of irrigation and a major factor of production, we will first of all discuss the importance of access to GW and the issue of groundwater depletion. Then, as the examples are located in areas characterised by a great percentage (20 to 30 %) of scheduled castes (s.c., previously called Untouchable) (see map of Atlas of South India, Oliveau, 2004), and as most of the s.c. are still landless agricultural labourer (NCRWC: 4-5), we will focus on a social crisis related to water and socio-economic status, that of the encroachment of the tanks.

The approach we have is mainly an anthropological one, discussing with farmers and observing the practices about water issues. We will then present the perceptions of the

¹ with the financial help of the research group EMIS

villagers, and replace them in a broader context. It is an ongoing research that began in September 2005. Some socio-economic data are nevertheless available for 1 village (SRVP) collected by Girard & Guillet (2000).

I- Water poverty in 2 geological contexts

In a country where Green Revolution has brought irrigation by groundwater as the first source of irrigation and the agriculture mainly dependent on this resource, geology is a determinant factor in the GW access and availability, and then in determining agriculture possibilities.

1.1. Rocky zone

In the rocky zone in the South West of Villupuram characterised by granitic gneiss, we looked the influence of access to water to people activities in a village. SRVP, of more than 3 000 inhabitants, is mainly composed of *Gunders* (1500 persons) caste of small farmers, *Mudaliars* (800 pers.) caste of landowners and weavers and of s.c. (800 pers.).

Agriculture is the main occupation in the village (79 % of villagers are farmers or agriculture laborers according to 1991 census) and the Mudaliars practice also weaving. But as most of the villagers are landless (60% of villagers, and among s.c. 80%) or marginal farmers (75 % of farmers have less than 2 acres = 0,80 ha), they are dependent on the work they can find in the village as agricultural labourers, or outside mainly during the off season of agriculture (Girard & Guillet, 2000).

From an agricultural point of view, two types of lands exist: the “wet land” (*nanjai*) with clay soil and tank as the main source of irrigation (123 ha). One crop of rice is realised with the tank (sept to dec), and another one with both tank and wells irrigation (from januray to april). In the “dry land” (*punjai*), characterised by mixed soil, some wells exist also, and crops as sorghum, millet, groundnut and cotton are cultivated (145 ha) from September to March.

Even if surface water is available and irrigates 45% of the cultivated land, SRVP is perceived locally as a “dry” village, because it has a bad access to GW and can not cultivate during the dry season. The available GW in the wells is indeed in meagre quantity (one well allows the irrigation of 2500 m² of *punjai* during the rainy season, to progressively decreasing to nil during June –July) and the drilling of bore² is too expensive for the villagers. The villagers then attribute their low socio-economic status due to a lack of water, and consequently to lack of local work in agriculture from April to September for women, and from January for men specific activities. As agriculture cannot meet the needs of all villagers, many of them go for seasonal migrations, mainly during the dry season. These migrations concern 20% of the villagers (landless and marginal farmers) and 35% of the families. They go to towns as Chennai or Bangalore or for the harvest of sugar cane in Tamil Nadu or Andhra Pradesh.

Even if the villagers perceived the problem as due to a lack of GW access during the dry season, other factors have also to be taken into account: the population density is very

² 3 bores of 70 m depth exist nevertheless, but their flow is small.

high (850 h/km²), and the landless people and marginal farmers represent a great percentage of the population (respectively 60% of villagers and 75% of farmers), dependent on labour wages. Within this socio-economic context, the water scarcity can be here defined as a lack of water *over the year*. The physical scarcity of GW and the economic scarcity of the farmers who cannot afford for drilling deep bores or even for digging large wells, lead to a lack of access to GW. And this leads to migration situations.

We have still to analyse if the poverty of the village is due to lack of access to GW –as the villagers explain us-, or if it is an old situation, from which the village couldn't escape even with the Green Revolution. The Green Revolution had nevertheless some positive impacts on the village agriculture. The construction of a dam on the Ponniyar river secured the surface water availability and the short cycle varieties of paddy have been cultivated. These two factors increased the intensity of paddy cultivation from 1 to 2 crops a year.

Another question that arises also is the link with the proximity of alluvial area where three crops of paddy are grown: is this perception of water scarcity linked to this proximity with a rich zone where seasonal migrations seem to be very few?

1.2. Alluvial area

In the alluvial area between Pondicherry and Villupuram, the sensation of lack of water is not there as the countryside is green all other the year, with 3 seasons of paddy cultivation in wet lands, and various crops in other lands. But this apparent abundance of water hides two facts:

- if today, there is no physical lack of water, there is a water depletion. This GW depletion leads to some socio-economic differentiation as those who can not afford for deepening their bores have to become dependent on bore owners (see below).
- this apparent profusion of water is due to technical advance. During the 1960s and the 1970s, when GW depletion started because of the use of motors, the farmers deepened their wells. But in the 1970s, when water depletion was below the depth of the wells (20 m) which is the depth of pumping capacity of the motors then available, the villagers faced a water scarcity. During a few years, as well as in 1948 a year of famine, due to drought no agricultural activities could be carried out. In 1980, when the submersible pumps arrived in the countryside, the farmers were able to tap the ground water deeper, by drilling bores (40 to 110 m) and by using these powerful motors. And since then the scarcity took a different turn, that of a water scarcity affecting everyone, we could say a water scarcity in common, to scarcity that avails the owners of the deep borewells. Nowadays, farmers drill bore at the depth of 130 m (and even 160 m in south of Pondicherry in the alluvial plain).

The farmers without borewell and also with borewell not at an accessible depth are dependent on the deep borewell owners with submersible pumps who are able to draw water. And this dependency is not new in VAD and TIR, as the tank has not been used

for irrigation for the last 30 years. The central arguments of the borewell owners about this absence of tank water use are that the availability of water is not secured (they could get water 10 times only within the last 30 years), and water in the tank would not suffice for a whole season, rather in the end the farmers have to depend on the groundwater, and then on their supply (the borewell owners).

In SOR, tank water is still used for irrigation by some farmers, but they are dependent on GW to start the season and also for the cultivation of the 2nd crop. Very few fields are cultivated during the 3rd crop due to the bad discharge of the bores: the boreowners do not give water to others at that time.

In these 3 villages, boreowners by controlling the GW access, control the access to a precious productive resource. They let the other farmers dependent on them, especially in VAD and TIR where tank water has not been used for irrigation. In VAD for example, 72 bores deliver water to more than 120 farmers : 40 % of the farmers are then completely dependent for their agriculture on the boreowners. And since the groundwater depletion reaches deep depths (more than 50 m), boreowners whose bore has failed (about ten) have also to depend on the deep bore owners. By controlling the GW access, the boreowners gain some local power. As we didn't do economic interviews about the economic gain of bore irrigation, we can only suppose that they also get some socio-economic advantages. But we could also be in the situation described by Kumar et al (2004) in north Gujarat, where to deepen the bore bring the boreowner in a less healthy conditions than the water buyers. For example, surprisingly, the price of water³ in VAD didn't change with the depletion of GW level and the need of deepening the bore, whereas the investment cost increased seriously these last years.

One incomprehensive fact is that the situation of water depletion is, in some extend, related to irrational management of ground water: motors run even if plots are already filled and water is wasted. In spite of the knowledge amongst farmers of existence of different aquifers, of water depletion due to overexploitation of groundwater, of the cost of deepening the borewells, boreowners continue to mismanage the bore. Their contention is that due to the inconsistency in the electricity supply, they are forced to do this with no alternative or remedial practices.

Such a practice would lead to a unconditional water scarcity that could impinge on the economic returns of the agricultural produce, and could as well result in pushing them into crucial consequences on their livelihood.... to that of rocky zone situations ?

1.3- Irrigation and poverty in the 2 studied contexts

The two zones face different water crisis (bad access to GW and GW depletion), even if water depletion affect both of them. Because of the quasi-absence of access to GW in the rocky zone, and villages inhabited by landless or marginal farmers, seasonal migrations affect 1/5 of the population and 1/3 of the families. Lack of production factors as land

³ The price of "rent water" is fixed, paid in bags of paddy for paddy cultivation, in money for sugarcane, groundnut and coton. In many other villages, the price of water for paddy is 1/3.

and GW access *all through the year*, in a context of great density of population, implies this vulnerability.

But these migrations are not a specificity of rocky zones. Some migration also take place in the alluvial area. This is mainly due to the great percentage of landless agricultural labourer that exist there also, most of them being s.c. As Rajuladevi (2000) points out “green revolution wet areas are not plentiful”.

Villages	SRVP	VD, SOR, TIR
Geology	rocky area	alluvial area
Surface water	- secured access (head of system tank + dam) - used	-variability in water availability - not or little used
GW	-no or bad access - wells (5 m diam.)	- good flow whole year - bores
Water issue	lack of GW access during dry season	groundwater depletion
Agriculture <i>nanjai</i>	1 or 2 seasons paddy	3 seasons
<i>punjai</i>	1 season	3 seasons
Landless %	60 %	(data still to be collected)
s.c. (% of the pop)	27 %	26% - 29 % - 17 %
Migration	during 3 to 9 months of 20 % of population (men & women)	during 3 months of some s.c. men

Table : Irrigation and agriculture data of villages where the study is carried out, presented according to the geological characteristics.

These two zones are characterized by a great percentage of scheduled castes among the population (data from 1991 census). The ancient irrigation may explain this situation as irrigation implies a high agricultural intensity (Oliveau, 2003). Most of the s.c. are still landless people and agricultural labourers, depending on daily wages. In wet areas - as opposed to "dry areas" as SRVP - they could benefit in some extent from the Green Revolution, as the intensification of the cropping pattern gives them more opportunities of work especially for women (Marious-Gnanou, 1991). But the Green Revolution didn't solve the problem of unemployment in the countryside; as the agricultural labourers increased of 42% between 1961 and 1981 (*ibid*). And as they do not have any specific skill, they have to depend on agricultural work or unskilled labor. S.C. from SOR go during 3 months in various parts of Tamil Nadu and Andhra Pradesh to harvest the sugarcane. To the question why they do not go for a job in the industries in neighbouring city of Pondicherry (25 km), they explain that they do not have any connections there, the employment being the result of a social network and political connections.

As for the GW depletion issue, it is due (with reference to the dimensions of water scarcity listed by Molle and Molling, 2003) to :

(i) managerial scarcity as the aquifers are overexploited ;

- (ii) institutional scarcity as the society failed to preserve the environment, there is a lack of collective institution to manage GW collectively ;
- (iii) political scarcity as no strong political will exist to limit the use of GW ;
- and we can add (iv) legal scarcity, as GW is perceived as a private resource, owned by the boreowners.

Programmes for the harvesting the rainwater and recharge the groundwater take place in many part of the country, but the management of GW is not yet changed. As the water keeps depleting, investments on rigging more borewells and deepening the existing borewells would take place that would deteriorate the conditions of the farmers who are only dependent on the agriculture for their livelihood. The farmers who could increased their income in the late 1980s through bore irrigation, especially marginal farmers who became self-sufficient in food (Marius-Gnanou, 1991) will certainly suffer of it. In turn the already prevailing notion 'unpopular' agriculture wage labour would face extinction, were the younger generation of the agriculture wage labouring category in the society have already been alienated, be it the scheduled caste or the economically weaker sections of the other categories in the rural areas.

Because of water depletion, boreowners are interested in the recent programme of Tank Rehabilitation of Pondicherry government, viewed as a way of recharging the groundwater. They are then interested in using the tanks as a storage lake, and to evict the encroachment of the tank beds, leading to some crisis with the landless people, especially in SOR, subject of the second part.

II - Encroachment in the tank as a social crisis around water

Cultivation in the tank bed of the irrigation tanks was a practice that was prevalent in many regions during the specific cropping season (Shah and Raju, 2001: 7-8). Many accounts about it have been attributed to the weakening of traditional irrigation institution particularly in South India. The cultivation in the tank-bed in retrospect was termed as encroachments and those who were cultivating were termed as encroachers. As this land neither had legal land use nor usufruct rights for those who have been cultivating. In 1971 the government legalized the cultivation of foreshore⁴, this had lead to a tension between the farmers of the command area and those who were cultivating inside the land (Mosse:38) : the farmers in the tank-bed in order to protect their crop would open the tank sluices, cut the tank bund, or break the surplus weirs to lower the water level in the tank.

The cultivation in the tank bed received importance as the differential rate in the quantum of produce that were harvested inside the tank was higher than the command area of the tank. The pioneers who cultivated in the tank bed areas were the farmers who had land in the fringes outside the foreshore area of the tank, who extended their cultivable land inside the tank. Distribution canals were made in the foreshore to bring water from the

⁴ A tank is composed of bunds on three sides of it, delimiting the tank bed which on the fourth side is let open. The foreshore defines this part of the tank bed, without physical boundary to delimit it from the adjacent fields, forest or what ever.

borewell situated in legally owned lands (*patta*⁵ land) to the lands cultivated inside the tank. These farmers also encouraged the landless to cultivate the land inside the tank. This facilitated many landless that include the Scheduled caste people to cultivate the land inside the tank.

In case of the VAD Tank, until late 2000, within the spread of 106 ha of the tank more than 80 ha were cultivated. This tank catered a command area of 165 ha belonging to two villages, VAD and PSP. There had been long standing dispute over the ownership of the tank amongst the two villages, it is said that at one point the tank-bed area was demarcated by a physical boundary mark that divided the tank bed area into two, each belonging to the respective villages. And the two villagers in the respective boundaries carried out the cultivation. The landless that included the scheduled caste cultivated inside the tank, using the borewell water for irrigation from the adjoining land owners with borewell. It is said that during 1975 from the 170 SC families of PSP there were about 100 families who were cultivating inside the tank, and also similarly a majority of the SCs from VAD village. In VAD when cultivation inside the land began, over the dispute of usage of land, the village elders intervened and allotted land inside the tank to the landless who wanted to cultivate.

Most of the lands that was cultivated by the landless in the tank were dependent on the borewell owners in the adjoining 'patta' fields. The general notion that prevails under the practice of cultivation inside the tank area is, the borewell owners on due course happen to acquire the land that was under their 'water-control'. Owing to the fertility of the field, the borewell owners tricked the supply of water to the other cultivators who were depended upon them. At crucial times of water need, the borewell owner would not supply water, pushing the others to situation where they had to forego the harvest seasons. And for the next season, the dependent cultivators were forced to a situation that they 'sell' the land by receiving a nominal amount from the borewell owner and let the land to the borewell owner to be cultivated. In this process, the landless who were cultivating inside the tank reduced in numbers, in VAD there were none at the time of encroachment eviction in 2000, whereas in the PSP there was only 4 to 5 families of the SC that were cultivating inside the tank until five years ago.

In 1998-2000, the government of Pondicherry initiated a Tank Rehabilitation Project (TRPP), in the aim to control the water depletion of the region and curtail the intrusion of sea water in the ground. This project was implemented by forming Tank Associations for all the 84 Tanks in the region. The primary target of the project was to evict the cultivators from inside the tank who are termed as encroacher and undertake the maintenance activities of the tank, de-silting the tank, etc. This programme was undertaken in phases, the VAD tank was one of the three tanks that were considered for the Pilot tanks where it was first implemented. With the support of the government the TA were able to evict the 'encroachers' from the tank. The Executive Committee (EC) of the TA comprising of the representatives from the village undertook the eviction process. In 2001 they were able to evict all the encroachers in the tank. In the process there was hurdles from the 'encroachers' but at that point of time, the ones who opposed the

⁵ The "patta" is the legal document, which prove the legale ownership.

eviction process were the ones who already had legal land possession and were extending their cultivation inside the tank but ironically not the landless. The strategy that was undertaken to oppose the eviction was by canvassing and gathering support from among the landless who were earlier cultivating inside the tank. In other words they were earlier the victim of the borewell owners, who had the 'power' over the water.

The irony here is few of the EC members who were instrumental in evicting the 'encroachers' from the VAD tank, continue their cultivation inside the tank-bed area of the adjoining tank of TIR, that falls under the administrative jurisdiction of Tamilnadu. The area of this tank is 300 acres and there is only 10 acres that is left without being cultivated. A maximum space of over 100 acres is being cultivated inside the tank area by the farmers of Pondicherry adjoining the foreshore area of the tank. Also in TIR a similar system of 'water-control' and 'power' over the other cultivators who are dependent on the borewell owners still exist.

The other land owning castes of the villages contend that the ones who were cultivating inside the tank were not only depending on the income generated from the land, but it was an additional income apart from their regular occupation of wage labour in the case of the landless. But to the fact the landless especially the scheduled caste who cultivated in the tank had the food security in the notion of grains from the harvest that would suffice them for the year. There are very few cases of the SC acquiring own land in the tank command area or in the *punjai* (dry land) from the earning that was made from cultivating inside the tank. Most of them were denied the privilege of cultivating due to the 'power' of water though the land had no monetary value. The most benefited is said to be the borewell owner who were also cultivating inside the tank, who could enlarge their land possession with the benefit they get from the encroached lands.

SRP village has three tanks, cultivation was undertaken in these tanks when there is no water in the tank. There were 34 families that were cultivating in one of the tanks (5.2 ha) since more than forty years. Even after the implementation of the TRPP in the tank, the 'encroachers' have not been evicted. Ever since the formation of the TA during 2002, the cultivation has been stopped but the desiltation and deepening of the tank are not carried out by the project nor the tank association. In the other two tanks works have been carried out.

The tank under 'dispute' is situated near the SC colony and a maximum of them were cultivating in the tank-bed area. Their contention is that initially it were the gounders adjoining the foreshore area of the tank who were using their borewell to also cultivate inside the tank, later encouraged the SC to also cultivate. The EC of the tank association includes two members from the SC colony, who have been cultivating in the tank, and also involved with other members of the colony in opposing to ground works being undertaken in the tank.

In one case a family that started cultivating 40 cents (160 m²) of land 40 years ago in the tank. When the two sons had their own families the land was divided amongst the brothers in to equal halves. When all the members of the family work in it and if the yield is good with proper supply of water for rent, it was said there would be 10 bags of paddy excluding the rent for water. They had also cultivated, millets, groundnuts and cotton.

They express that they were able to labour and get a good yield, but now with advent of the tank association and the practice being stopped. They had to look for work elsewhere unlike their own work that was carried for cultivation.

Regarding the dispute on the tank, within the families that have been cultivating inside the tank there are two factions : one only wants to use the land in the tank for cultivation, whereas the other group wants a compensation and then could carry out the desilting of the tank. At some point of time the administrative accepted to provide compensation, but has reverted it commitment as the Project has not provided any compensation to the other 83 tanks. The SCs suspect that the caste people in the village are responsible for not providing them the compensation. The other castes counter the accusation. Their contention is that though the Gounders caste who is in majority in the village and is administering the affairs of the village, do not wish the SC people to develop. This exemple highlights the caste relation problems rural India has to face.

To conclude briefly, we showed that the water issues in these two areas are of different kind: in the rocky zone, the intensity of the water scarcity is more accute than in the alluvial zone, leading to economic deprivation. In the alluvial zone, the political and managerial scarcity leads to some vulnerable conditions: non use of tank water and dependy on bore owners; deepening of the bore and its costly implementation; environment deprivation (water depletion). These two areas have in common to be inhabited by a great number of s.c. who still remain the deprived section of the population who is always dependent on others (daily wage labour, boreowners while encroaching the tank). The eviction of the encroachment becomes a social issue in tanks where landless people occupy a large part of it and could see their income increase due to this illegal cultivation.

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**The Paradox of Water Crisis and Rural Poverty
in the Niger Delta of Nigeria:
The Case of Bayelsa State***

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**1. Introduction: Analysis of the Nature of the Water Crisis and
Its Paradox**

In Nigeria, while the Nigerian state is joining its counterparts across Africa in popularizing the African Water Vision on the one hand, its approach to the governance of natural resources and surplus accumulation are precipitating water crisis and rural poverty in Bayelsa State, located in the heart of the third largest wetland in the world after the Amazon. Bayelsa state is 90 percent water, and only 10 percent land; its water crisis therefore, poses a major public policy challenge for policy makers, scholars, development practitioners and non-governmental organizations. With a predominantly rural population, water crisis is linked with land crisis, because the rural livelihoods are tied to land, the ownership of which is also vested in the Nigerian state. The water crisis is historically determined, rooted in the Nigerian state and the colonial legacy. It is the contradiction engendered by state's capitalist development in natural resources and service delivery.¹

As a natural resource, the state conceptualizes water largely as a resource to be exploited to generate capital and other public goods, with little or no consideration for its sustainability and renewal.² In fact, scholars like Hardin had contended that, as a common resource, water lacked proprietary character and that accounted for its tragedy.³ Critics of Hardin like Bromley and Cernea had described his metaphor as not only socially and culturally simplistic, but historically false.⁴ It was Okoth-Ogendo⁵, who argued that, Hardin was ignorant of the customary laws, customs and traditions of Africa; and that, the real tragedy of the African commons goes beyond its non-proprietary character to include the appropriation, suppression and subversion of the African commons by the colonists. Common resources like water had proprietary character, because there were various traditional institutions, social hierarchies, and indigenous knowledge for the organization, governance, conservation and renewal, according to the needs of the people and the community. It was colonial capitalism and its policy that vested the sole ownership, rights and access to water resource on the state, which has been continued with in the post-colonial period.

Further, water resource is intricately connected with land over which the state also exercises sole ownership and control by virtue of the Land use Decree of 1978, which was extracted from the Mineral Act of 1914. The Land Use Decree of 1978 has turned land inclusive of the swamps, creeks, lakes, and the wetlands in the Niger Delta where oil is being explored, produced, transported and stored into a *minefield* and the people who live there as squatters in their ancestral land. So, too, has the Water Decree

of 1993 vested the sole ownership of water, both primary and secondary water, surface and underground, on the Nigerian state, and empowered it to appropriate waters for hydropower development, and the construction of river basins, but largely did so to benefit private interests.

The water crisis also arises from the poor governance of water as a social infrastructure and sanitation facilities, resulting in its inadequacy and scarcity, and the attendant ill health and other hazards for the rural and urban poor. As a social service, the state has continued with the philosophy of urban-based development of its predecessor, and this accounts for the provision of water schemes mostly within Yenagoa and few semi-urban centers like Imirringi, Kiama, Ogbia, but largely to the neglect of the rural areas of which the Bayelsa state is largely composed. Within the state capital, water consumption per head per day is estimated at 20 liters in the areas reserved for State House of Assembly members, commissioners and top government officials, even against the estimate of 70 liters per head per day. In the rural areas, per capita water consumption is put at 5 liters, with very limited water schemes, as the creeks, rivers and swamps still remain the main sources of water. The contamination of both surface and underground waters by the oil companies as evident in the presence of solubles, iron and manganese in water has the insecurity of water in the state. In fact, water crisis is a national problem in Nigeria, as the national water coverage is about 40 percent for the major cities like Lagos, Ibadan and Abuja, with a miserable 5 percent in few local government areas.

The water crisis in Bayelsa State is a governance crisis. It represents a larger crisis deeply rooted in the kind of capitalist development in natural resources being promoted by the Nigerian state and foreign capital. The state, in practical terms, means the political leadership and this cuts across the oligarchies, the bureaucracy, fronts of local and foreign private capitals, with the government of the day serving as the ground where the politics of the constituents and struggles for advancing parochial interests are played out in concrete terms. The Nigerian state is constituted as an instrument of oppression and violence, and this explains why the state managers and the larger political elites are not well disposed towards the democratization of the governance of natural resources and development matters in general.⁶ Therefore, democratizing the governance of water resource involves contestations over ownership, rights, power and rationalization of interests, violence, struggles, with very clear implications for political competition, democratization and development. It was for this purpose that, the authority in Spain established the Water Court in Valencia, in 1831 to resolve water disputes and the Water Court still meets in the same place till date. Yet, the Nigerian state refuses to undergo a rethink of its approach to the development of water resources.

As its primary objective, this paper examines water crisis and its linkage with rural poverty in Bayelsa State within the larger context of the path the Nigerian state took to the governance of natural resources. Within this framework, it critically looks into the governance of water both as a natural resource and as a social service. Paradoxically, Bayelsa State is 90 percent water, and 10 percent land, and the second largest oil-producing state after Delta State in Nigeria. Yet, it remains predominantly rural with the majority of the people poor having no access to portable water. The paper also analyses rural poverty not strictly on the less than US\$1.00 threshold, but how the poor governance of water resource has constrained the social and economic activities of the people through the degradation of their environment and destruction of the biodiversity and conservation of the area by Shell Petroleum Development Company and Texaco. It

examines the efforts of the state, the oil companies, the development agencies, the civil society groups and the non-governmental organizations in bringing about water security and the promotion of sustainable local livelihood. Finally, it charts alternative and actionable strategies for redressing water poverty and the worsening trend of rural poverty in the state in particular and Nigeria generally.

2. Political and Economic Geography

Located within Latitude 5.16° and 5.00 N; and longitude 5.51° and 6.37°E, the topography of Bayelsa State is generally low-lying, with fresh water and salt water, and a typical mangrove trees, which permit the growth of planktons, and with aerial roots, used for the production of native salt, and tropical vegetation supported with raffia palm trees whose wine is used for distilling local gin. It has two major seasons-dry and rainy; and an average rainfall of 350cm with its peak spread across June and July, and an average temperature of 78°F. The state is criss-crossed with numerous rivers, most of which are tributaries of the River Niger. The major rivers are Ekole Dodo, Pennington, Middletown, Sam Bartholomew, Freshtown, Sangana, Nun, Brass, St. Nicholas, Santa Babara, and Rams. The main creeks are Kolo, Ikebiri, and Digatoro. There are large inland water bodies, spreading from Oloibiri to Brass, and dotted with few small islands, or fish markets, where fishes caught are preserved through smoking before moving them to the markets in the hinterlands.⁷

The sources of water are, underground, rain, fresh and coastal/salty, all of which are in abundance in the Bayelsa State. The underground water is the major source of water in the state and the safest, because the earth crust provides a natural filtration process, making underground water relatively less polluted. However, several incidents of sippages and overflows from uncased waste pits dug by the oil companies showed that underground water still contains solubles, iron and manganese, explaining the brownish sediments in the water about 5 minutes after collection from wells and private boreholes without treatment plants. There is the need to remove these impurities in order to make the water safe for public consumption. Underground water is cheaper to process than de-salinizing the coastal or salt water, or refining the fresh water. There is also the problem of constant pollution of rainwater through gas flaring by the oil companies and the resultant acid rain. No doubt, fresh water remains in abundance across the state, but it is into these sources of water that the oil companies dump untreated water-based drilling wastes thereby turning them into toxic waters.

Indigenous knowledge confirms that, the traditional sanitation facilities of the riparian rural people are restricted to portions of the river, especially the fast flowing sections, which enable the river to renew itself after five kilometers.⁸ Perhaps, that explains the limited or relative absence of modern sanitation facilities in the rural areas, yet there were no water-borne diseases. But, that is no longer possible since the state and oil companies began operation there and have been constantly polluting the rivers and creeks, killing fishes and other aquatic organisms, disrupting the course of the rivers through dredging and laying of oil pipelines, all of which have left the hydrological regime of the rivers/creeks constantly under threat of uncontrollable pollution.

Created out of then Rivers State in 1991, Bayelsa State is administered from Yenegoa- the state capital, a semi-urban and the largest and coastal city with about 1.500,000 people. Bayelsa state has a population of about 3 million people.⁹ Of this, 30,000 representing 2 percent are civil servant, while the remainder is rural farmers and

self-employed.¹⁰ The state is bordered in the south by the Atlantic Ocean, northwest by Delta state, and northeast by Rivers state. It has 8 local government areas and 24 development centers. Chief DSP Alemeseyia is the first elected executive governor of the state. The Peoples Democratic Party [PDP] ruling party at national government, is dominant in the Bayelsa State House of Assembly, and the 3 senatorial districts. The state is the home of the Ijaws, fourth largest ethnic group in the country after Hausa/Fulani, Yorubas and Igbos.

3. Structure of the Economy

The structure of the economy Bayelsa state, like other major oil-producing states, namely Delta, Rivers and Akwa Ibom, can be delineated into two broad categories: the traditional economy, and the oil-induced economy with all its artificialities. The productive system of both economies is not complimentary. The traditional economy still subsists on land and water resources with 80 percent of the population engaged in fishing in the coastal communities like Nembe, Brass and Akassa; and 70 percent involved in farming in the hinterlands like Ogbia, which was once regarded as the 'food basket' of the Ijaws before the discovery of oil. About 10 percent of the population is engaged in building canoes, production of native salt, tapping palm trees, raffia palm trees, and petty trade, among others. Oak tree is one of the major forestry resources, used for hand-dug canoes. The major food crops grown in the state include cocoyam, water yam, pepper, sugar cane, swamp rice and plantain. The forest is equally rich in rural resources and food gathering is part of local livelihoods. Traditionally, crops have gender nuances and rights: while coco yam is regarded as women's crop, can be relatively grown in swamps and other dryland; the yellow or white yam, the 'king of crops', men's crop and grown dry farmlands. The family unit remains the major provider of labour, and the farming implements are still crude, essentially hoes, cutlasses and spades. The growth of these and other food crops is sustained with the application of indigenous knowledge in the governance of water resources and the land. The swamps are traditionally regarded to provide a buffer for the sustenance of the environment of the communities, and they are barely tilled.

As an occupation, fishing is predominant and carried out in the coastal communities of Nembe, Akassa, Brass and Sangana. In between these communities are large inland water bodies and fishing settlements. Fishing is usually carried out on the estuaries, creeks and rivers, using the traditional hand-dug canoes from where the nets are cast. The men dominate the occupation, while the women and children engage in smoking the fishes. Basic types of nets used in fishing include dragnet, subnet, driftnet, and the traditional basket called 'akapli'. Fishing is practiced sustainably. If the productive forces were allowed to grow without obstructing the development continuum of the area by the forces of western capitalism, they could have sustained the growth and development of its economy.

The oil-induced economy came with the advent of the oil companies, structuring the dependence and underdevelopment of the Bayelsan economy and its re-insertion into the world capitalist system. The activities of the oil companies are not integrated backward into the local economy. Nor do they impact positively on the social lives of the people who live there. Instead, at each stage of oil exploration and production, the oil servicing companies [OSCs] like Euro-American Seismograph Services Limited, Santa Fe and Flopetrol hired by the oil majors like Shell, Agip and Texaco, destroyed the water resources, land and other natural resources attached to it. Socio-culturally, the oil

workers lure girls and even wives of the people to their temporary campsites where they sex them, leaving behind bastards, who are forbidden by the custom and norms of the people. With the pollution of the gods of the waters, land and forest, the philosophical and sociological foundations of the economic activities of the people are destroyed, leading to poor harvest, decline in fishing and the practice of traditional health medicine becoming difficult as most of the herbal plants are disappearing. The efforts made by the people to appease the various gods have not yielded positive results, because of the constant assault on the water gods, and other cultures of the people. A greater insight will be gained into the implications of the activities of the state and the oil companies for water crisis and rural poverty as the nature of state-transnational capitalism is looked into

4. State, Capital, Water Resources and Rural Poverty

4.1 State-Transnational Capitalism and Resource Governance: Explaining the Theoretical Underpinnings¹¹

To start with, the approach the state took to the governance of natural resources is intricately tied to colonial capitalism. The basic interest of British colonialism was economic, because the industrial revolution in Europe had not only precipitated scarcity in natural resource crisis, but the over concentration of international finance capitals in Europe, increasing labour cost and declining returns on investment compelled capital to seek for more profitable market outlets and cheaper labour outside of Europe. In moving business out of the shores of Europe to Africa, the basic aim of the forces of western imperialism was to extract the raw materials from the colonies for use by the metropolitan countries, processed them into manufactured goods and brought back to the colonies. One of the mechanisms for achieving this goal was to have the colony first, conquered, subjugated and brought under the political control of the British. Then, enacted laws that governed the exploration, production and use of natural resources. This was partly achieved by the extension of the Foreign Jurisdiction Act of 1890, which empowered the imperial power, Britain, to exercise control and administration of the colony [Nigeria] and its natural resources. That Act also empowered the sovereign to control and dispose waste and unoccupied land in the colony. In fact, property rights only derived from the sovereign.

The next mechanism was the imposition of the English law on the colony. This meant that, the law of the colonial power [Britain] became the law in all respects in the colony, Nigeria. The colonized only had *usufruct* right to land and other resources, dictated as usual, by the colonizer. Colonial land and natural resources policy only entrenched the interests of the foreign and the colonizer. Virtually all natural resources, ranging from mineral, wildlife, trees and water were controlled by the colonial state. Therefore, the colonial state was constituted to play a major role, that of facilitating the exploitation of the natural resources by the European [British] capitalism. It was not surprising that, the colonial state became the most powerful instrument of exploitation had unlimited power, repressive, all-powerful, all-purpose, totalistic and accumulated by terror.

In the post-colonial period, the Nigerian state inherited its predecessor's policy, politics and structures over land, minerals, forest resources and waters, and re-centered itself in the ownership, control and administration of natural resources inclusive of water resources. All is to the detriment of the rural and urban poor. The governance of natural

resources remains undemocratic in the sense that, the ownership and control of natural resources are still vested in the state, denying the people their rights of ownership and control to water resources. As noted, traditionally, water resources belonged to families and communities with the appropriate indigenous social institutions governing these resources in place. Colonial capitalism overthrew this process and the expectation of the people is that, their rights to natural resources inclusive of water, will be restored after political independence. Unfortunately, those entrusted with the management of the state are not interested in change, but retaining the state's political power, because such power holds the key to wealth.

3.2 Nature of State-Oil Capital Alliance and Implications for Water Resources and Rural Poverty¹²

As noted, with petroleum long becoming the cheapest energy source globally with yet no known substitute since 1920, Euro-American oil capitals continue to have monopoly power over the exploration, production, refining and sale of oil and gas worldwide. In spite of the American Anti-Trust Act of 1911, which legally broke the monopoly of the Rockefeller's Standard Oil Company over the petroleum industry and the prices of petroleum products in the United States of American, the 'seven sisters', or major oil companies have continued to exert control of the oil and gas industry. While the oil majors still control oil exploration, production, refining and sale of oil and gas and their bye-products globally, the small-equity-based and specialized oil companies known as the OSCs, provide expertise in various stages of finding, wining, transportation and sale of oil and gas. As oil capitals move business to the developing regions like Africa, and indeed, Nigeria, they are basically interested in the extraction of mineral oil, but first, have to decide how to relate to land. This represents one aspect of the state-oil capital alliance.

To all intents and purposes, the Nigerian state is capitalist, but has devised various mechanisms for fostering its capitalist interests in the natural resources sector, given its weak technological base. For this purpose, the state vested on itself, the sole ownership and control of land, water, forestry and other natural resources as explained. With the political ownership over natural resources, that state is able to extract surplus from this sector. Its mode of capitalism accumulation in the natural resources is essentially rent collection. The joint venture agreements [JVAs] provide the framework for the mediation of state capitalism. The JVAs show the nature of the state-capital alliance in the oil and gas industry and gives an insight into the dire consequences for water resources, land and other natural resources. The foreign oil companies, for instance, are the technical operators of the JVAs, and indeed, the junior partners, with the state through its agency, NNPC, as the senior partner in terms of the percentage shares they hold in the agreement. Technically, the JVAs are held responsible for the pollution of water resources, land and other natural resources, yet, it is the oil companies that find, win, transport and store the oil, and equally pollution the water resources. From the onset, therefore, water resources, are not even imputed into public policy on natural resources and poverty reduction as a resource that should be protected, conserved and renewed in oil exploration and production in the Niger Delta. All this accounts, in part, for the poor management of the wastes generated from the water-based chemicals used in drilling oil. Some of the water-based chemicals used by the oil companies and the negative consequences for water resources, the environment and human beings are shown in table 1 below.

Table 1. Selected water-based chemicals used for drilling by Shell, Texaco and Agip in Bayelsa State and across the Niger Delta, and the consequences for water and environmental resources and human beings

<i>Chemical</i>	<i>Management of the wastes and consequences</i>
Bentonite	Wastes were discharged into the environment [farmlands, swamps and creeks/rivers] untreated; causes bronchial disorder among the people if the gas inhaled and automatic death if contaminated natural resources are eaten, and intoxicates animals if ingested and death later.
Persene drilliad	The wastes were emptied into the environment untreated by the oil companies indiscriminately; and if the gas generated in the process is inhaled, it cause shortness of breath similar to asthma and could lead to death if the victim did not get treated immediately.
Soda ash	The wastes generated from this chemical were usually dumped into the environment untreated, and through evaporation, falls back as an acid rain, corroding the roofing sheets; it causes shortness of breath too.
Pipe lax	Wastes were usually dumped into the environment, easily percolates into the soil, causing underground pollution of the water tables; cause abdominal pains if polluted natural resources like fruits are eaten; causes cancer of the skin.
EP-20	Wastes generated, largely in the form of dust, were released into the environment untreated. If the dust is inhaled and the contaminated fruits eaten can result in instant death.

Source: Based on the author's fieldtrips to the oil-producing areas inclusive of Bayelsa state, in 2000, 2003 and 2005.

That is not all. The oil companies have acquired notoriety for polluting the rivers and creeks where they operate across Bayelsa state, because they are minefields as explained earlier. For instance, Shell's activities are dominant around Ekole Dodo and Nun rivers, Kolo and Nembe creeks, where the company has wrecked great havoc on the water resources. The same is true for the operations of Agip in the coastal areas of Brass, and Texaco and Agip around the Sangana area. In fact, in 1980, one of the wellheads at Finuwa, Sangana, blew out, had the entire jack-up rig razed down, and spilled for about 4 weeks before engineers were flown in from USA to stop the spillage. An estimated 3million barrels of crude were spilled and all lost to the environment, which is wholly water and fishing as the major occupation of the people. There was no post-spillage study to evaluate the extent of damage done to fishing grounds, health and social lives of the people. Nor was any compensation paid to about 5000 people whose socio-economic activities were adversely affected. The tidal waves also increased the scope of destruction as the oil slakes were washed to the shorelines and other rivers like Nun and Sagbama, across the hinterlands, which, in turn, polluted the farmlands. This is an indication of the relative recklessness of the subsidiaries of the oil transnational corporations in the host-oil communities in Nigeria. The Nigerian state even absolved Texaco of any negligence.¹³ Yet, there was no protest, largely because of the limited knowledge of the people of the impact of oil pollution on the environment at the time. The non-governmental organizations were not just emerging, but had not really conducted studies in the Niger Delta and involved in advocacy. Between 1980 and 2005, there was hardly a year with one form of environmental pollution or the other, but space will not permit a blow-by-blow account. Rather, one of the recent and very devastating oil spillage will suffice.

In December 2003, the Nembe oil field, operated by Shell creek, suffered a major oil spillage where estimated 1.5million barrels were lost to the environment. As noted, Nembe is almost wholly water with fishing as the dominant occupation of the people.

Characteristic of the state and Shell, no post-spillage study was undertaken. About 4500 fishermen were displaced as a result of the spillage. The Association of Fishermen in Nembe and its chairman, Chief Kenemor Igbeta, through their lawyer, Oronto Douglas, sued Shell for damage. According to Mr. Douglas, Shell paid a compensation of N5million without input from him, nor the community, wondering the basis for calculating the compensation.¹⁴ All explained why the community rejected the money, and the company did not seek for alternative mechanism for resolving the dispute, because of the strong backing from the state. In another study, the author had explained the Oloibiri's experience¹⁵, which had completed the full circle of capitalist exploitation and abandoned by Shell would soon become trend of the pillage across the Niger Delta by the Nigerian state and oil capitals.

The oil companies do not only pollute water resources through oil spillages, but by with the combination of others forms of recklessness such as flaring gas day and night in the past 45 years, dredging the rivers and creeks for the laying of oil pipelines, erecting tank farms, oil terminals, among others. The Sagbama River, for instance, is linked with the community's inland water body, where the people practice traditional fishponds for fish farming and hunting. But, the Benneisebe oil pipeline built by Westminster Dredging for Shell and which connects all the company's oil locations to its terminal at Forcados in Delta State, deepen the river thereby making it too swift for hand-dug boats to be use for water transportation, but fishing was impaired as the traditional ground for breeding fish was destroyed on the basis that it fell on Shell's right -of -way.¹⁶

The kind of rural poverty being precipitated by the forces of state-transnational capitalism is such that, it destroys the sociological foundation of the existence of the people as evident in the death of most of the revered or totemic animals of the people like fox, which, if seen around the road, or found dead, due largely to the pollution of the environment, signaled war or spiritual attacks. Prolonged pollution of the continental shelf and the environment of coastal towns like Brass, and the natural estuaries connecting rivers to the Atlantic Ocean, and creeks generally, have been identified by the people for the disappearance of shark, which Ogbia people revered because it rescued them during boat mishap. The majority of the flora and fauna of Bayelsa state and across the wetland of the Niger Delta have equally been decimated. With prolonged pollution of the swamps, creeks and rivers, the farmlands have equally been rendered infertile, heightening the crisis of scarcity and landlessness in the hinterlands. Before the advent of the oil companies, the size of farmland per family was 40meters by 20meters, giving a total of 800sqare meters landholding. But, this has declined over the years, and was estimated at 20mx10m=200sqare meters of even infertile lands. The growth of cassava is stunted as evident in the observed coiled leaves and one or two miserable tubers upon harvest. Like cassava, the productivity of cocoyam has declined since 1975.¹⁷ See Table 2 for details.

Table 2 Effects of oil pollution on sampled flora and fauna of the Ogbia Communities, Bayelsa State

Flora and Fauna	Significance	Remarks
Coco yam	Carbohydrate source; major staple food and was widely grown	Declined productivity noticed since 1975, and its production is virtually disappearing since 1980
Electric fish	One of the dominant fishes caught in the wetland, and a major of protein	Became totally extinct about 1979
Manatee or sea	A major fish found in the area, with such much fat	The decrease in its population

cow	used cooking and medicinal purposes	was first noticed in 1975, until it became extinct since 1980
Cat fish	One of the predominant fishes caught throughout the wetland; source of protein and used for spiritual purposes	It has become virtually extinct since 1980
Hippopotamus	One of the rare sea mammals found in the area; source of protein and fat, used for spiritual purposes	Migrated out of the area since 1978
Shark	It is revered by the people, because it rescues them in case of boat mishap or drowning in the river or sea	Migrated out of the area

Source: Based on the author's field trips February 2003 and September 2005.

What have been the reactions of the people to the resources crisis? How have the state and oil companies responded to the reactions?

5. Reactions and Responses to Water Crisis and Rural Poverty

5.1 Agitations and Democratization of the Governance of Water Resources

To begin with, it is important to have an idea of the political economy of the protracted agitations in the state and across other oil-producing communities in the Niger Delta in order to determine whether they are really concerned with the democratization of the governance of natural resources inclusive of water resource and land. For, an understanding of the political underpinnings of the protests will also give greater insight into the extent to which the people, who bear the brunt of the water crisis and rural poverty, are mobilized for the struggles; the alternatives strategies they are developing for survival. The Ijaws for whom Bayelsa state was created, have mounted persistent agitations for self determination, social justice and equity, ownership and control of natural resources, and fiscal federalism since the late 1950s. Since the late 1980s, when the negative consequences of environmental pollution by the state and oil companies have fully unfolded, the state had had and still has the highest incidents of taking oil workers hostage, especially as most of the oil locations are offshore.

However, not much success has been recorded in terms of water security and promotion of rural development. Rather, the state and the oil companies still pollute the environmental resources thereby deepening the trend of rural poverty. There are no indications that water insecurity will be reversed, largely because of inadequate problematization of the crisis itself by the agitators. The majority of those involved in the struggles do not really understand that water crisis is state perpetuated; indeed, a governance crisis, and that a fraction of the political elites who empathize with the agitations even lack the political will to enforce the re-distribution of rights over natural resource to the people. In part, because they are not politically oriented to embrace democratization, and that they are in opposition only to mediate their access to the state's political power to advance their narrow political, social and economic interests, but not to halt the accentuation of water crisis. As the author has explained elsewhere, the Nigerian political elites are not oriented towards the democratization of the governance of land around which water crisis revolves. For, some of the architects, who helped re-awaken the agitation for resource control in the year 2000, notably, the governors of Akwa Ibom, Bayelsa, Delta and Edo, have presented it as the political project of the governors of the south-south geopolitical zone, where about 97 percent of

the country's oil is produced. They are able to sustain the struggle, using their political positions in the interim, because resource control is not being internalized in the various communities, groups and organizations participating in the agitations across the Delta region. Worse still, democratizing the governance of natural resources is not an agenda of the ruling Peoples Democratic Party, which they all belong; nor are there any political party and pressure group of the Niger Delta extraction, and in the country at large, committed to resource governance and recruiting the rural poor and peasants for right-based development and pro-poor governance of natural resources. All this portends great risk for the sustenance of the struggle, because as soon as the current crop of politicians ceases to be governors, or excluded from the state's political power, the struggles might lose its tempo and relevance.

In regards to rural poverty, particularly for the peoples whose predominant occupations are fishing and farming, there are no clear indications that the water crisis in Bayelsa state is abating. Coupled with the fact that, the water crisis is governance crisis and indeed, crisis of the Nigerian state, it cannot be effectively dealt with by a state government. For, there are other powers outside of Bayelsa State and even the national government like the local private capitals and foreign oil capitals that would want to the status quo to remain in order to operate with utmost recklessness in the Niger Delta. Herein lies an aspect of the internationalization of the water crisis and rural poverty in the oil-rich Bayelsa state.

What is more? Together, the natural resources, particularly land, water, oil and gas, forestry resources have characteristics, which make their governance problematic. It links the local to the national and international, raising issues that can foster poverty reduction, participation, accountability, transparency and inclusiveness at all levels of governance. In particular, water resources are slow growing, offering various values to different people and providing long-term repository of value to the people and society. But, these resources are being easily destroyed with unsustainable exploitative policy and framework for their governance as evident the path the state took to resource exploitation. Neither can an adequate monetary value be ascribed to them; nor can appropriate financial value be given to the kind of poverty that is being precipitated following the destruction of these resources by the state and oil companies. Because the state conceives of the oil-producing areas as minefields, the operations of the state and oil companies even annihilate indigenous resource governance methods, which are better suited than the western-driven conservation policies and projects for managing bio-diversity, conservation and protected areas. Located in this context, it is difficult to promote rural development. With the swamps, creeks and rivers also biologically dead due to constant pollution, coupled with the killing of fishes and planktons, fishing, as a predominant occupation in the coastal areas of the state, has been on steady decline. The pollution in the continental shelf and oil locations in the deepwaters has destroyed the hydrological regimes of the rivers thereby blocking the renewal process of the aquatic organisms. Land scarcity and landlessness in the hinterlands, where farming is the major occupation, has compelled the rural farmers to till the swamps and the extension of the frontier has precipitated massive flooding during the raining reason. Little wonders the establishment of the establishment of the Niger Delta River Basin Authority [NDRBA] in 1981, among other such organizations, purportedly to harness water in the Delta region was a monumental failure. For, it was created without putting in place, appropriate mechanisms and strategies for halting gas flaring, oil spillages and other forms of environmental pollution.

Food gathering [rural water and forestry resources like snails] among the rural Bayelsan is not barbaric, but constituted a viable poverty reduction strategy for the rural dwellers. This was the situation until the oil companies began operations in the Niger Delta. As a result, food gathering is no longer protected as a local livelihood strategy, particularly as the rural resources have, under gas flaring and oil spillages and indiscriminate dumping of untreated drilling water-based wastes on land and into the swamps, been constantly destroyed. In fact, the poor governance of water resources has become the focus of the impoverishment of the rural people. Yet, few of the local non-governmental organizations like the Chicoco Movement, Environmental Rights Action, the Center for Democracy and Development that have been engaged in the study and advocacy for the Niger Delta region, have hardly developed programmes and projects dealing with the core issues of rural development. The members of the international community like the UK Department of International Development, United Nations Development Programme, UNESCO and USAID, which have demonstrated interests on rural development and provided minimal funding, have equally not really shown concern for the origin, nature and dynamics of rural poverty and helping the NGOs to strategize for its reversal. It is in order to examine the responses of the state and other development agencies to water crisis in the context of an infrastructure.

5.2 Politics of Water Schemes¹⁸

As an infrastructure, water is a public good and service. The process of getting water to the people depends on many factors: feasibility studies, sample analysis, planning, implementation and renewal, the dept of the boreholes, right facilities-ranging from the pumps and their capacity, to water treatment plants and alum, chlorine and other consumables, overhead tanks, pipes conveying the water to the end users, the right manpower/skill, staff quarters and vehicles. In addition to the Bayelsa state government, agencies of the federal government, the oil companies, and donor agencies have been involved in providing safe water in the state.

5.2.1 At Bayelsa State Level

To begin with, the government of Bayelsa state has made efforts to deal with water crisis in the state, as evident in its plans to refine the fresh water. About N4billion has been spent in making drinkable water available to the people since 1999. Yet, the water crisis still persists. In part, because, at this level of government, the production and delivery of portable water have been politicized that they lacked transparency and accountability. It is a governance crisis. The Bayelsa Water Board is a statutory public corporation created to produce and supply water in urban and rural areas across the state, but, the Water Board hardly performs its statutory functions. Rather, it operates a water scheme built by the Ministry of Public Utilities and Rural Development. The process of getting safe water to the people in rural and urban areas is yet to be democratized.

The Ministry, for instance, performs both policy-making functions and the executive duties. Without consultation with the 3 major departments under the Ministry, namely, Water, Electricity and Rural Development, the executive branch awards all contracts for water schemes to Hydro Construction and Engineering Company. The tendering process is limited to the company, which provides the water pumps, overhead tanks, treatment plants and consumables, installation of transformer. After the water scheme is built, the Ministry then instructs the Water Board to operate it. One of the

constraints of the Water Board is that, it is forced to operate a water scheme that it does not know the capacity of the water pumps, where they are made, capacity of the tanks, the population it is meant to serve, no maintenance budget etc. As a result, whereas more water schemes are being built in the state, the production of water remains grossly inadequate

5.2.1.1 Urban Water scheme- Yenagoa

The Yenagoa water scheme is the oldest of all the schemes in the state, dating back to when Yenagoa was once a UAC depot in the colonial period, to when it became the headquarters of the local government. The water scheme produces 600,000 gallons in 18 hours, given constant electricity supply, which is hardly guaranteed, as the state is yet to be connected to the national grid system. Conservatively, this translates into 2.3million liters of water every 18 hours, approximately a day. There are other water schemes within Yenagoa: the Swale water scheme. It is installed with 6 water pumps of 150 cubic meters each, totaling 900 cubic meters, and this translates into 900,000 liters of water. Therefore, daily water supply for Yenagoa is 2.3million plus 900,000 liters, totaling 3.2million liters of water. But, the total population of Yenagoa is 1.5million and given the estimate of 70liters daily need/person, this will translate into 105million liters of water per day, against the total daily production of 3.2million liters/day, with an average of 20liters/person. This is just an aspect of the magnitude of water crisis in urban water supply. Even with the 20liters/person water supply, the places fully supplied include: Ovum area, which includes Government House, House of Assembly Quarters, and Commissioners Quarters.

Other water schemes within Yenagoa, which were still projects at the time the study was conducted, included: Etegwé water scheme, Egebgwu water scheme, Igbogini and Kpaasia water projects, with each project planned to redress the scarcity of drinkable in the various quarters within the state. The exact capacities of these projects were yet to be decided at the time of the study- part of the politics of water crisis. But, water delivery within the state capital is still grossly inadequate with private boreholes, as the main source of water, which is not treated, in spite of the heavy presence of iron and manganese in the water, Water vendors sell the 25 liters gerrican of water at an average of N35.00. The hand-dug well and the stream are still the major source of water for the majority of the urban dwellers. The DSP Water Initiative in 1999, which the government refuted of having anything to do with the governor, but a private initiative for water distribution project, was aimed at selling water to the residents of Yenegoa and its immediate environs. It began with 10 tankers of 3000litres capacity. Lacked funds for maintaining the tankers and grounded most of them. It folded up in 2004.

5.2.1.2 Public and Private Semi-Urban and Rural Water Schemes

These are water schemes outside of Yenagoa located in semi-urban and -rural communities. All 8 LGAs and 24 Development centers in the state have one form of public or private water scheme, but not all of them are equipped with water treatment plants. These water schemes are still in various stages of development, with some of them nearing completion, and others still being test-run, under construction and old ones being rehabilitated. One of the implications of this is that, safe drinking water is still very scarce in the rural areas. First, on the functioning public water schemes, and this include the Kolo water scheme [producing about 3000 liters for 8000 people] and those of Oruma under Ogbia LGA and Odi town [producing skeletal], and those about to be

completed are in the Southern Ijaw LGA [Opomowe], located in Perembiri, Amasoma, Eseomi, Otuan and Lobia. Second, is the category of water schemes being test-run. They include the schemes located in communities under the Sagbama LGA, namely, Essozui, Oglobiri and Tomibiri expected to produce 6000 liters. The water scheme in Sagbama town has a water treatment plant, and produces about 5000 liters of water.

Third, are schemes being rehabilitated and one of them is the Okolobiri water scheme. Fourth, are water schemes that are still largely projects. They include: Kiama Water Project under Kiama LGA, Agbobini and Otueke water schemes under the Ogbia LGA; Peretorugbene and Anyalobiri water projects under Ekeremo LGA. The fifth category includes public-private partnership water schemes. Under this, is the Brass water work, which is the only scheme refining the salty water, produces about 10,000 liters of water for about 9000 people per day. Initially, it was the project of the Rivers State Government and AGIP, because the company's oil terminal is located in the city of Brass. However, when the state was split into two, Bayelsa and Rivers, the scheme came under the management of the Bayelsa State Water Board. Agip funds the water scheme, while the Bayelsa Water Board provides the technical staff, who operate the scheme.

The sixth category of water schemes can be regarded as the responses of the state and oil companies to the protracted agitations of inhabitants and groups over the underdevelopment of the oil-producing communities. As agency of the state, the Niger Delta Development Community [NDDC] has been charged to provide basic social and physical infrastructures in the Niger Delta, and portable water was one of its priority projects. However, as a microcosm of the state, its projects are largely bedeviled with corrupt practices with shoddy work done. An example is the Bilogo water project, which was commissioned, but now idles away due to lack of funds to maintain it. Another example is the Ametolo Water project, Southern Ijaw LGA. Started first, by Shell, NDDC, OMPADEC and finally, UNDP. Yet, the project was not completed at the time of this study. However, Shell's water project in Imirringi [10,000 liters of water for about 9000 people per day], is functioning. But, it was built to calm the nerves of the agitated host communities; yet, the company still flares gas day and night for the past 40 years, thereby polluting the environment.

Seventh and finally, are the efforts made by the international community to redress water crisis. The UNICEF showed interest in educating the rural people on water and sanitation, collaborated with the state in providing water and sanitation programmes and projects and it is still dialoguing. The World Bank has trained personnel/built capacity for the Water Board to manage secondary water projects in the state commercially, especially in a state that is badly hit with water crisis. Started in 1998, the Bank provided the funds for the construction of the current building housing the Water Board in Yenegoa, provided computers and other technical assistance, all inherited by Alemeseyia in 1999. Yet, nothing has been done, largely because it was difficult public policy on water to implement in a state ridden with water crisis. The European Union and Shell have promised to construct water treatment plants, but they yet to do so.

The various water schemes itemized above represent considerable efforts towards redressing the inadequate production of safe water and its poor delivery in Bayelsa State. The reality of the situation is that, water crisis is biting harder.

6. Concluding Remark: What must be done?

First, the Nigerian state and its constituents should be democratized. For, in its present composition, the Nigerian state is repressive; and given its actions and politics, the state has become the major clog to the democratization of the governance of natural resources inclusive of water resources. Part of the strategy of democratizing the state is to re-orient the political class away from its narrow perception of politics as a means to wealth, to catering for the common goods for all, with the enhanced material condition of the people as its centerpiece. In fact, the essence of politics is about the empowerment of the people and improving their material condition, which can be achieved by re-distributing rights over natural resources to the people, but necessarily denying the state its power over resources.

Second, the governance of the natural resources should be democratized. The aim of the democratization of the governance of natural resources is to empower the people to exercise their rights to own, exploit and control natural resources currently usurped by the state. It is concerned with the re-distribution of power over natural resources away from the state to the people. That way, the resultant inequity and social injustice and other confusions and ambiguities that have characterized the path the state took to the production of natural resources, which have benefited a few, while the majority of Nigerians wallow in poverty, would have been overcome. One of the advantages of the strategy for the democratization of the governance of the natural resources is that, repression, intimidation, killings, tortures and maiming that have come to characterize the state's responses to the agitations in the oil-producing, would gradually be phased out. For, the militarization of the Delta region has, rather than reduce, heightened the siege across the Niger Delta, creating security threat for most of the foreign oil companies.

Third, the sustainable governance of water resources should be brought to heart of Nigeria's development policy. Unlike in the management of water resources, which may not necessarily deal with the issues of rights, ownership, transparency and accountability, governance provides larger space to redress these and other related issues. As a source of life, this means that the location of power and authority over water resources are not really secured over clearly defined rules, but are struggled over between the state, oil capital, community and community-based organizations, and the people

Fourth, there is the need for community-based budgeting on resource extraction and infrastructure. As part of the strategy to democratize development matters, power over the kind of development including infrastructures will reside with people, who, together, with the community-based organizations, and the state, decide the size of the water scheme, among other social services, they want and have it allocated; rather than a situation they have a substandard water project imposed on them by the state. The people are likely to protect such infrastructure, because it is seen as their own. Though the governor has launched the community budgeting initiative in June 2005, it was not convoked at community level.

Fifth, there is the need for a Forum for the Governor and Stakeholders of Water Resources in the state. At this Forum, there will be public audit on water resources, progress made, constraints noted and resolved. This will provide a rigorous basis for the government, non-governmental organizations, community-based organizations, private

capitals, donor agencies to develop public-private partnership in water resources and delivery of water service and sanitation facilities.

Sixth and finally, there is the need for a pro-poor land policy. Its basic objective should be the restoration of the peoples' title of ownership to land and its content and the recognition of the proprietary character of common resources. This is because, a people-oriented land policy would help reverse the state's appropriation of the people's rights to own, empowering them to exploit and control their lands, all of which would amount to the engaging the people in the development process. A pro-poor land policy would compel the Nigerian state to rethink its preferred dependence to self-reliance in the manner in which land is governed in the country.

Without doubt, the implementation of the above prescriptions would lead to water security and promotion of rural development in Bayelsa state. But, it will be mistaken that, they will not be resisted by the state. In fact, the state is ever more aggressive towards to struggles in the Niger Delta. Rather, what is required, is the sustenance of the current tempo of struggle for the democratization of the governance of natural resources by those who are interested in reversing the underdevelopment of the oil-rich Niger Delta and Nigeria at large.

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Notes

1. See Daniel A. Omoweh, *Shell Petroleum Development Company, the State and Underdevelopment of Nigeria's Niger Delta: A Study in Environmental Degradation*, Trenton, NJ: AWP, 2005. pp. 300.
2. Daniel A. Omoweh ed., 'Resources, Governance and Democratization in Africa', *The International Journal of African Studies*, Vol. 5, no. 1, December 2005. [Special issue]
3. See Garret Hardin, 'Tragedy of the Commons', *Science*, 1968.
4. See Bromley and Cernia, 'The management of common property/Natural resources: Some Conceptual and Operational Fallacies', World Bank Discussion paper, no. 57, 1989.
5. Se HWO Okot-Ogendo, 'The Tragic of the Commons: A century of Expropriation, Suppression and Subversion', *Proceeding of the African Public Interest law and Community-Based Property Rights Workshop*, Arusha, Tanzania, August 1-4, 2000.
6. See Daniel A. Omoweh and Dirk van de Boom, *Blocked Democracy in Africa: Experiment with Democratization in Nigeria, 1999-2003*, Abuja: KAF, 2005.
7. See J. Illoeje, *Geography of Nigeria*, Lagos: Longmans, 1974.
8. Based on the author's fieldwork to Yenogoa, in September 2005.
9. Based on the projection from 1990 census and interview with Oronto Douglas, Commissioner, Ministry of Information and Strategy, Yenogoa in September 2005.
10. *ibid*, Ministry of Information and Strategy.
11. Omoweh, Shell Petroleum Development Company... *op.cit*.
12. *ibid*.
13. *ibid*.
14. Based on the author's interview with Oronto Douglas, lawyer to the association and Commissioner, Ministry of Information and Strategy, Bayelsa State in June and September, 2005
15. See Daniel A. Omoweh, *Political Economy of the Operation of Shell Petroleum Development Company in the Oloibiri Area of Nigeria*, Report of Study submitted to the Bread for the World, Stuggart, Germany, August 1998.
16. Based on the author's field trip to Sagbama in June 1998 and July 2005.
17. Daniel Omoweh, *Political Economy of the Operation of Shell...* *op cit*. And author's fieldwork in July, 2005.
18. Based on the authors field trip to Yenogoa, Imirringi, Kolo in September 2005.

Water Availability, Poverty and Socio-Economic Crisis in the Floodplains of Barak Valley, Assam, North East India

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Abstract

The Barak Valley is located in the southern part of Assam, North East India, and comprises of three districts, viz., Cachar, Hailakandi and Karimganj. Lying between $24^{\circ} 8' - 25^{\circ} 8' N$ latitude and $92^{\circ} 15' - 93^{\circ} 15' E$ longitude, it covers a geographical area of 6922 km². Wetlands occupy a total area of 13747.5 ha, of which seasonally inundated floodplains occupy 10016 ha (72.9 %). Most floodplains in Barak Valley comprise low-lying areas that get inundated during the monsoon months of June-September, with numerous small hillocks strewn within them. These hillocks are occupied by villages that are largely inhabited by the *Kaivarta* people who are traditionally fishers and cultivators. They earn their livelihood through fishing in monsoon, and by growing *Boro* paddy (summer rice) that is sown in January and harvested in late April-May, after the water recedes from the floodplain. A unique feature of the floodplains is that when they are inundated during monsoon, they are treated as common property fishing grounds by the community, while after the water recedes, private property rights are re-established in the agricultural plots. The situation is rather paradoxical, as in spite of having an annual rainfall of 2500-3000 mm, the floodplains experience water scarcity during the dry months of December-March, as irrigation facilities are non-existent. Again, heavy pre-monsoon rains in April-May often lead to flooding that destroys the crop. Thus the people are caught in a vicious cycle of either too much or too little water. The burgeoning population pressure has also resulted in overexploitation and depletion of fish stock, and a general decrease in the size of landholdings, landlessness also being rampant. Consequently, the traditional livelihood means of fishing-agriculture can no longer sustain the majority of the households. The per capita earnings are very low, with associated problems like lack of education in children, poor healthcare facilities, lack of transport and other infrastructure, cultural erosion, and an all-pervading sense of stress and pessimism among the people. Thus the 'green revolution', spread of education and industrialization has had little impact on this community that once had a reasonably flourishing, albeit largely non-monetized, economy. The condition of their women, who traditionally assisted the men in fishing and agriculture by weaving and repairing nets, husking paddy and by performing other similar chores have also become deplorable. Confronted by the degradation of the rural resource base and in the absence of any alternative economic package, many families are migrating to the nearby cities to work as unskilled labours. In the domestic sector, the villagers do not have access to sufficient water of good quality for drinking and other household uses. Most sources are highly contaminated with pathogenic organisms and incidences of diarrhea and other water-borne diseases are very common. A large section of the people cannot afford to adopt simple remedial measures like boiling the water before drinking because fuelwood is both scarce and costly because of the denudation of the once-abundant swamp and foothill forests. While answers to these rather complex problems may not be readily available, sustainable water management appears to be pivotal to improve the socio-economic conditions of the inhabitants of this ecologically and economically important landscape.

Introduction

Floodplains of tropical rivers are of immense ecological and economic importance. The river-floodplain interaction is mainly governed by the seasonal pulsing of floodwater from the river onto the floodplain and its subsequent recession back into the river (Welcomme, 1979; Junk *et al.*, 1989; Dudgeon *et al.*, 1994). The seasonal entry into and recession of river water from the floodplain comprises the key mechanism that makes it a very important landscape in any area. Many species of fishes synchronize their breeding activity with the flood season and migrate into the inundated floodplain to feed and

spawn, and return to the river in the dry season. These fishes also show intense feeding activity during flood season that declines drastically in the dry period (Dudgeon, 1992; Borgström, 1994). Consequently, the floodplains support rich capture fisheries that sustain the livelihood of scores of fisher families. Furthermore, the deposition of nutrient-rich alluvium renders fertility to the floodplain soil, which is used for agriculture when the floodwater recedes after monsoon. Besides, the floodplains also contribute towards water storage and supply and serve as retarding basins for excess floodwater. However, unsustainable anthropogenic activities leading to overexploitation of resources, accompanied by the absence of comprehensive water and soil management measures have pushed many riverine floodplains in developing countries including India to the brink of ecological and economic bankruptcy. Seasonally inundated floodplains comprise a very prominent landscape element in the North East Indian state of Assam, especially in the Barak Valley region in its southern part. Besides harbouring capture fisheries that sustain the livelihood of thousands of fishers and traders, they are also used for agriculture in the dry period, especially for growing summer rice. In spite of their overriding importance in terms of water supply and storage, mitigation of floods, fishery, agriculture and tourism, the floodplain ecosystems of Assam are threatened with reclamation, environmental degradation, overexploitation and pollution (Bhuyan, 1987). Studies conducted by the Space Application Centre (SAC), Ahmedabad (Garg *et al*, 1998), reveal that seasonally inundated floodplains comprise 23.15 per cent of the total area under wetlands in the state of Assam. However, while these areas have plenty of water during monsoon, they also suffer from water scarcity during the dry season, thereby affecting their agricultural potential. This paper, therefore, attempts to analyze the problem of water availability in the floodplains of Barak Valley in the Southern part of Assam, assess its impact on the human communities that live and obtain their livelihood from these ecosystems, and suggest ameliorative measures to improve the situation.

Floodplains of Barak Valley, South Assam, India

Barak Valley derives its name from River Barak that along with its tributaries drains its 6922 sq. km area lying between $24^{\circ} 8' - 25^{\circ} 8' \text{ N}$ latitude and $92^{\circ} 15' - 93^{\circ} 15' \text{ E}$ longitude south of the Borail range of mountains in the state of Assam, North East India. The valley comprises the three districts of Cachar, Hailakandi and Karimganj, and is bounded by the North Cachar Hills district of Assam and the state of Meghalaya to the north, the state of Manipur and Mizoram to the east and south, respectively, and the state of Tripura and the Sylhet district of Bangladesh to the west (Fig. 1).

Table 1 shows the area under different types of wetlands in the Barak Valley districts of Cachar, Hailakandi and Karimganj. The total wetland area is 13737.5 ha, which in turn, represents about 14 % of the total natural wetland area in the state of Assam. It may also be seen that seasonally inundated floodplains are the most important type of wetlands in this area. Together they are known to comprise 42.75 % of the total area under floodplain wetlands in the State of Assam, although Barak Valley comprises a mere 8.8 % of the total geographic area of Assam (Garg *et al*, 1998). Thus these floodplain ecosystems play a significant role in the economy of these three districts in terms of their overriding

importance as repositories of fish, as habitats for resident and migratory birds, for storing excess flood water, and for supplying irrigation water to nearby fields in the dry season. Chatla in Cachar, and Shonbeel in Karimganj district are the two major floodplain wetlands of Barak Valley. While Chatla has an area of around 10 km², Shonbeel is the largest floodplain wetland in Assam, having an area of 15 km² (Choudhury, 2000). Besides these two, the other important floodplains include the Jabda and Lucca Haors in Cachar, Bakri Haor in Hailakandi, and Anair Haor in Karimganj district. The floodplains are locally called *Haors* or *Beels*.

Topography, Ecology and Society in the Barak Valley Floodplains

Topography: The two major floodplains, viz., Chatla and Shonbeel are in the catchments of Ghagra and Singla rivers, respectively. These rivers are tributaries of R. Barak. The topography comprises extensive low-lying areas with numerous small hillocks strewn in between. The human habitations are confined to these hillocks.

Vegetation: The floodplains originally had rich vegetation with *Barringtonia acutangula* as the dominant species. This tree can withstand prolonged water logging and is a common swamp forest species in this region. Large scale removal of this species was initiated in the 1960-70s and now a few patches remain. The other common trees include *Lagerstroemia flosreginae* and *Vitex* spp. Reeds such as *Erianthus ravenae* and *Phragmites karka* are also found.

Human Communities: One of the major ethnic groups in the Barak Valley floodplains, especially Chatla and Shonbeel, are the Kaivartas, a fisher-cultivator community. The property regime in the floodplains is also unique: when it is covered with water in the monsoon, it is treated as a 'Common Property Regime' (CPR) with community fishing rights. However, after the water recedes, the land reverts to a 'Private Property Regime' (PPR) with restoration of individual property rights. The other floodplains are inhabited by a plethora of Hindu and Muslim communities who also earn their livelihood through fishing and agriculture.

Flood Pulse, Water Availability and Floodplain Economy

Barak Valley experiences a subtropical monsoonic climate with an annual rainfall ranging between c 2500-3300 mm. About 80-85 % of this rainfall occurs during the months of April/May-September/October. December and January are normally the driest months. Pre-monsoon rains often accompanied by thunder and hail occur in April-May, and the monsoon arrives in early June and continues till September, although heavy rains may also occur in October. The seasonal pattern of rainfall and its variations from year to year govern the flood pulse and determine the extent and duration of inundation of the floodplains by the overflowing river waters. These in turn have profound effects on both capture fishery and agriculture in the floodplains. Heavy pre-monsoon rains may cause early floods in April-May when excess river water inundates the floodplains and destroys the ripening summer rice that is harvested in April. For example, between 1996 and 2005, heavy pre-monsoon rains in 1996, 2000 and 2004 inflicted severe damage on the crops,

thereby causing economic distress to the farmers. Severe hailstorms during this season can also have adverse effects. If the monsoon arrives on time in early June and the rainfall is more or less evenly distributed over July-September, successive flood pulses inundate the floodplains, resulting in the entry of a large number of potamodromous (fishes that migrate from the river to the floodplains) species of fishes, and the consequent boom in fish capture and trade. In contrast, less than average rainfall during July-September, such as that in 2003 and 2005, resulted in reduced fish catch and brought in economic depression. Adequate rains in September-early October is also vital for agriculture, as in the absence of rain, the ground becomes too hard and dry, hampering the sowing of rice seeds in November and the planting of saplings in January. Thus inundation of the floodplain till early or mid October is necessary for both fishery and agriculture. Inundation also renders the soil fertile because of enhanced silt deposition and decomposition of plant biomass. Table 2 reveals that soils that remain inundated for a longer time have significantly higher water holding capacity, organic carbon content and clay-silt percentage compared to those remaining inundated for a shorter period of time. Farmers growing summer rice do not use any synthetic fertilizers. They depend on the natural fertility of the soil which gets replenished annually by alluvial deposits brought in by the floodwater. It may be mentioned here that the consumption of NPK in Assam as a whole is very low (6.9 kg/ha) compared to the national average (67.1 kg/ha), and it is still lower in Barak Valley.

From October onwards, water recedes from the floodplains and the land is exposed barring a few depressions where some water is retained till about January. These depressions are often called *beels*, although this term may be rather loosely used to denote the whole floodplain as well. The cultivable land is now prepared for agriculture—mostly for growing summer or *boro* rice. Private property rights are now reestablished in the floodplain. However, the major constraint for agriculture is the scarcity of water. In the absence of any irrigation facilities, the farmers face great difficulty in procuring water. Only those farmers who own plots located in the lowest elevations in the floodplain have easy access to water-filled depressions or small natural water channels that they can impound to obtain water. Farmers having plots in the middle and upper layers of the floodplain suffer from acute water scarcity. Pumping up water from distant sources is both costly and cumbersome and can be afforded by few. Thus a paradoxical situation exists where the lower plots have better access to water but are exposed to a greater risk of inundation by pre-monsoon floods in April that would destroy the crop. In contrast, the middle and upper plots are relatively safe from pre-monsoon floods, but are constrained by the scarcity of water in winter. The situation has worsened over the years as deforestation in the catchments of the feeder streams and rivers, especially in the hills, has led to soil erosion and deposition of silt in the watercourses that drain the floodplains. The floodplain lakes that used to retain water in the dry season have also become progressively shallower due to silt deposition and/or due to reclamation for agriculture. Water scarcity has reached such a state that many floodplain farmers, especially those having land in the middle and upper zones, are converting their land into 'semi-natural' fisheries. Fishes enter these impoundments along with floodwater and are trapped inside. They are then allowed to grow through the monsoon. The fishes mostly thrive on natural food in the systems, although some farmers provide some supplementary feeds, and may

also release some additional carp fries or fingerlings. These fishes are harvested in the post-monsoon and winter. Thus the farmers are desperately trying to earn their livelihood by opting for fisheries in place of agriculture. Some farmers in the middle and upper elevations have started growing winter rice, locally called *shail or shali*, which grows through the monsoon and is harvested in December. However, they are also totally dependent on good monsoon rains, failing which the plants suffer from water stress during October-November. To cope with this problem, some farmers apply a thin layer of urea in November to enhance maturation of the paddy and try to save the crop.

Impact of Water Scarcity on Floodplain Economy

Pauperization of Fisher-Cultivators: The absence of effective and sustainable water resource management in the floodplains of Barak Valley has led to the pauperization of the fisher-cultivators in this area. On the one hand, over-fishing has depleted the natural stock and prevented its regeneration, leading to serious decline in fish density and the size of fishes in the catch. To counter this, the fishers have gone on reducing the mesh size of the nets to capture small fishes. This in turn has further depleted the fish stock. On the other hand, agriculture has also suffered due to water scarcity. The impoverished condition of the floodplain farmers is reflected in the low per capita income in Chatla and Shonbeel floodplains (Table 3). Many farmers including their female family members have started migrating to the nearby cities to find work in construction sites, as rickshaw pullers and as other petty labour. Those who can afford have opted for small trade. It is indeed deplorable that the womenfolk who being proficient in weaving, made fish nets, produced dried fish, and husked rice in a fairly prosperous and largely non-monetized economy, are now compelled to work as manual labours. The occupational pattern in Chatla floodplain is depicted in Table 4. It may be seen that a large section of the people are still dependent on fishing and farming, although a considerable proportion have gone for wage labour in the dry season instead of farming. However, in the monsoon, they still engage in fishing in the common property fishing area as it is not only a means for livelihood, but integrated into their culture. The situation has been exacerbated by the decrease in landholding size, which is much lower than the Barak Valley average (Table 5). The productivity of summer rice is also somewhat low, ranging from c 700-1150 kg/ha against a Barak Valley figure of 1180-1970 kg during 1991-2000. Pauper

Land Grabbing by Brick Kilns: Taking advantage of the poverty of the floodplain farmers, brick kiln owners are grabbing the agricultural lands for making bricks. Bricks now have a high demand because of the construction boom in the cities of Barak Valley, and the demand is being met by digging up good agricultural land by cleverly bypassing legal restrictions of utilizing such land for other purpose. The brick-kiln owners lure the poor farmers into renting out their land on lease. They offer a yearly sum of INR 22000 (c US \$ 500) per hectare of land and take the land on lease for a period of three years, after which the land reverts back to its original owner. However, the entire topsoil and a substantial portion of the subsoil are excavated for making bricks during the lease period. When the farmer gets back his land it becomes virtually useless and defaced. Such land does not even make good fishery because lack of nutrients does not encourage planktonic growth, and it takes a long time for any pioneer invasive species to establish itself in such

barren areas. The brick kilns are located on relatively high ground, while soil and water are transported from the low lying areas to make the bricks. This is a very serious ecological issue in the floodplains that has its root in the declining fish and agricultural productivity in the floodplains and the resultant impoverishment of the farmers.

Domestic Water Availability Scenario

There is no drinking water supply scheme in most of the Barak Valley floodplains, including Chatla and Shonbeel. There are very few borewells and these are mostly located on the outer fringes, near main roads or markets. They cater to the relatively wealthy sections. Inside the floodplains, people obtain water for drinking and other domestic purposes from dugwells. In Chatla and Shonbeel, around 60 and 67 per cent, respectively, of these dugwells are in the form of shallow and turbid mud holes, while the rest (40 and 33 per cent, respectively) are paved. Enumeration of faecal coliforms in both borewells and dugwells reveal that only 19.6 % of these drinking water sources have less than 10 faecal coliform CFUs (colony forming units) and may therefore be considered safe to consume. Another 13 per cent have moderate contamination, having 11-100 CFU faecal coliforms. However, 28.3 and 39.1 % of the sources have between 101-1000 and more than 1000 CFU faecal coliforms (Fig. 2). Only some of the borewells have low contamination, while all the dugwells sampled are contaminated to varying degrees. As a result of such heavy and widespread contamination, incidences of diarrhea are very common in the floodplain villages.

Suggestions and Conclusions

The green revolution was able to bring self-sufficiency in food production for India. However, one of its shortcomings is that it still remains confined to a very small area of the country. The marginal areas have not directly benefited from its technology, being still dependent on rains and the vagaries of nature for food production. This has really hit hard the subsistence level farmers, as illustrated by the dismal scenario in the floodplains of Barak Valley. At the same time, the continually degrading natural resource base is unable to support the burgeoning population. It is ironical that in a region receiving 2500-3000 mm annual rainfall, a major constraint in agriculture is the water scarcity in the dry season. Declining water retention during monsoon and shortage of irrigation water in the dry months are, therefore, major factors responsible for impoverishing the *Kaivarta* community and bringing about a socio-cultural crisis where a large section of an once thriving and self-sufficient community has been reduced to a state where they have to migrate to the cities to live in slums and do odd jobs unsuited to their temperament to eke out a living. While it would be beyond the scope of this paper and perhaps a bit too simplistic to offer solutions to this problem, a few suggestions could be made to halt the ecological and economic degradation of the floodplains of Barak Valley. Firstly, an integrated and sustainable water management is crucial for improving the situation. Participatory rural appraisals made in the study area indicate that if road-cum-embankments that would remain above the flood level could be cleverly designed and laid across the landscape, these could serve to augment the retention of water in the floodplain, thereby enhancing fishery prospects and providing water for agriculture,

besides improving communication. These road-cum-embankments could be provided with sluices at appropriate places to regulate water entry and exit, based on the local needs. Enhanced retention of water is also expected to attract migratory birds that earlier used to flock to these areas in large numbers in the winter, but whose numbers have severely declined in the recent years. These include several threatened species such as Baer's Pochard (*Aythya baeri*), Gadwall (*Anas strepera*), Bar Headed Goose (*Anser indicus*), Geylag Goose (*Anser anser*), Brahminy Duck (*Tadorna ferruginea*) and others. Besides bringing about biodiversity conservation, this could also open up the prospects for eco-tourism and provide gainful employment to the local people in various ways. Secondly, land regulations should be strictly enforced to prevent loss of good agricultural land to brick kilns. Another important strategy would be to change the cropping patterns in the floodplains. This could include introduction of deepwater paddy varieties having higher yields during flood period, rapid-growing yet high yielding summer rice varieties that could be harvested before pre-monsoon inundation of the floodplain, and cultivation of pulses and vegetables in the flood-free period (Borthakur, 1981). All these measures would have to be integrated with forest restoration and soil conservation in the hills as well as in the lowlands along with proper management practices in micro-watershed development and land use planning to prevent silt deposition in water courses (Gupta, 2003). Special efforts should be made to restore the *Barringtonia acutangula* forests in the floodplains in order to enhance water and nutrient retention as well as to attract the potamodromous fishes in larger numbers to the floodplains because of increased allochthonous food resources (Dudgeon, 1992). In the domestic front, microbiologically safe water could be provided through rainwater harvesting in the rainy season and solar water purification in the dry, sunny days. The latter could include boiling of water using solar heaters or by introducing inexpensive yet effective methods like SODIS that involves exposing water kept in transparent PET bottles to sunlight to capitalize on the germicidal properties of the UV-A radiation in sunlight coupled with increased temperature inside the bottles (Gupta, 2004). An impending ecological, economic and socio-cultural crisis in the Barak Valley floodplains can only be averted by well-concerted efforts on several fronts with adoption of measures that should ideally spring from the bottom rather than being imposed from the top.

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Table 1. Statistics of natural wetlands in Cachar, Hailakandi, and Karimganj districts, Barak Valley, Assam, India

District	Area in ha				
	Lake/Pond	Seasonally Inundated Floodplain	Ox-Bow Lake	Swamp/ Marsh	Total
Cachar	1151.5	4869.5	592.5	564.5	7178
Hailakandi	322.5	480	37.5	0	840
Karimganj	95	4667	87.5	870	5719.5
Total	1569	10016.5	717.5	1434.5	13737.5

Source: Garg *et al* (1998)

Table 2. Soil variables (mean $\pm$ SD) in floodplain sites with longer inundation (A) and those with shorter inundation (B). Statistical comparisons of A and B by one-way ANOVA

Soil Variables	A	B	Rankings based on One-Way ANOVA
pH	5.6 $\pm$ 0.2	5.7 $\pm$ 0.2	NS
Conductivity (uS cm ⁻¹)	80.5 $\pm$ 10.8	67.5 $\pm$ 16.8	NS
Water Holding Capacity (%)	56.3 $\pm$ 3.8	31.6 $\pm$ 2.1	A>B (P $\leq$ 0.0001)
Organic Carbon (%)	0.88 $\pm$ 0.4	0.48 $\pm$ 0.1	A>B (P $\leq$ 0.01)
Potassium (mg l ⁻¹)	4.9 $\pm$ 2.3	4.8 $\pm$ 1.4	NS
Clay+Silt %	45.8 $\pm$ 0.9	16.7 $\pm$ 7.9	A>B (P $\leq$ 0.0001)

NS: Not significant

Table 3. Annual per capita income of fisher-cultivators in Chatla and Shonbeel, Barak Valley, India

Income Slabs	% Occurrence	
	Chatla	Shonbeel
INR 1201-3600 (US \$ 27-80)	53.3	3.3
INR 3601-6000 (US \$ 81-133)	30.0	38.7
INR 6001-8400 (US \$ 134-187)	13.3	45.7
>INR 8240 (US \$ 187)	3.3	12.3

INR: Indian Rupee

Table 4. Occupational pattern in the Chatla floodplain

Occupation	% Occurrence
Only fish capture	9.9
Fishing and Wage Labour	32.4
Fishing and Trade	8.5
Fishing and Farming	45.1
Fishing and Rickshaw Pulling	4.2

Table 5. Land holding size distribution in Chatla and Shonbeel compared with Barak Valley average

Land Holding size category and range	% Occurrence		
	Chatla	Shonbeel	Barak Valley
Marginal (0.2-1.0 ha)	53.3	43.3	34.4
Small (1.0-2.0)	33.3	50.0	35.7
Low-Medium (2.0-4.0)	13.3	6.7	23.6
Medium (4.0-10.0)	0	0	5.6
Large (10.0-20.0)	0	0	0.6

Fig. 1. Map Showing the Location of Barak Valley.

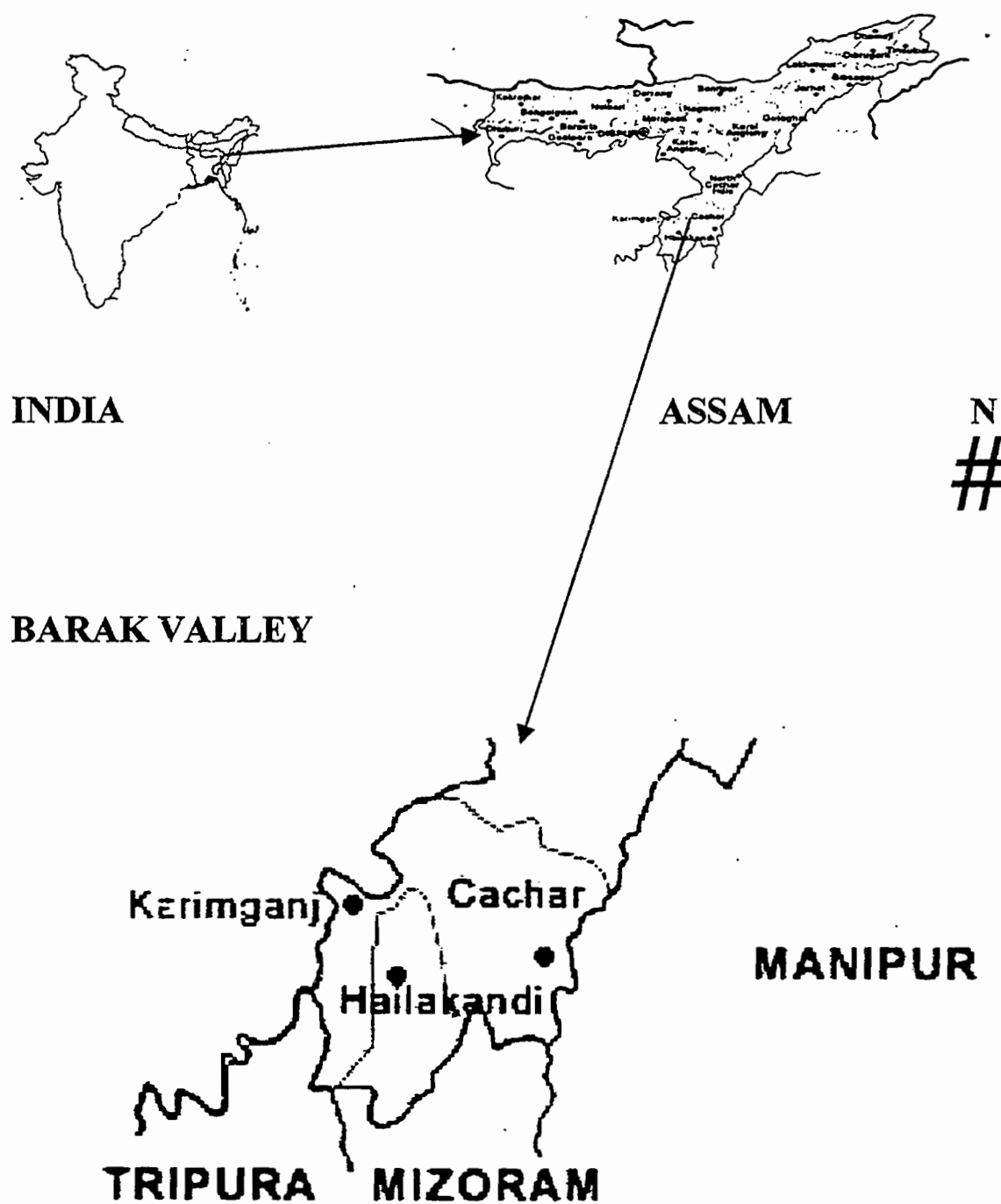
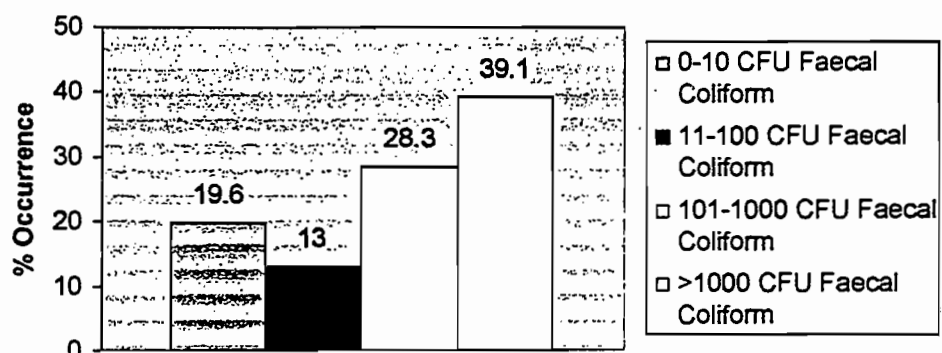


**Fig. 2. % Occurrence of Drinking Water Sources
With Different Levels of Faecal Coliforms in Chatla
Floodplain, Barak Valley, India**



Pauvreté et accès à l'eau dans la vallée du Sénégal

Communication au colloque international
Pauvreté hydraulique et crises sociales
Agadir, 12-15 décembre 2005

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Résumé

L'histoire hydraulique de la vallée du fleuve Sénégal est ancienne et remonte à la culture de décrue. Mais elle connaît une profonde mutation depuis l'introduction de l'irrigation. Peut-on parler de « pauvreté hydraulique », alors que deux barrages régulent à présent le régime du fleuve Sénégal et assurent une permanence de l'abondance en eau ? La réponse à cette question est proposée sous l'angle de l'articulation entre la pauvreté, l'accès au financement, l'accès au foncier, la participation à la gestion de la ressource.

Mots clefs : pauvreté, accès à l'eau, exclusion, agriculture irriguée, culture de décrue, revenus, crédit, endettement, participation, organisations paysannes, vallée fleuve Sénégal.

Abstract

Water poverty in the Senegal Valley

Considering the flood recession agriculture, the hydraulic history of the valley of the Senegal River is ancient, but knows a deep mutation since the introduction of the irrigation. Can one speak of water poverty, whereas two dams now control the water flow of the Senegal River and ensure a permanent abundance in water ? The answer to this questioning is proposed through the link between poverty, access to funding, access to land, and involvement in resource management.

Keywords : water poverty, exclusion, irrigated cropping, flood recession agriculture, income, credit, indebtedness, water management, farmers' organizations, Senegal Valley.

Une histoire hydraulique ancienne

Aux portes du désert, la vallée du fleuve Sénégal connaît une histoire hydraulique ancienne. La pluviosité élevée de son haut bassin du Fouta-Djallon alimente une crue, qui inonde les vastes étendues de son lit majeur (*waalo*) en aval de Bakel (figure 1). Durant la longue saison sèche, le débit régresse sévèrement, jusqu'à un tarissement de l'écoulement certaines années.

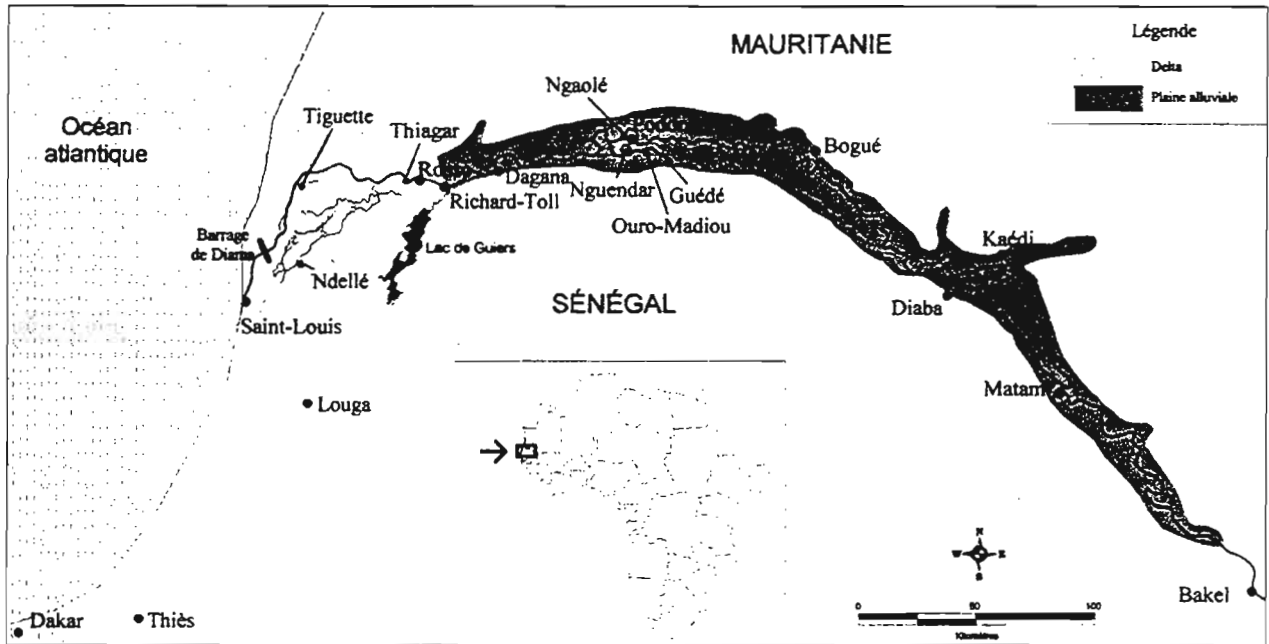


Figure 1. La vallée du fleuve Sénégal

Pendant des siècles, la culture de décrue est la seule valorisation agricole de cette eau à l'abondance saisonnière. Dès le retrait de l'eau, le sorgho se sème selon un rituel précis. Un homme découpe la croûte superficielle du sol avec une houe à long manche. Dans la petite excavation ainsi créée, sa femme perce au grand plantoir un poquet, dans lequel sa fille dépose quelques graines. La plante se développe sans pluie, puisant l'eau emmagasinée dans le sol lors de sa submersion de plusieurs semaines.

Chaque année, une migration pendulaire locale se cale sur les saisons, avec dualité de résidence et d'aire de culture. En saison des pluies (hivernage), le mil se produit dans le *jeeri*, plateau sableux qui surplombe la plaine alluviale. En saison sèche, les habitants de nombreux villages se déplacent pour plusieurs mois à proximité de leurs cuvettes de décrue, pour y semer le sorgho. Sur les berges (*falo*) se pratique un jardinage : maïs, niébé, patate douce, tomate. Avant les premières précipitations suivantes, un mouvement inverse permet de préparer les futures parcelles de saison des pluies.

Plusieurs textes attestent l'ancienneté de la culture de décrue dans la vallée du Sénégal. Dès le XI^e siècle, l'érudit arabo-andalou Abou Oubayd Al Bakri signale que les habitants sèment deux fois par an, la première pendant la saison de la crue du Sénégal, la seconde plus tard dans la terre qui a gardé son humidité. En 1674, Louis Moreau de Chambonneau, représentant de la Compagnie de Guinée sous Louis XIV, évoque également un double semis annuel, celui du mil en juin et celui du sorgho après que les eaux soient tout à fait retirées. En février 1818,

l'explorateur Gaspard Théodore Mollien mentionne des plantations de sorgho à la végétation vigoureuse, sur les terres alluviales au nord de Diaba (figure 1). En novembre 1824, l'explorateur René Caillié s'étonne de la manière « vicieuse » mais qui donne peu de peine, de semer le sorgho, quand les eaux du Fleuve commencent à baisser : trous faits avec un grand piquet, trois ou quatre grains mis dans chaque trou. En 1918, Yves Henry, directeur de l'Agriculture aux Colonies, décrit la culture du sorgho dans la Vallée, sur les terres fortement mouillées par la crue, de Kaédi à l'embouchure (figure 1). L'itinéraire technique que détaille l'agronome Jacques Maynard en 1957 correspond exactement aux pratiques actuelles.

Pendant un millénaire, le sorgho de décrue occupe la première place dans l'alimentation et dans l'économie de la Vallée. Il permet la mise en valeur de sols profonds, inaccessibles en hivernage, fertilisés chaque année par la crue. La culture de décrue présente l'intérêt majeur d'une utilisation différée de la ressource, sans aménagements coûteux, sans risque financier. Toutefois, le sorgho de décrue suscite une incertitude, par sa dépendance vis-à-vis de la crue, imprévisible et d'ampleur très variable d'une année à l'autre. Ses faibles rendements supposent de vastes superficies.

Une abondance en eau

C'est pourquoi une volonté politique, de meilleure valorisation et de contrôle étatique de la ressource, conduit à la mise sur pied de programmes pour améliorer les conditions de submersion. Si les relevés et les études débutent en 1905, cette ambition ne se concrétise qu'en 1939, par un périmètre de 250 hectares près du village de Guédé (figure 1). Le principe repose sur un aménagement sommaire, sans retenue d'eau. Des digues, des canaux d'alimentation et de vidange, un ensemble de vannes, procurent une maîtrise partielle du niveau de l'eau. L'expérience ne reçoit pas l'accueil escompté et l'installation forcée de colons fait naître aux abords du périmètre un nouveau village, appelé Guédé-Chantier.

Dix ans plus tard, débute l'aménagement du casier rizicole de Richard-Toll, qui atteint 4 000 hectares, auxquels s'adjoignent 400 ha attribués aux populations spoliées de leur terre. Le casier de Richard-Toll, mené en régie, s'avère un gouffre financier, qui justifie sa rétrocession à la Compagnie sucrière sénégalaise (CSS) en 1971.

Les aménagements d'envergure, qui impliquent directement les populations locales, ne débutent qu'après l'Indépendance. Ils se limitent à la zone pionnière du Delta (figure 1), dont les vastes étendues peu habitées sont pâturées en saison sèche par des troupeaux itinérants. Un chapelet de villages jalonnent les deux rives du Sénégal. Ils se composent de pêcheurs et de piroguiers pour le transport fluvial.

Le procédé de la submersion contrôlée s'applique à une première vague de 500 hectares de cuvettes inondables. En 1965, la création de la Société d'aménagement et d'exploitation du Delta (Saed) marque le véritable décollage de l'agriculture irriguée. Cette société d'Etat organise l'implantation de migrants, à dominante wolof, mais aussi peul et toucouleur, dans des localités parfois créées de toutes pièces. Ce programme ambitieux s'accompagne d'un encadrement technique et économique étroit.

Les années 1972 à 1974 amorcent un tournant dans l'histoire hydraulique de la Vallée, par la maîtrise complète de l'eau. Les cuvettes à submersion contrôlée font place progressivement à des aménagements plus sophistiqués, mais beaucoup plus coûteux. Des stations de pompage, tout un réseau hiérarchisé de canaux, des parcelles planées délimitées par des diguettes créent des conditions de production et un paysage agraire nouveaux.

L'extension de l'agriculture irriguée vers l'amont, à l'ensemble de la plaine alluviale, marque profondément l'économie de la moyenne vallée du Sénégal. La période de grave sécheresse, qui atteint son paroxysme en 1973, favorise ce phénomène. Les deux piliers de l'agriculture

s'effondrent. La pluviosité trop faible ne permet plus une croissance normale du mil de saison des pluies, tandis que la disparition des crues interdit le sorgho de décrue. Le riz irrigué les supplante.

Les effets de ce programme ne se font pas attendre, avec une progression constante des surfaces cultivées de 1977 à 1993 (figure 2). Toutefois, le Delta conserve sa suprématie et l'importance de l'agriculture irriguée décline en allant vers l'amont. Si le département de Podor occupe une place non négligeable, ceux de Matam et surtout de Bakel ne représentent qu'une faible proportion des superficies irriguées.

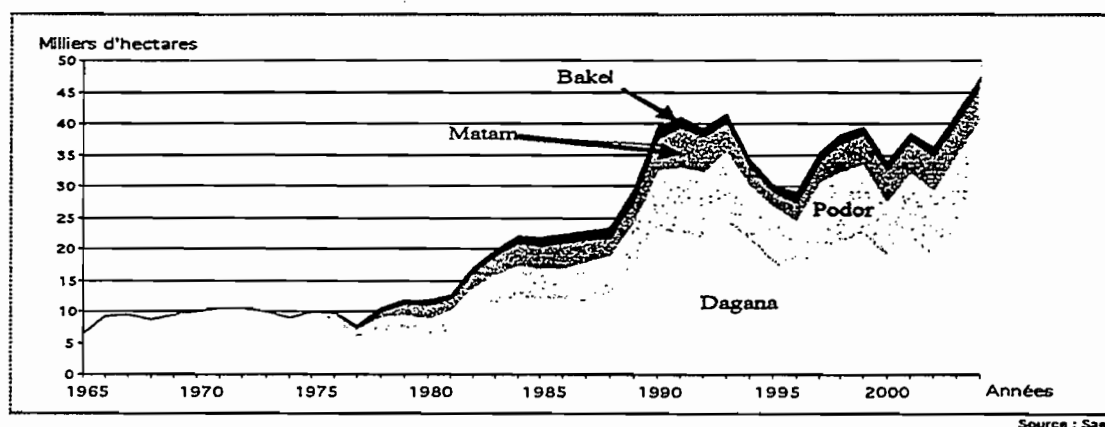


Figure 2. Evolution des surfaces irriguées dans la vallée du Sénégal selon le département

La construction de deux barrages forme le point d'orgue de l'aménagement de la vallée du Sénégal. Près de l'embouchure, celui de Diama (figure 1) en 1986 empêche la remontée de l'eau de mer. En amont, celui de Manantali, construit en 1987 au Mali, stocke une partie de la crue. Des lâchers en saison sèche permettent de maintenir un niveau minima dans le Fleuve et autorisent trois cycles de culture annuels.

Le fleuve Sénégal se caractérise maintenant par une abondance et une permanence de l'eau. Certes, cette disponibilité de la ressource découle de la construction des deux barrages. Mais elle s'explique également par des besoins en eau beaucoup moins élevés que les prévisions. Le calendrier trop optimiste d'extension des surfaces aménagées n'a pas été respecté. Le taux d'utilisation des périmètres irrigués reste faible, toujours inférieur à 1. L'intensité culturale chute même à 0,5 certaines années. La double culture du riz rencontre des difficultés de calage du calendrier cultural et essuie un échec cuisant. Le riz de contre-saison chaude, le plus exigeant pour les besoins en eau, devient presque anecdotique. La campagne de contre-saison froide connaît un franc succès pour le maraîchage dans le département de Podor, mais se pratique sur des périmètres distincts de ceux consacrés à la riziculture.

Une exclusion par la pauvreté

Une des caractéristiques de l'agriculture irriguée dans la vallée du Sénégal est son caractère exogène. La mutation, que représente l'adoption de l'irrigation et de la culture du riz, ne se réalise qu'à travers une forte incitation, un encadrement serré et une aide financière. Les aménagements onéreux mis en place ne sont pas supportés par les populations bénéficiaires, mais pris en charge par l'Etat, le plus souvent sur financement extérieur. Des aménagements sur financement privé se créent toutefois. Ils expliquent la forte progression des surfaces irriguées entre 1987 et 1991 (figure 2), malgré la fin de la période dorée de l'agriculture irriguée dans la Vallée.

En effet, les plans d'ajustement structurel, imposés par le Fonds monétaire international et la Banque mondiale, sonnent le glas du « tout Etat ». Mise en œuvre en 1984, cette politique drastique de désengagement de l'Etat ne se fait sentir dans la Vallée qu'à partir de 1987. Cette année-là, la Saed allège son dispositif et se retire de la gestion directe des aménagements hydro-agricoles, du crédit, de la fourniture des intrants et des prestations mécanisées. La deuxième étape intervient en 1990, la Saed n'assurant plus l'entretien des aménagements, ni la production et la commercialisation des semences.

Enfin, la libéralisation de la filière riz entre en vigueur. Courant 1994, la Saed vend ses rizeries, cesse l'achat du paddy et la distribution du riz blanc. En 1995, les marges fixes sont supprimées et la Caisse de péréquation et de stabilisation des prix disparaît. Puis, l'importation de brisures de riz s'ouvre au secteur privé. Quelques opérateurs de la place de Dakar s'engouffrent dans la brèche et génèrent des surplus importants par des achats excessifs de brisures sur le marché international.

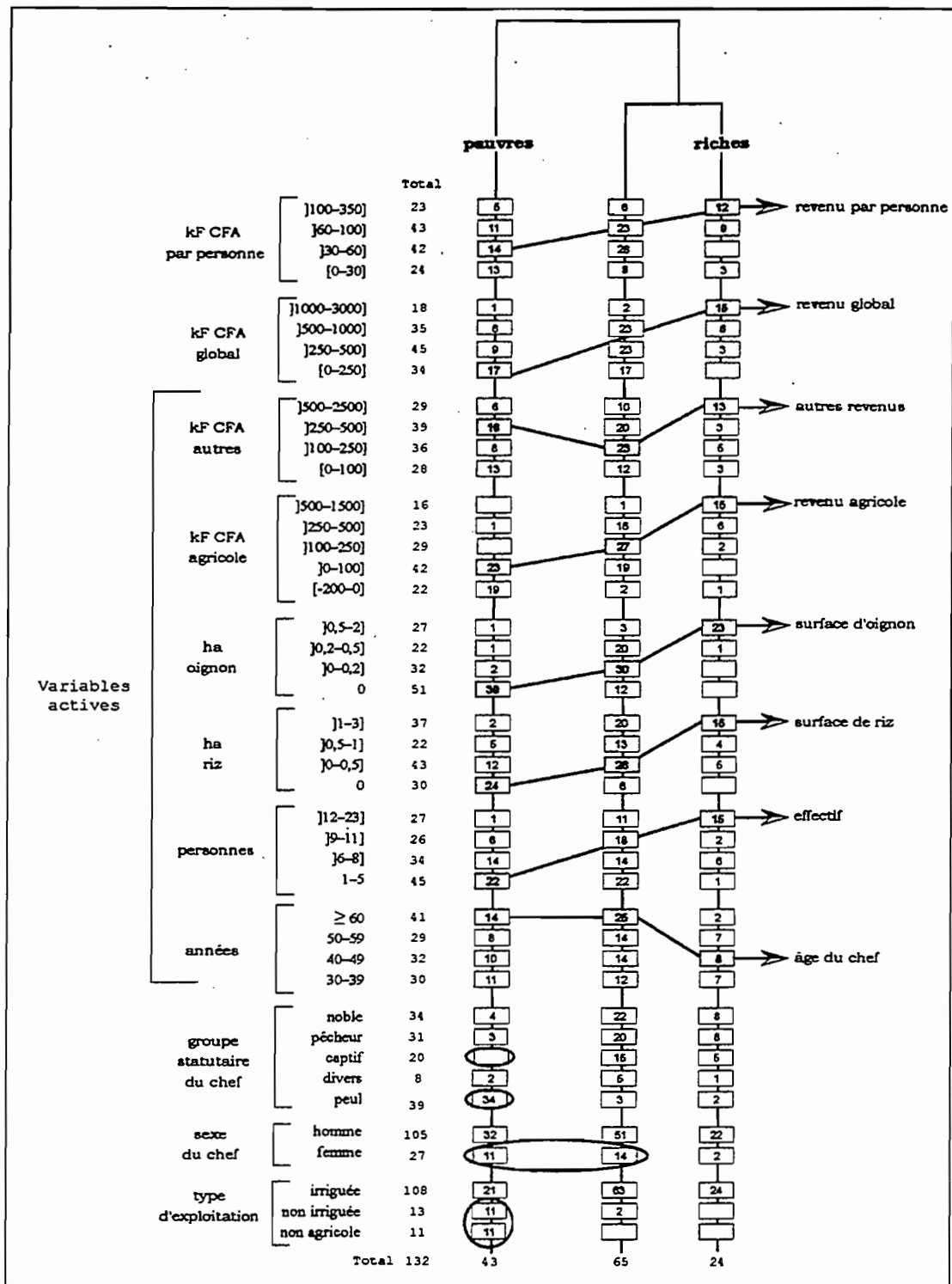
Il s'en suit une désorganisation complète du marché du riz au Sénégal, que ce soit à la production ou à la consommation. Les prix de détail fluctuent. Le cours à la production baisse. Le mécontentement des producteurs se traduit par un bras de fer avec les nouveaux riziers privés, de juillet 1996 à début 1997, par un refus de vendre au prix proposé. Pendant ce temps, des montagnes de sacs de paddy se forment dans les villages de la Vallée.

Cette libéralisation programmée de la filière riz se met en place au plus mauvais moment. La dévaluation du franc CFA du 12 janvier 1994, loin de stimuler la production locale, anéantit la riziculture. Pour des motifs sociaux et politiques, le gouvernement sénégalais limite l'augmentation du prix de la brisure de riz, base du fameux *ceebujen*, le riz au poisson, incontournable plat dakarois à la mi-journée. Non seulement, les droits de douane antérieurs ne viennent plus financer la filière locale du riz, mais le gouvernement subventionne les importations de brisures.

Tandis que le prix du paddy au producteur ne progresse que modestement en francs courants, ceux des intrants et du matériel agricole montent en flèche. Ce renchérissement des coûts de production, non compensé par celui des recettes, grève sévèrement les résultats financiers des campagnes suivantes. Une profonde désorganisation de l'économie de la Vallée s'ensuit. Les surfaces cultivées régressent trois années successives, de 1994 à 1996 (figure 2). Les revenus des agriculteurs chutent, accentuant l'état de pauvreté de la majeure partie des agriculteurs de la Vallée. Ainsi tout un pan de la population se voit marginalisé, exclu de l'agriculture irriguée par son état de pauvreté.

Cette crise affecte en premier lieu les petites exploitations, comme le met en évidence une typologie de 132 exploitations significatives du département de Podor en moyenne Vallée, dont nous avons suivi le budget pendant toute l'année 1998. Cette typologie se fonde sur une classification ascendante hiérarchique, par agrégation des individus selon le critère de la perte d'inertie minimale (critère de Ward). Les variables actives sont les revenus agricole et extra-agricole, les surfaces d'oignon et de riz, l'effectif de l'exploitation, l'âge et le groupe statutaire de son chef. Quelques variables supplémentaires, qui ne contribuent pas à la construction des classes, caractérisent chaque classe : revenu global par exploitation et par personne, sexe du chef d'exploitation, pratique de l'agriculture et de l'irrigation.

La figure 3 formalise une partition simplifiée à trois groupes. Cette représentation non conventionnelle appelle quelques explications. En haut de la figure, l'arbre symbolise la hiérarchie des regroupements de classes. Les modalités s'ordonnent de manière descendante par variable. Pour une classe, la fréquence de chaque modalité se lit à l'intérieur d'un rectangle et correspond au nombre d'exploitations concernées. Chaque colonne de petits rectangles identifie une classe d'exploitations. Un fond grisé signale la fréquence la plus élevée de chaque variable. Des flèches visualisent la progression entre classes. Des ellipses attirent le regard sur un phénomène particulier, comme la place des femmes ou l'absence d'irrigation ou d'activité agricole.



Source : X. LE ROY

Figure 3. Classification d'exploitations dans le département de Podor : effectifs par modalité

Cette typologie multidimensionnelle révèle l'état de pauvreté d'une proportion élevée des exploitations enquêtées. Les petites exploitations à revenu agricole nul ou négatif se détachent franchement (classe de gauche). Les autres activités, essentiellement l'élevage chez les Peuls, atténuent parfois cette pauvreté, mais le revenu global demeure faible. Plus de la moitié de ces unités pauvres ne pratique pas l'agriculture irriguée et la quasi-totalité des exploitations sans irrigation se situe dans cette classe à très faible revenu global.

À l'opposé, le groupe des exploitations à gros revenus cultive des surfaces importantes. La grosse majorité des producteurs d'oignon se situe dans cette classe. Cette culture, sur

autofinancement et qui présente un risque financier élevé, peut être très rémunératrice. Certes, un effet taille intervient dans la classification, mais la composition de l'exploitation se borne à amplifier la différenciation économique, sans toutefois la justifier. Le revenu par personne prouve que l'effectif de l'exploitation ne structure pas la population : les petites exploitations pauvres ont un revenu global par personne très faible, tandis que les grosses exploitations riches bénéficient d'un revenu moyen par personne élevé.

Relevons que le statut social ne hiérarchise pas les exploitations. Les Peuls se concentrent dans la classe à faible revenu. Mais les autres groupes statutaires se distribuent dans les différentes classes. Dans le groupe des riches se retrouvent, côte à côte, la classe sociale dominante des nobles *torodo*, les pêcheurs *cubalo* et les descendants de captifs *maccudo*. En focalisant sur les deux catégories extrêmes de la hiérarchie sociale toucouleur, il ressort que chez les descendants d'esclaves, la proportion de riches est la même que chez les « nobles ». Il n'y a aucun « captif » dans les classes des pauvres et globalement les descendants d'esclaves dépassent aujourd'hui leurs anciens maîtres par le niveau de revenu. Une profonde révolution traverse bien la société toucouleur : la hiérarchie sociale ne fonde plus la stratification économique.

En revanche, se manifeste une double discrimination, selon le genre et l'âge. La proportion de femmes dirigeant une exploitation augmente avec le niveau de pauvreté. Rares sont les chefs d'exploitations âgés dans le groupe à gros revenus.

Une exclusion par l'endettement

L'intensification, qui accompagne l'agriculture irriguée, implique un coût de production élevé, par l'achat de semences sélectionnées, d'engrais, d'herbicide, de produits phytosanitaires, et par le paiement des façons culturales motorisées et de la redevance hydraulique. La faible pente du Fleuve (1 à 2 cm par km) et la présence d'un bourrelet de berge imposent le pompage. L'eau à la parcelle a un prix, du fait des dépenses de gasoil ou d'électricité, du renouvellement de la pompe et de son entretien, de la maintenance des canaux et des vannes.

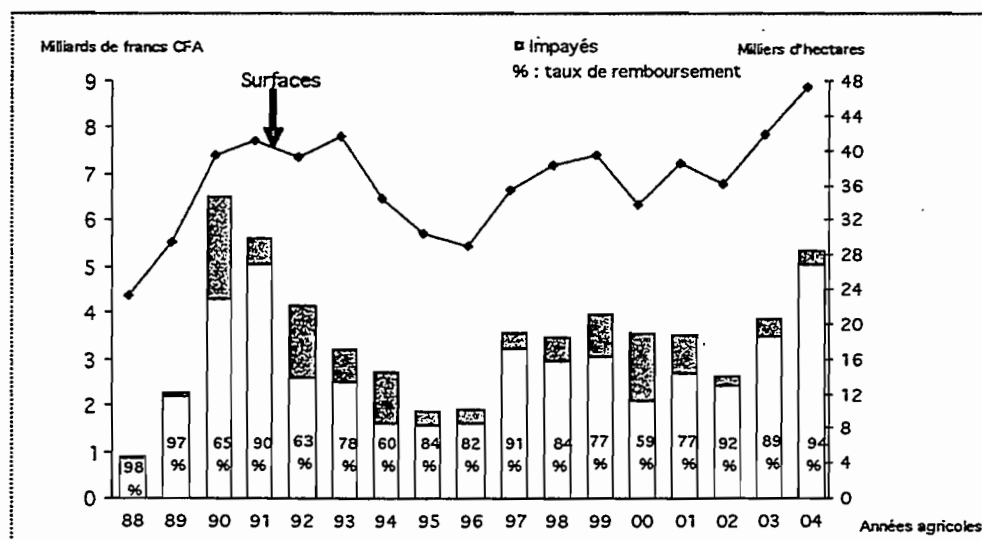


Figure 4. Emprunts au Crédit agricole

La pauvreté qui touche nombre d'exploitations ne leur permet pas de s'autofinancer. Le recours au crédit s'avère indispensable. Depuis le désengagement de la Saed pour la fourniture des intrants et des prestations, la Caisse nationale de crédit agricole du Sénégal (CNCAS) assure les prêts de campagne. La figure 4 montre l'impact de cet organisme dans le fonctionnement de l'agriculture irriguée. L'histogramme du bas visualise les exigibles (capital + frais financiers) par année agricole. Les montants suivent assez fidèlement les surfaces irriguées, représentées

dans la courbe au-dessus. Afin de comparer les variations, l'année agricole correspond aux normes de la Saed. Elle débute à l'hivernage, se poursuit par la contre-saison sèche à cheval sur deux années civiles, pour s'achever en contre-saison chaude de l'année suivante. Ainsi « 04 » correspond à l'année 2004/2005 de la Saed.

Le sommet foncé de chaque bâton de l'histogramme représente les impayés. Sur les dix-sept années agricoles, le taux de remboursement n'atteint que 80 %. Cet endettement structurel altère le fonctionnement du système de crédit. Un octroi plus sévère des prêts en 1992/1993 fait chuter le capital emprunté et les surfaces irriguées, essentiellement le riz. La tentative de relance en 1993/1994 n'ayant pas les résultats escomptés, les trois années suivantes font l'objet d'un tour de vis, qui coïncide avec la péjoration du contexte national rizicole déjà évoqué. Nombre de périmètres endettés ne sont plus mis en culture. Cette difficulté d'accès au crédit, du fait de l'endettement, grippe le processus productif. Elle aggrave le niveau de pauvreté d'une frange importante de la population de la vallée du Sénégal.

En juillet 1997, le gouvernement sénégalais réagit, instaurant un deuxième plan de relance, avec établissement de moratoires pour les périmètres pas trop endettés. L'effet de cette mesure se montre immédiat, avec un vif redressement de la courbe des surfaces. Un troisième plan de relance voit le jour en 2004, une subvention de 50 % pour certains intrants se combinant avec l'application de nouveaux moratoires. De nombreux périmètres privés endettés bénéficient de cette mesure. L'effet est tout aussi spectaculaire (figure 4). Lors des trois mesures de relance, les périmètres les plus endettés sont exclus de l'accès au crédit, donc généralement de l'accès à l'irrigation.

Cette forte relation entre niveau du crédit et importance des surfaces irriguées se confirme par la droite de régression de la figure 5. Les années sont mentionnées pour chaque point. Le coefficient de corrélation est élevé : 0,83.

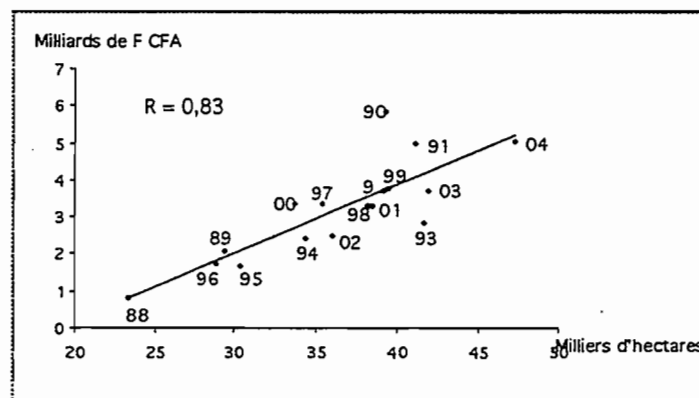


Figure 5. Relation entre superficie irriguée et crédit

Une exclusion de la terre

Dans la plupart des cas, les bailleurs de fonds ou la société d'aménagement imposent une distribution équitable des parcelles irriguées, entre les différents résidents des villages concernés, sans tenir compte des structures sociales. Cette métamorphose est particulièrement accentuée en moyenne Vallée. En effet, la culture du sorgho de décrue y reflète la stricte hiérarchie sociale de la société toucouleur, qui se stratifie, depuis la catégorie dominante et majoritaire des *torodo*, jusqu'aux descendants de captifs, en passant par les hommes libres de statut inférieur, généralement regroupés en castes ancrées sur des corporations (pêche, travail du métal, du bois, du cuir, tissage, griots). L'accès aux cuvettes de décantation traduit l'inégalité sociale de la population toucouleur, avec une forte disparité dans les droits fonciers. À l'opposé des bénéficiaires de grandes étendues dans le lit majeur, les catégories du bas de l'échelle sociale ne peuvent y accéder qu'à travers le *rempeccen*, une forme de métayage.

Le principe égalitaire d'attribution des parcelles irriguées, qui gomme la réalité sociale préexistante, s'applique en tenant compte de la force de travail de chaque exploitation. Dans certains cas, chaque chef d'exploitation reçoit une superficie proportionnelle au nombre d'adultes (15 ans et plus) résidents des deux sexes. Dans d'autres cas, comme nous le rencontrons dans un village du Delta, chaque personne âgée d'au moins 15 ans reçoit 60 ares.

Toutefois ce bel égalitarisme se trouve souvent dévoyé, par la conjonction de plusieurs phénomènes. Le nombre de personnes étant généralement établi par un recensement déclaratif rapide, des erreurs entachent le calcul de la superficie, par prise en compte de jeunes enfants ou de migrants absents. Ces tricheries bénéficient généralement à des notables, que personne n'ose remettre en cause. Dans le cas du village mentionné dans le Delta, l'attribution individuelle est purement formelle, le chef d'exploitation rassemblant pour son compte toutes les parcelles de ses dépendants. Si un homme peut réclamer sa parcelle s'il se sépare de son père après son mariage, si une veuve peut conserver sa parcelle si elle se remarie dans une autre exploitation, en revanche une femme qui se marie ou qui divorce renonce définitivement à sa parcelle.

Par ailleurs, la répartition des parcelles irriguées entre exploitations reste figée, ne tenant pas compte des variations démographiques ultérieures, comme les décès, l'accès à l'âge adulte de certains membres, les mariages, le départ ou le retour de migrants.

Une différenciation spatiale entre en jeu dans l'accès à la terre aménagée. Elle provient d'une position plus ou moins propice des localités par rapport aux ramifications du Fleuve, par la chance de bénéficier d'un nouvel aménagement ou d'une réhabilitation, par la capacité de lobbying pour capter l'intérêt d'un bailleur de fonds, d'une ONG, ou d'une association de migrants internationaux, voire d'un riche bienfaiteur.

Enfin, des attributions privées de vastes zones permettent à certains gros agriculteurs de financer sur fonds propres des aménagements sommaires, dont la superficie est amplement supérieure à celle des parcelles individuelles sur les périmètres collectifs. La combinaison de plusieurs de ces facteurs entraîne une disparité dans l'accès à la terre aménagée.

Interviennent aussi les différents transferts d'usage, lorsqu'une parcelle est mise en valeur par quelqu'un qui n'en est pas titulaire. Certes, le faire-valoir direct prédomine chez les exploitations familiales. Il englobe les trois quarts de leurs superficies cultivées dans nos sept villages d'étude, que ce soit dans le Delta (villages de Tiguette, Ndellé et Thiagar) ou en moyenne Vallée dans le département de Podor (Ngaolé, Ouro-madiou, Nguendar et Guédé) (figure 1). Le dernier quart regroupe quatre catégories de cession d'usage foncier (figure 6). Deux modes d'exploitation de la terre se retrouvent dans des proportions comparables dans les deux départements. Le « prêt » est la mise à disposition sans contrepartie d'une parcelle à un tiers, qui appartient à une exploitation distincte de celle du propriétaire. La « location » implique un versement monétaire au propriétaire par campagne. Le département de Podor se différencie par le « métayage » (*rempeccem*), avec partage de la récolte par moitiés entre propriétaire et exploitant.

Une innovation dans l'accès à la terre singularise le Delta et découle du grave endettement de certaines exploitations. Cette quatrième pratique du faire-valoir indirect se décrit ainsi : un individu fait crédit à un agriculteur endetté et cultive sa parcelle jusqu'à ce que ce dernier le rembourse. Un contrat lie donc un créancier à un débiteur, dont la parcelle garantit le paiement de sa dette. La terre étant exploitée par le créancier, cette forme de garantie diverge de l'hypothèque, pour laquelle le bien gagé demeure en possession du débiteur. Quoique ne relevant pas spécifiquement du registre foncier, le « nantissement » recouvre cette réalité. L'usage de la terre s'assimile à la possession fictive d'un bien en gage, qui caractérise le nantissement.

Certains individus, profitant du surendettement chronique des agriculteurs, se spécialisent dans le nantissement. C'est le cas de neuf entreprises agricoles, qui se détachent nettement des exploitations familiales. Ne représentant que 2 % des unités de production, ces neuf entreprises accaparent à elles seules 46 % des superficies cultivées dans nos trois villages. Leur surface s'échelonne de 27 à 230 hectares. Trois gros entrepreneurs du même village sortent du lot, avec plus de 190 ha. Ils sont prestataires de service (labour et récolte motorisés) et/ou fournisseurs d'intrants. L'un d'eux possède une rizerie.

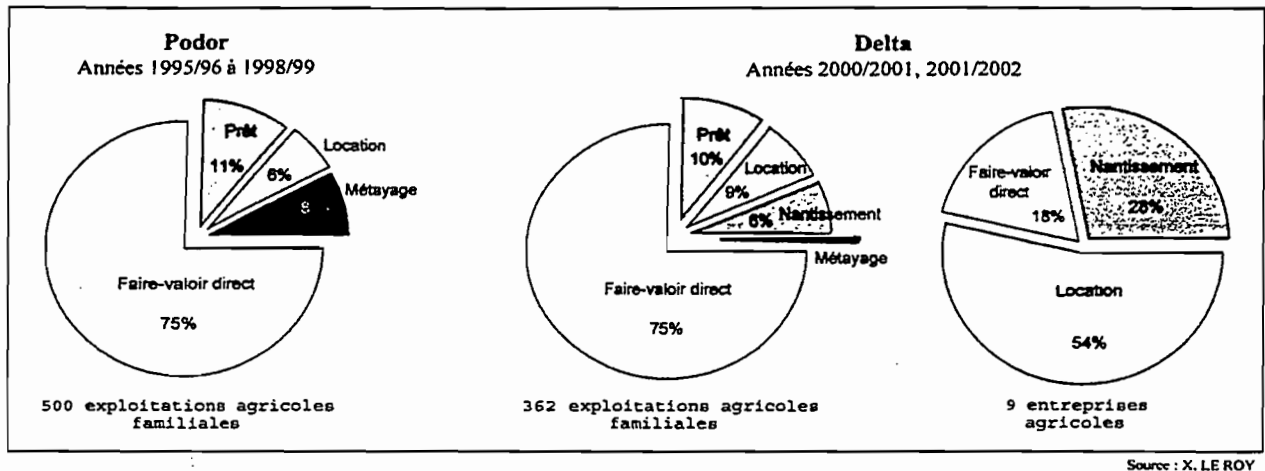


Figure 6. Formes de tenure pour les parcelles irriguées

Le nantissement représente plus du quart des superficies cultivées par ces neuf entrepreneurs (figure 6). En fait, il réunit deux contextes spécifiques. La situation la plus simple équivaut à se substituer à un individu défaillant, en payant ses arriérés vis-à-vis de son groupement de producteurs. Si c'est la seule sorte de nantissement rencontrée chez les exploitations familiales, cette substitution au propriétaire endetté ne totalise que 2 % de la surface des neuf entrepreneurs. La forme de nantissement qui a leur préférence (26 % de leur superficie) lie cette fois-ci un exploitant-créancier non pas à un simple individu, mais à une organisation paysanne, non éligible auprès du Crédit agricole du fait de son endettement. Elle consiste à exploiter le tiers de la surface du périmètre de cette organisation, en contrepartie de la fourniture à crédit des prestations et des intrants nécessaires à cette organisation paysanne pour la conduite d'une campagne sur les deux tiers restants, que se partagent ses membres. La garantie pour le créancier est l'usage de la terre, qu'il conserve l'année suivante s'il n'est pas remboursé.

Ce contrat de nantissement, entre un entrepreneur et une organisation paysanne, est annuel, renouvelable, ou trisannuel. Généralement verbal, il fait parfois l'objet d'un document signé par les deux parties. L'entrepreneur assure le financement essentiellement sur fonds propres. Parfois, il recourt à un emprunt auprès du Crédit agricole, déclarant à son nom l'exploitation de l'intégralité de la superficie du périmètre. Il enregistre dans le détail toutes les prestations et fournitures, affecte un amortissement à la pompe éventuellement mise à disposition. La facturation se fait au prix du marché, sachant qu'il est lui-même fournisseur d'intrants et prestataire de service. Il applique à l'ensemble le même taux d'intérêt que le Crédit agricole (7 % par an). Le remboursement se fait en nature au champ, le riz étant généralement récolté par sa propre moissonneuse-batteuse. Cette innovation fonctionne bien, avec un taux de remboursement bien supérieur à celui du Crédit agricole. Cette réussite s'explique par des relations de voisinage ou de parenté, mais surtout par un système de réelle garantie. La caution solidaire des contrats du crédit institutionnel se montre inopérante lorsque l'ensemble du groupement de producteurs est fortement endetté.

Toutefois, la location constitue plus de la moitié de la surface cultivée par les neuf entrepreneurs agricoles. Ce contrat de fermage, verbal et pour une campagne renouvelable, revêt deux réalités distinctes. Un paiement classique en argent (15 000 à 17 000 F CFA/ha)

représente 15 % de la surface cultivée par ces neuf entrepreneurs agricoles. Une autre innovation dans les rapports fonciers réside dans le paiement en nature suivant : l'entrepreneur exploite les neuf dixièmes de la surface d'un périmètre endetté et fournit les fournitures et les prestations (hors récolte) nécessaires à la culture par le propriétaire du dixième restant. Le propriétaire ne rembourse pas ce qu'il a reçu. Ce type de location correspond à 39 % de la surface cultivée par nos neuf entrepreneurs.

Une participation dérisoire

L'émergence des organisations paysannes est une autre conséquence du désengagement de l'Etat dans la vallée du fleuve Sénégal. Schéma unique de participation des populations locales pour les bailleurs de fonds internationaux, ces organisations de producteurs sont suscitées, voire imposées. En fait, c'est le moyen de se décharger auprès des populations de la gestion d'aménagement hydro-agricoles, dont la rentabilité était déjà plus que douteuse. Ce transfert de responsabilités s'opère de manière précipitée, sans formation suffisante des apprentis gestionnaires. Il s'en suit de profonds problèmes de gestion financière et technique, qui accentuent les mauvaises performances de l'agriculture irriguée depuis la désorganisation de la filière rizicole et la dévaluation du franc CFA.

Prenant la forme juridique souple et peu onéreuse de groupement d'intérêt économique (GIE) ces organisations paysannes jouent un rôle incontournable dans l'agriculture irriguée. Outre qu'elles assurent maintenant le fonctionnement et l'entretien des périmètres irrigués collectifs, les organisations paysannes constituent un passage obligé pour l'accès au crédit institutionnel. L'obtention d'un prêt auprès de la Caisse nationale de crédit agricole du Sénégal ne peut se réaliser qu'à travers un GIE.

Un ensemble de règles formelles régissent le fonctionnement d'un GIE, à travers des assemblées générales et la formation d'un bureau. Cette démocratie participative de façade cache bien souvent la rémanence de rapports sociaux et économiques locaux. Le poids des notables et des anciens joue un rôle généralement prédominant dans la vie au quotidien d'une organisation paysanne. Les femmes et les jeunes se voient trop souvent écartés des décisions. De véritables baronnies se créent, à travers les postes clé du bureau, notamment la fonction déterminante de président de GIE. Même si des élections statutaires permettent leur éviction en cas de crise, le renouvellement des bureaux s'avère bien faible.

Certes, de nouveaux meneurs, dynamiques et compétents, émergent. Mais on les retrouve souvent dans plusieurs organisations paysannes, voire dans les niveaux supérieurs, au plan régional ou national, d'unions ou de fédérations d'organisations paysannes, de structures interprofessionnelles. De véritables professionnels de la représentation agricole, aux connexions parfois politiques, font leur apparition. Pendant ce temps, le simple petit agriculteur, surtout s'il appartient à la frange sociale ou financière la plus basse, se retrouve exclu du fonctionnement de l'organisation dont il est membre. Il la perçoit comme une entité externe, qui se substitue aux rouages antérieurs.

Quant à la gestion de la ressource, l'absence de participation est flagrante. La gestion du Fleuve relève de l'Organisation pour la mise en valeur du Sénégal (OMVS), créée en 1972. Sa mission est d'organiser la coordination entre les trois pays riverains : le Mali, la Mauritanie et le Sénégal. Le fonctionnement de cette institution dépend directement des gouvernements des pays membres, dont la hiérarchie, des différents objectifs fixés à la gestion de l'eau du Fleuve, diverge. La dimension politique de l'OMVS ne peut s'ignorer, devenant même explosive, lors de tensions entre deux Etats membres, comme ce fut le cas entre la Mauritanie et le Sénégal pendant le conflit de 1989 ou lors de la brève tension de début juin 2000.

La construction des barrages de Diama et de Manantali procure une nouvelle dimension et un levier économique encore plus fort à l'OMVS. Visant à réguler le débit et le tirant d'eau, la

gestion de ces barrages échappe totalement aux populations riveraines du fleuve Sénégal. La compétition entre les différentes affectations de la ressource se voit particulièrement vive depuis la mise en service des turbines en 2002, pour la production d'électricité au profit des trois pays membres. La production électrique est compatible avec les besoins en eau actuels de l'agriculture irriguée. Le soutien de crue pour la culture de décrue va dans le sens de la protection de l'environnement, des besoins de l'élevage et de la préservation de la pêche. En revanche, production d'électricité et culture de décrue entrent en concurrence. Le maintien de lâchers au barrage de Manantali, pour assurer une crue artificielle, va à l'encontre de la maximisation de la fourniture d'électricité.

Le sorgho de décrue, qui a presque disparu pendant vingt ans, refait son apparition en 1995. Si la reprise des crues, soutenues par des lâchers au barrage de Manantali, redonne accès aux cuvettes de décrue, le regain du sorgho s'explique également par d'autres motivations. Tout d'abord, il agit comme marqueur foncier, qui permet de réactualiser et de réaffirmer les droits coutumiers d'accès à la terre, mis à mal par la répartition des périmètres irrigués. En deuxième lieu, il délivre du risque économique que l'agriculture irriguée introduit par le recours à l'emprunt. De plus, le sorgho de décrue écarte les problèmes générés par la gestion collective des périmètres irrigués. Enfin, cette céréale appréciée perpétue les anciennes habitudes alimentaires.

Depuis 1995, trois bonnes crues surviennent et sont suivies du même succès des cultures de décrue. En 2004, intervient pour la première fois le choix entre le soutien de crue pour la culture de décrue et la crainte d'hypothéquer la production d'électricité, plus rentable pour les Etats. L'arbitrage se fait au profit de l'électricité et l'absence de crue artificielle interdit la culture de décrue cette année-là. De même en 2005 aucun soutien de crue n'intervient, mais le fonctionnement important des turbines en août et septembre, allié à un débit satisfaisant sur les autres bras du Fleuve, assurent une crue et des superficies en sorgho de décrue d'ampleurs conformes aux objectifs.

Qu'en sera-t-il les prochaines années ? Bien qu'une décision définitive ne soit pas encore prise par l'OMVS, on semble s'orienter vers un lâcher fin août au barrage de Manantali, pour un soutien de crue correspondant à 50 000 hectares de décrue, seulement si le barrage est suffisamment rempli. En dessous d'une certaine cote, la culture de décrue sera sacrifiée à la production électrique. Ce niveau dans la retenue d'eau du barrage de Manantali n'est pas encore officiellement arrêté.

Outre que les producteurs de sorgho de la moyenne Vallée jugent l'objectif de 50 000 hectares de décrue largement insuffisant, l'absence de participation à la gestion de la ressource va jusqu'à leur exclusion du bénéfice de l'information. Les populations de la vallée du Sénégal ne sont pas averties de la future arrivée de la crue. Pourtant, compte tenu de la faible pente du Fleuve, la crue se diffuse lentement et la vitesse du flux d'eau diminue avec l'ampleur de la crue. Lorsque le Fleuve ne sort pas de son lit mineur, la crue met quinze jours pour parvenir de Bakel à Podor. Mais ce temps de propagation atteint six semaines lors de fortes crues. Le débit du Fleuve dépendant des précipitations dans le Fouta-Djallon, la combinaison de relevés pluviométriques dans le haut bassin et des prévisions météo, allongerait la durée de prédiction du délai et de l'ampleur de la future crue.

Conclusion

Dans le contexte actuel d'abondance en eau, parler de « pauvreté hydraulique » paraît paradoxal. Indépendamment de la pluviosité locale, le débit important du fleuve Sénégal, alimenté en saison des pluies par le massif très arrosé du Fouta-Djallon, fournit l'eau à profusion pour les besoins de l'irrigation. La régulation du régime par la construction de deux barrages étend cette disponibilité de la ressource à toute l'année.

Si par « pauvreté hydraulique » on entend l'articulation entre la pauvreté, l'accès à l'eau et la participation à la gestion de la ressource, alors cette expression – simple opportunisme ou innovation conceptuelle ? – s'applique à la vallée du Sénégal.

Tout d'abord, les populations riveraines du fleuve Sénégal ne participent pas à la gestion de la ressource. Peu associées aux prises de décision pour l'aménagement de la Vallée, elles se trouvent maintenant exclues non seulement de l'arbitrage entre les différents objectifs assignés au barrage de Manantali, mais également de l'information. Ainsi, l'incertitude qui frappe la culture millénaire de décrue se perpétue, l'arrivée et l'ampleur de la crue n'étant pas communiquées. Pourtant la simple transmission des données hydrométriques permettrait d'avertir quelques semaines à l'avance les agriculteurs.

La disponibilité de l'eau se voit amplement restreinte par ses modalités objectives d'accès. Si l'eau se puise librement et gratuitement dans le Fleuve, son pompage et l'entretien du réseau d'irrigation présentent un coût. Ce dernier se cumule au montant des consommations intermédiaires et s'avère incompatible avec le niveau de pauvreté d'une tranche importante de la population.

En fait, l'accès au financement est un préalable à l'accès à l'eau. Le faible autofinancement et l'inefficacité du mode de garantie donnent au crédit un caractère surdéterminant. La dégradation du contexte économique, de la riziculture en particulier et de l'agriculture irriguée en général, est la conséquence du désengagement de l'Etat et de la dévaluation du franc CFA. Elle génère un endettement structurel, qui frappe beaucoup d'exploitations agricoles et de nombreux groupements de producteurs. Une fraction importante de la population se voit ainsi exclue de l'usage de l'eau par son incapacité à rassembler les moyens financiers indispensables à sa valorisation.

L'accès à la terre est la seconde condition d'accès à l'eau. L'utilisation agricole de l'eau passe par l'usage d'une parcelle aménagée. Outre que l'égalitarisme foncier se trouve dévoyé par des disparités spatiales, par des tricheries, par l'absence d'actualisation des attributions et par des transferts d'usage, l'endettement entraîne l'éviction de certaines exploitations de l'accès aux aménagements hydro-agricoles. La stratification économique supprime la hiérarchie sociale pour l'accès à la terre.

La crise profonde que traverse l'économie de la vallée du Sénégal favorise l'émergence d'entrepreneurs agricoles, dynamiques et opportunistes, qui captent les activités en amont et en aval de la production agricole, abandonnées au secteur privé. Profitant du lourd endettement des exploitations appauvries, cette élite se substitue au système de crédit et accapare une part importante du foncier aménagé à travers des formes originales de tenure.

Dans le même temps, une spirale de la pauvreté aspire les petites exploitations endettées. Marginalisées par leur exclusion du financement et par ricochet par leur exclusion de la terre, elles se retrouvent exclues de l'accès à l'eau. Ecartées du nouveau système productif fondé sur l'irrigation, détournées du système productif ancien reposant sur la culture de décrue sacrifiée à la production hydro-électrique, leur précarité augmente.

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La borne d'irrigation serait-elle un lieu d'exclusion sociale dans le Haouz de Marrakech ?

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La gestion de l'irrigation à partir des bornes sous pression dans la Haouz de Marrakech (périmètre de N'Fis) cache en fait un processus d'individualisation et d'exclusion liée à un accès inégal à la ressource. L'on se rend compte que le dispositif technique et les modalités de gestion instituées par l'office du Haouz, opérateur de type Etatique de la distribution de l'eau, sont sources d'inégalités et de tensions sociales. En effet, l'eau mise sous pression est délivrée aux usagers par des bornes d'irrigation dont l'ouverture et la fermeture sont strictement contrôlés par l'office. Ces bornes sont ainsi un haut lieu d'expression d'une gestion de type Etatique exécutivement soucieuse du contrôle de la distribution de l'eau. Une borne d'irrigation comprend une vanne, un programmeur et un compteur. Ces outils de contrôle sont protégés dans un casier de béton fermé à clef. Seul les agents de l'office sont en principe habilités à ouvrir et à fermer les bornes en fonction d'une programmation exécutée d'une manière groupée ou individuelle à travers un système de tours d'eau animé, dans l'esprit de l'aménageur, par l'idéal de l'équité (même dotation à l'hectare pour tous). Mais l'observation des pratiques effectives de gestion par le système des bornes fait ressortir une nette différence entre plusieurs catégories d'usagers. Ces bornes d'irrigation, considérées par l'aménageur comme un simple procédé technique, prennent en fait plusieurs configurations sociales en fonction de profil, de la position de l'usager et de la nature de ses rapports avec l'opérateur de la distribution de l'eau (l'office). C'est ainsi qu'on retrouve dans le Haouz plusieurs types de bornes : bornes individuelles, bornes collectives, bornes individuelles avec possession de clefs et bornes individuelles mais sans possession de clefs. Cette multiplicité des bornes rend très lourde la gestion du dispositif technique de l'irrigation et instaure une distorsion sociale et institutionnelle entre les usagers du réseau sous pression. C'est dans ce sens que la borne d'irrigation devient un marqueur de différenciation sociale et d'exclusion institutionnelle. D'un côté, il existe les irrigants détenteurs des bornes individuelles. Ce sont les exploitants qui ont la possibilité d'ouvrir et fermer librement leurs bornes et par conséquent organiser leur irrigation en fonction de leurs propres besoins. Dénommés par l'office « possesseurs de clefs », ces exploitants forment une catégorie privilégiée d'usagers disposant de grande superficie, pratiquant les cultures de rente et possédant des forages qui leur permettent d'avoir une certaine autonomie face aux aléas du réseau public d'irrigation. D'un autre côté, les petits exploitants constituent la masse des irrigants. Ils sont rattachés aux bornes collectives dans des zones de micro-propriété et subissent en plein fouet les effets de la défaillance de réseau sous pression (faibles débits, charge solide de l'eau, bouchages, pannes des compteurs et de programmeurs et surestimation des volumes consommés, restrictions des dotations, coupure d'eau...). Leur revenu et leurs moyens ne les prédisposent ni à adopter les techniques d'amélioration de l'irrigation à la parcelle, ni à recourir à l'hydraulique individuelle. Leur stratégie consiste principalement à diversifier les apports en eau en utilisant aussi les eaux de crue des oueds non régulés. Mais les vagues successives de la sécheresse ont considérablement limité ce champ de manœuvre. Ils sont désormais de plus en plus enclins à la perte de la récolte, la baisse des revenus et l'exclusion sociale (abandon des terres et exode rural).

Pauvreté hydraulique et crise sociale – perspectives de recherche et d'action

Colloque international du 12 au 15 décembre à Agadir

**Organisation : Institut de Recherche pour le Développement, Université d'Agadir,
CRDI, Fondation Ford**

Quelle gouvernance des crises sociales liées à la gestion de l'eau ?

Communication d'Annabelle Houdret

1. Introduction : quels liens entre crise hydraulique et crise sociale ?

1.1 L'allocation de l'eau comme reflet des structures sociales

1.2 L'adaptation à la pénurie au delà des enjeux techniques

2. Pauvreté hydraulique et marginalisation sociale au Maroc : les enjeux politiques

2.1 Le rôle stratégique de l'agriculture irriguée au Maroc

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**3. Crise sociale ou adaptation réussie ? Les ressources des agriculteurs
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3.1 L'inégale répartition des capacités d'adaptation

3.2 L'action collective, catalyseur de la crise sociale ?

3.3 Conclusions

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1. Introduction : quels liens entre crise hydraulique et crise sociale ?

1.1 L'allocation de l'eau comme reflet des structures sociales

Les modes de gestion de l'eau au niveau national ou local reflètent souvent les structures sociales établies. Ceci est particulièrement vrai pour les pays dont l'économie dépend largement de l'agriculture et qui, en même temps, sont localisés dans des zones arides ou semi-arides. La question de l'accès à l'eau devient ici un enjeu majeur de la production agricole, surtout pour les produits de haute rentabilité tels que ceux destinés à l'export. Les priorités dans l'allocation de l'eau d'irrigation reposent dans la plupart des cas sur des structures sociales établies depuis bien longtemps, quelque fois influencées par une période de colonisation. Ces priorités correspondent alors à d'autres structures sociales, politiques et quelques fois ethniques qui conduisent souvent à l'appui d'une élite relativement stable gouvernant les mécanismes de répartition à différents niveaux. L'allocation en eau privilégie alors fréquemment ceux qui sont également prioritaires dans l'attribution de soutiens financiers, de terres arables ou dans l'accès au marché. Cet aspect explique l'instrumentalisation fréquente de la répartition de l'eau dans un système d'échange de dons et de faveurs.

Dans les périodes de disponibilité abondante en eau, ces mécanismes d'allocation ne posent souvent pas de problèmes majeurs, puisque même avec une allocation prioritaire pour certains agriculteurs il reste toujours suffisamment d'eau pour satisfaire la demande des autres et leur assurer un revenu, quoique souvent modeste. Les désaccords ou les conflits autour de l'eau portent alors plutôt sur la question du moment ou de la durée de l'irrigation.

Dans les périodes de sécheresse cependant, la répartition de l'eau devient une question plus stratégique. C'est dans ces moments que l'importance des structures sociales et politiques jouant sur l'allocation en eau devient visible et que les enjeux au delà de l'accès à la ressource apparaissent. Des priorités économiques, politiques, sociales, géographiques ou ethniques jouent alors un rôle majeur d'une part dans l'allocation de l'eau d'irrigation et, d'autre part, dans les capacités diverses d'adaptation des agriculteurs aux conséquences de la pénurie. La marginalisation sociale ou politique et l'inégale répartition des différentes ressources qu'elle implique est structurelle. Elle peut concerner le manque d'intégration dans les processus politiques, une inégalité dans l'accès à l'éducation, aux soins médicaux ou encore à l'emploi. Lorsqu'une pénurie d'eau se manifeste, elle accentue souvent de tels processus de marginalisation qui peuvent alors devenir des enjeux de mobilisation collective. La mobilisation peut porter sur une amélioration de la situation à travers des initiatives

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collectives, telles que le creusement de forages, la création de systèmes d'assurance ou l'investissement commun pour le développement de sources de revenus non-agricoles. Mais une telle mobilisation collective peut également s'inscrire dans une dynamique revendicative mettant en cause les différents processus de marginalisation et ainsi provoquer des conflits plus ou moins violents. C'est ce que nous définissons dans le cadre présent par une *crise sociale*. La *crise hydraulique* telle que nous la concevons, est nourrie d'une part par la pénurie d'eau croissante dans notre région de recherche, le Maroc. D'autre part, et surtout concernant sa dimension sociale et politique, elle est également le résultat de choix humains concernant l'aménagement et les mécanismes d'allocation de la ressource.

A partir des liens introduits ci-dessus entre l'allocation en eau et les structures sociales, nous formulons l'hypothèse qu'une pénurie d'eau peut provoquer des crises sociales. Comme nous le verrons par la suite, la « pénurie d'eau » est un label relativement général pouvant désigner autant des phénomènes naturels que le résultat d'activités humaines, intentionnées ou non-intentionnées. L'ampleur de ces crises sociales et leur potentiel d'innovation structurelle dépend alors des capacités d'adaptation des gouvernements d'une part et des agriculteurs concernés d'autre part.

Nous définissons une adaptation réussie à ces défis à l'ordre social par une « transformation des conflits ». Dans la recherche sur la paix et les conflits, ce terme désigne un processus à long terme qui permet de dépasser les causes structurelles de polarisation et d'opposition entre plusieurs acteurs, que cela concerne des organisations, des mobilisations collectives ou encore une opposition entre un Etat et certains groupes de la population (Lederach 1995; Reyckler and Paffenholz 2000; Bächler 2004). Cette approche est basée sur l'hypothèse qu'une négociation entre des groupes opposés qui se limite au sujet de la dispute sans prendre en compte les conditions générales déterminant la position, les intérêts et le pouvoir des partis concernés, ne pourra être durable. L'application de cette perspective à l'analyse des enjeux conflictuels quant à la gestion des ressources naturelles s'est avérée efficace dans plusieurs pays, car elle réussit à englober simultanément une étude des rapports de force autour des règles de gestion des ressources et la prise en compte des conditions sociales et politiques plus générales, indirectement liées aux ressources (Bächler 2001; Bächler 2002).

1.2 L'adaptation à la pénurie au delà des enjeux techniques

Afin d'élucider les rapports entre les processus d'adaptation à la pénurie d'eau et les crises sociales, nous nous basons sur l'approche de Turton et Ohlsson (Turton 1999; Ohlsson 2000). Ces auteurs distinguent trois phases dans la gestion de l'eau. La première est caractérisée par une abondance de la ressource et l'absence de restrictions dans son usage. Dans la deuxième phase, les gouvernements se trouvant face à une demande plus importante que l'offre, optent généralement pour une augmentation de celle-ci à travers des investissements importants dans les techniques de mobilisation et de rétention, notamment les barrages. L'ampleur de la croissance de la demande aboutit cependant souvent à une offre structurellement insuffisante. La réduction de la demande devient le seul moyen de rééquilibrer l'offre et la demande dans cette troisième phase, mesure souvent difficile politiquement à mettre en œuvre. Les différentes capacités d'adaptation jouent alors un rôle clé dans la recherche d'un nouvel équilibre.

Vu les enjeux liés à l'allocation de l'eau, l'adaptation à la pénurie touche des domaines politiques et sociaux très divers qui sont alors soumis à des changements parfois importants. Ohlsson formule ainsi la nécessité de modifications structurelles entraînée par la pénurie d'eau : "... *water scarcity is transformed from an absolute constraint into a strong driving force for societal and economic structural change*" (Ohlsson 2000). Mais de quelle nature sont ou peuvent être ces changements structurels, et dans quelle mesure peuvent-ils remettre en cause les priorités politiques et sociales mentionnées ci-dessus ? Plusieurs chercheurs

thématisent les capacités d'adaptation à la pénurie (Ohlsson 1999), sans pour autant en développer les aspects quant à l'évitement des crises sociales. Homer-Dixon, expert des conflits provoqués par des changements environnementaux, parle de "ingenuity gap"¹ (Homer-Dixon and Barbier 1996) et Abrams définit le seuil de l'adaptation possible comme un "capacity threshold" (Abrams 2003). Turton, expert de la gestion des pénuries d'eau, met l'accent sur la légitimité d'un gouvernement pour la mise en place de restrictions dans la consommation d'eau et d'autres mesures d'adaptation (Turton 1999). L'accord sur l'importance de ces différentes capacités est implicite, mais le concept est généralement peu différencié et rarement mis en rapport avec le risque de conflits sociaux. D'autre part, la notion de changements structurels innovateurs évoquée dans la citation de Ohlsson n'est que rarement développée dans des études de cas. Nous y reviendrons plus bas, dans l'analyse des défis actuels observés au Maroc.

En adoptant une perspective large sur les enjeux liés à l'allocation de l'eau d'irrigation au Maroc, nous développons ci-dessous les liens entre la crise hydraulique et la crise sociale, réelle ou potentielle. Une brève introduction sur la valeur stratégique de l'eau au niveau national permettra de mieux comprendre les enjeux liés à la ressource au niveau local. Des mécanismes de marginalisation politique, sociale et économique sont analysés à travers leurs fondements historiques. Des exemples de stratégies d'adaptation aux conséquences de la pénurie sont alors étudiés afin d'élucider comment la crise sociale – d'une certaine façon à la fois origine et résultat de la crise hydraulique – est vécue au niveau local. Les résultats de recherches effectuées dans deux périmètres irrigués du Maroc, le Gharb et le Souss, appuieront ces analyses et permettront également d'aborder les conflits qui en résultent.

2. Pauvreté hydraulique et marginalisation sociale au Maroc : les enjeux politiques

2.1 Le rôle stratégique de l'agriculture irriguée au Maroc

Afin de comprendre l'impact de la crise hydraulique sur les structures sociales du Maroc, nous évoquerons brièvement le rôle de l'agriculture dans l'économie du pays ainsi que ses liens avec des processus de marginalisation.

L'économie marocaine dépend à un degré important de la production agricole, qui contribue en moyenne entre 14 et 16% au produit intérieur brut (PIB) (Bzioui 2004) et crée des emplois pour environ 40% de la population² et même 81% dans les zones rurales (DRS 2002). La plupart des régions agricoles se trouvant dans des zones arides ou semi-arides, l'agriculture est cependant soumise aux aléas climatiques qui se répercutent directement sur la performance économique du pays. La rentabilité du secteur agricole en terme de pourcentage du PIB peut ainsi varier de 11,4% en année de sécheresse (2000) à 20,8% en année de climat favorable (Akesbi 2005). Durant une année particulièrement affectée par la sécheresse (1994-1995), 60% des emplois dans le milieu rural ont été perdus. L'exode rural est une des conséquences du phénomène. L'importation des produits alimentaires, déjà en forte augmentation par rapport aux taux de couverture des besoins dans les années 1980, pèse alors plus lourd sur le budget étatique. Aujourd'hui, le Maroc importe, selon la situation climatologique, entre 40 et 60% des céréales consommées, alors qu'en 1985 la production nationale couvrait 85% de ses besoins (Akesbi 2005). Simultanément, la somme des importations de nourriture a augmenté de 486 millions US\$ en 1984 à 1411 millions US\$ aujourd'hui (2004) (Worldbank 2005).

¹ Homer-Dixon identifie quatre restrictions de cette "ingenuity": la défaillance des marchés, les conflits sociaux, la disponibilité de capitaux financiers et les contraintes pesant sur la science Homer-Dixon, T. (1995). "The Ingenuity Gap - Can Poor Countries Adapt to Resource Scarcity?" Population and Development Review, 21(Nr.3): 587-612.

² 44,4% en 2002 pour l'agriculture, la forêt et la pêche (DRS 2002).

Cependant, cette évolution n'est pas uniquement liée à la croissance de la demande et aux difficultés climatiques mais résulte également de nouvelles priorités politiques. Dans les années suivant l'indépendance du pays, années surtout de politique publiques hautement symboliques, la priorité était donnée à l'autosuffisance alimentaire. Les stratégies contemporaines ne visent plus à développer à tout prix la production de céréales et de sucres mais surtout à améliorer les conditions de production des produits à haute valeur ajoutée, qui peuvent contribuer à financer les importations d'autres produits. En 2000, les recettes d'exportation d'agrumes et de primeurs représentaient ainsi 67% de la valeur des importations de blé (Belghiti 2005).

Vu l'ampleur des aléas climatiques, le rôle clé de l'irrigation pour l'économie à tous les niveaux est évident. Elle améliore d'une part la stabilité du produit intérieur brut, car l'agriculture, et surtout l'agriculture irriguée, constituent une part importante du PIB (contribution du PIB agricole : entre 7 et 10% du PIB général, (Bzioui 2004). D'autre part, dans les secteurs où l'irrigation fonctionne bien, les revenus auparavant soumis aux aléas climatiques se sont relativement stabilisés. Plusieurs transformations en cours concernant les marchés agricoles et le rôle de l'Etat dans ce secteur pourront cependant influencer cette donne.

Les produits à haute valeur ajoutée sont pour la plupart cultivés dans les grands périmètres irrigués, qui ne représentent que 10% du total de la surface agricole utilisable (SAU) mais contribuent à 45% de la valeur ajoutée de la totalité des produits agricoles. Il s'agit notamment de produits destinés à l'export, tels que les agrumes ou le maraîchage. En dehors de ces périmètres, des exploitations aménagées par le secteur privé (estimées à 400 000 ha selon Belghiti, 2005) et pour la plupart alimentées par des ressources souterraines, se concentrent également sur les cultures d'exportation.

Le Maroc se trouve aujourd'hui face à la croissance de la demande en eau pour les besoins de l'extension de l'agriculture irriguée, mais également pour l'alimentation des zones urbaines et l'industrie. Dans certaines zones du Sud du pays, le développement du secteur touristique et notamment des terrains de Golf accentuent davantage la concurrence autour de la ressource. En même temps, la réduction des ressources mobilisées à travers les barrages ainsi que la fréquence et l'intensité des périodes de sécheresse réduisent sérieusement la disponibilité de la ressource. Le seuil de « stress hydrique » défini par la FAO à 1000 m³/habitant/an ayant déjà été atteint, le Maroc devra faire face à une pénurie très sérieuse d'ici 2020 avec moins de 500m³ d'eau disponible par habitant par an (EU 2003). Par ailleurs, ce niveau sera par endroits encore plus bas car ces chiffres ne reflètent pas les disparités régionales qui sont généralement importantes dans ce pays.

Vu l'importance du secteur agricole développée ci-dessus, les mesures d'adaptation à ces évolutions nécessiteront des transformations considérables qui remettront probablement en cause beaucoup de structures établies. La partie suivante évoquera les liens entre l'allocation en eau et les mécanismes de pouvoir politique et esquissera ainsi les enjeux des crises sociales potentielles et existantes.

2.2 Les origines historiques de la marginalisation dans le secteur agricole et tendances actuelles au niveau national

Après cet aperçu de la place de l'agriculture dans l'économie marocaine, revenons à la question des processus de marginalisation qui expliquent le lien entre la crise hydraulique et la crise sociale. L'accès à la terre et à l'eau sont un facteur déterminant des conditions de vie dans le milieu rural. L'équipement et la répartition de ces biens sont très hétéroclites à travers le Royaume et s'avèrent alors être un bon indicateur des inégalités spatiales et sociales (Allain-el Mansouri 2001).

Comment la production agricole est-elle liée à la marginalisation sociale ? Nous tenterons d'expliquer ces liens à travers deux priorités clés de la politique agricole et hydraulique au Maroc : le choix pour le développement des grands périmètres irrigués d'une part et l'appui de la maison royale aux élites locales d'autre part. Il s'agit ici de tracer le cadre d'analyse des changements en cours au niveau national ainsi que de rappeler leurs origines historiques, avant de procéder à une analyse davantage axée sur les capacités d'adaptation à ces changements au niveau local.

2.2.1 Le développement des grands périmètres irrigués

Les grands périmètres irrigués du Maroc datent pour la plupart de l'époque du protectorat et ont été élargis dans le cadre de la politique du « 1 million d'hectares irrigués » sous feu le roi Hassan II. Déjà à l'époque du protectorat, les terrains les mieux irrigués et les terres les plus arables au sein de ces surfaces aménagées étaient attribués aux Français d'une part et aux notables ruraux coopérant avec le protectorat d'autre part. Les régions rurales au sein et autour des périmètres irrigués ont bénéficié d'investissements importants qui y ont élevé le niveau général de vie et ont permis la création d'infrastructures de communication, éducatives et sanitaires.

Le développement des périmètres irrigués constitue cependant une certaine césure dans l'histoire marocaine, puisqu'il met en évidence la division du pays en un « Maroc utile » (Pérennès 1993) et le reste du pays et accentue les disparités spatiales et sociales à l'intérieur du pays (Akesbi 1996). Jusqu'à aujourd'hui, des différences importantes concernant le niveau de développement perdurent entre ces régions privilégiées et d'autres zones rurales. Le niveau d'alphabétisation y est beaucoup moins élevé, les soins de santé nettement moins développés et le travail des mineurs plus répandu. D'une certaine manière, ces chiffres indiquent une dissociation du développement agricole, conçu a priori surtout comme un développement technique et économique, du développement rural en termes d'augmentation des revenus et d'amélioration des conditions de vie.

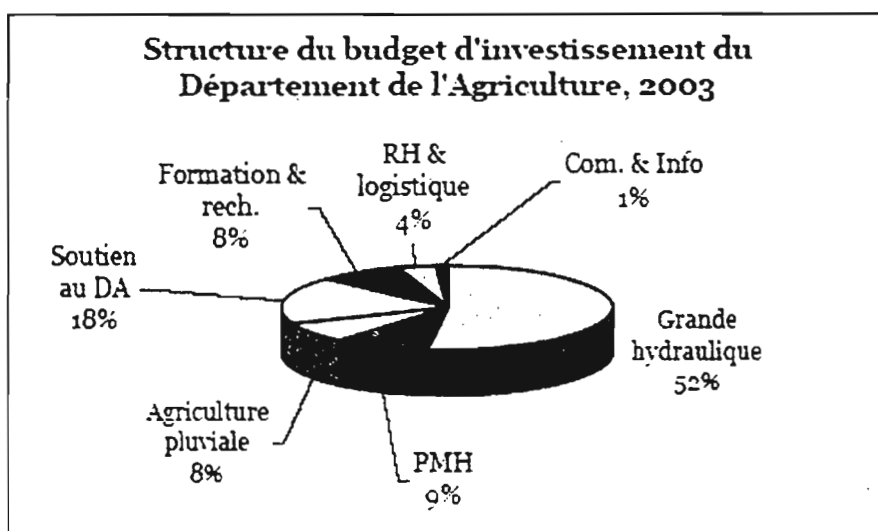
Une comparaison des revenus donne un idée de ces écarts, puisque les revenus engendrés par l'irrigation sont 4 à 8 fois supérieurs à ceux obtenus en zones bour (Belghiti 2005), sachant que les emplois en dehors du secteur agricole sont limités en zone rurale. Cet écart s'ajoute à l'élargissement des disparités sociales existantes entre le milieu rural et urbain (Mahdi 1996) d'une part, et entre les hommes et les femmes d'autre part. Ces dernières subissent une double discrimination, celle de la zone rurale et du genre, ce qui les rend plus vulnérables à la pauvreté et restreint nettement leurs capacités d'adaptation aux changements en cours. Alors que la moyenne des chefs de ménage illettrés est de 5,5% au niveau national, ce chiffre monte à 82% pour les femmes et même 96% pour celles chefs de ménage en milieu rural (DRS 2002).

Depuis les années soixante-dix, l'encadrement et la subvention par l'Etat de la production, de l'irrigation et de la commercialisation des produits agricoles dans les grands périmètres irrigués a été très sélective, afin d'encourager la production de certaines cultures « stratégiques » pour le marché national et celui de l'export. Pendant longtemps, elle n'impliquait quasiment pas les producteurs (Akesbi 1996) qui ne disposaient alors que de peu de marge de manœuvre pour modifier leur production.

La politique agricole actuelle du gouvernement marocain se focalise notamment sur la « mise à niveau », qui consiste surtout à favoriser le développement de certaines filières privilégiées (oléiculture, agrumiculture...) sur un marché de concurrence accrue lié à la libéralisation de échanges (Akesbi 2005). La priorité est donnée aux cultures d'exportation, secteur dont la valeur a évolué de 486 millions US\$ en 1984 à 1801 millions US \$ en 2004 (Worldbank 2005). La marginalisation conséquente d'autres filières moins rentables mais souvent la base

d'une agriculture de subsistance, apparaît alors quasiment inévitable – d'autant plus que les restrictions de budget des politiques publiques risquent de remettre en cause les larges subventions de ces secteurs. Aujourd'hui, ces restrictions budgétaires accentuent déjà l'écart entre les zones aménagées en grande hydraulique et les autres régions rurales. En 2003, 52% du budget d'investissement du ministère de l'agriculture a ainsi été investi dans la grande hydraulique qui, le rappelons-nous, représente 10% du total de la SAU³ (Akesbi 2005). En comparaison, la petite et moyenne hydraulique et l'agriculture pluviale ont reçu respectivement 9 et 8% du budget (cf. ci-dessous).

Les agriculteurs au sein des grands périmètres irrigués se trouvent alors dans une situation relativement favorisée, même si cette distinction est aujourd'hui remise en cause par la possibilité d'approvisionnement des terres en eau par l'utilisation privée de ressources souterraines. Ces forages permettent en effet une certaine indépendance vis-à-vis de l'irrigation « officielle », mais peuvent également produire de nouvelles disparités comme nous le verrons plus bas.



Graphique : Akesbi/ CIHEAM 2005

RH : ressources humaines et logistiques
PMH : petites et moyennes hydrauliques

2.2.2 Le rôle des élites rurales

Pour le gouvernement marocain et la maison royale de l'après-indépendance, des aménagements hydrauliques, l'attribution des terres et l'allocation en eau au sein des périmètres irrigués ne représentaient pas uniquement des mesures de politique agricole ou rurale. Ces mesures étaient aussi et surtout un moyen de contrôler les zones rurales (El Jihad 2001). A travers une alliance avec le parti de l'indépendance Istiqlal et profitant des antennes du parti dans les régions reculées, la maison royale restaura sa légitimité auprès des ruraux et notamment auprès d'une élite favorisée qui fut récompensée par l'attribution de terres et l'accès à l'irrigation moderne (Hammoudi 1997). Cependant, une partie de l'Istiqlal n'était pas a priori pour une subordination à la monarchie et ne put être intégré que peu à peu dans ce système de gouvernance. Une alliance se forgea entre des notables ruraux de l'époque du protectorat et les nouveaux grands propriétaires, qui devint alors la base d'appui rurale de la

³ Les charges de production hors frais d'irrigation en zone irriguée sont en moyenne de 3 à 8 fois supérieures à celles des systèmes de production en bour. (Belghiti 2005)

légitimité royale (Leveau 1985). Les nationalisations des terres au lendemain de l'indépendance, l'élargissement des zones irriguées mais aussi l'échec de la réforme agraire ont représenté des occasions majeures pour maintenir et renforcer ces (dés)équilibres de pouvoir⁴.

Jusqu'à ce jour, les élites rurales se trouvent alors dans une situation permanente d'échange et de clientélisme avec les structures de la maison royale, du gouvernement et parfois de l'administration : ils obtiennent des services, du prestige et des gains matériels en échange de leur appui au Makhzen (Layachi 1998). Ce constat signifie en retour que ce soutien est sérieusement remis en question si l'Etat ne parvient plus à assurer ces différents services particuliers. Dans le contexte des restrictions budgétaires croissantes se pose alors la question de la pérennité de ce système et celle de l'acceptation sociale de son maintien face au creusement des inégalités sociales. Ces dernières ont été fortement accentuées par les plans « d'ajustement structurel » (PAS) adoptés au Maroc dans les années 1980 et 1990 et ont contribué à réduire davantage les moyens déjà faibles de subsistance d'une partie de la population surtout rurale (Desrues and Moyano 2001).

Résumant nos observations sur les fondements historiques des processus de marginalisation dans le secteur agricole, nous observons d'une part une disparité importante entre les zones rurales aménagées en grande hydraulique et le reste du pays, qui concerne l'infrastructure agricole mais également celle plus générale du développement. D'autre part, nous constatons un rôle stratégique des enjeux liés à l'agriculture qui va au delà de la valeur économique de la production et qui touche aux mécanismes de légitimation des structures sociales et des modes de gouvernance. Plusieurs transformations actuelles, dont bien sûr la pénurie d'eau croissante, mais également la libéralisation successive des marchés, la modification des relations entre l'Etat et les agriculteurs et le rôle croissant du secteur privé dans la production et la commercialisation, contribuent à remettre en cause les fondements de ces mécanismes de gouvernance. Les agendas des politiques agricoles ou hydrauliques influant ces évolutions méritent une attention particulière, car, comme l'a constaté Destreneau pour les politiques de réduction de la pauvreté au Maroc : « *It should be added that the conflict also concerns the political content of this agenda, technocratic measures often being proposed as part of the scientific and modern welfare machinery, in an attempt to disconnect it from acknowledged political interplay* » (Destreneau 2005).

Dans la partie suivante, il s'agira d'analyser les ressources humaines, financières et physiques déterminant les capacités d'adaptation des agriculteurs. Une attention particulière sera apportée à la question du changement des rapports de force que ces transformations induisent afin de comprendre les dynamiques de mobilisation collectives ou individuelles qui en résultent.

3. Crise sociale ou adaptation réussie ? Les ressources des agriculteurs vis-à-vis des défis actuels

Après avoir revu les enjeux politiques et économiques majeurs de la pénurie d'eau au niveau national, cette dernière partie de notre analyse portera sur les capacités locales d'adaptation à ce phénomène. L'hypothèse est que la marginalisation structurelle (dans les processus politiques et économiques comme dans l'attribution des terres et dans l'allocation d'eau) esquissée ci-dessus se poursuit au niveau local à travers des mécanismes similaires produisant une inégalité dans les capacités d'adaptation. Néanmoins, les agriculteurs parviennent, par des

⁴ Ce mécanisme est particulièrement visible dans les moments de crise de cette légitimité, telle que pendant la période des putschs dans les années 1970.

stratégies individuelles et collectives, à en atténuer les effets et, quelques fois, les transformations imposées leur donnent même une autonomie plus importante et accroissent ainsi leur capacité d'action indépendamment des structures étatiques.

3.1 L'inégale répartition des capacités d'adaptation

Les transformations décrites dans la partie précédente (pénurie d'eau, retrait de l'Etat de l'accompagnement de la production agricole, nouvelles priorités politiques et économiques, implication croissante du secteur privé) ne se traduisent pas uniquement par des difficultés et des restrictions dans le secteur agricole, mais sont également source d'innovations et de stratégies alternatives des exploitants. L'on observe ainsi à l'échelle locale une diversité de stratégies d'adaptation et d'anticipation des agriculteurs, qui remet en cause l'hypothèse souvent formulée d'inertie. Il s'agit d'une part d'inégalités *causées* par ces évolutions, d'autre part d'une inégalité des moyens, techniques, financiers ou sociaux, pour y *faire face*. Cette inégalité est particulièrement visible pour deux facteurs essentiels de la production agricole : l'accès à l'eau et l'accès à la terre. Dans l'analyse des exemples observés dans le Gharb et le Souss, nous nous concentrerons sur notre espace géographique de la recherche en cours, à savoir les inégalités observées *à l'intérieur* des périmètres irrigués sans évoquer les écarts importants qui existent entre ces derniers et des terres cultivées en dehors.

L'accès à l'eau dans les périmètres irrigués dépend d'une part des Offices Régionaux de Mise en Valeur Agricole (ORMVA) et d'autre part, de manière de plus en plus importante, des moyens d'exploitation des ressources souterraines. Même si les périmètres irrigués sont généralement mieux alimentés en eau que les exploitations en dehors de ces structures, la pénurie d'eau s'y fait également sentir. Elle a cependant des origines très diverses. Dans le Souss, si la pénurie est liée à la faiblesse des précipitations, elle est également provoquée par l'accroissement des besoins du à l'extension des surfaces irriguées⁵ et à la surexploitation de la ressource.

Dans le Gharb, la question de la pénurie a une signification différente, puisque le système est plutôt bien alimenté par les fleuves et qu'à l'échelle du périmètre les ressources souterraines ne jouent qu'un rôle marginal dans l'alimentation, même si ce phénomène peut être important dans quelques secteurs. Néanmoins, quelques zones telles que le secteur du Beht souffrent de problèmes d'alimentation en eau. Ceux-ci sont dus d'une part à la déviation des ressources pour les besoins urbains, d'autre part à la dégradation de la qualité de l'eau suite à la pollution des industries sucrières, et enfin à des désaccords entre les agriculteurs et l'ORMVA sur l'utilisation du système.

A l'intérieur des zones d'action des ORMVAs, l'accès à l'eau était jusqu'à encore récemment surtout déterminé par les cultures (préférence des « cultures stratégiques »), par les moyens financiers des exploitants, par l'emplacement dans le réseau et par la répartition interne entre les usagers. Cependant, on observe aujourd'hui une remise en cause de ces relations de dépendance, liée d'une part à la libéralisation des assolements⁶, d'autre part aux déficits de l'alimentation par le réseau et, surtout, au développement de ressources alternatives. En effet, l'exploitation des ressources souterraines s'est développée de manière importante à travers quasiment tout le pays. Elle permet une certaine indépendance vis-à-vis de l'alimentation par l'ORMVA, mais provoque également des dommages écologiques et de nouvelles inégalités. Dans le Souss par exemple, on s'aperçoit ainsi que certains terrains « secs » ont été abandonnés par leurs propriétaires. D'autres agriculteurs dans les mêmes environs en revanche ont les moyens financiers d'investir dans les techniques d'économie d'eau et d'exploitation des ressources souterraines et peuvent alors continuer à exploiter leurs terres et

⁵ Qui est d'ailleurs interdite depuis quelques années dans une grande partie du périmètre

⁶ L'Etat décidait auparavant sur la plus grande partie de la production dans les grands périmètres irrigués et ne laissait les agriculteurs décider sur le choix des cultures que dans une petite partie de leur parcelle.

même y cultiver des produits très consommateurs en eau. Des subventions étatiques pour l'installation de l'irrigation localisée et pour le creusement de forages existent, mais ces mesures ne semblent, pour plusieurs raisons, ne pas suffire à réduire les inégalités⁷.

En effet, les moyens des agriculteurs pour s'adapter aux conséquences directes et indirectes de la pénurie d'eau varient selon la situation spécifique de l'exploitation et selon le cadre économique et politique régional dans lequel elle s'insère. A la répartition inégale des moyens financiers d'adaptation s'ajoute une diversité des types d'exploitation (structure foncière, cultures pratiquées, accès à l'eau) et de groupes sociaux (réseaux familiaux plus ou moins influents, producteurs industriels, privés, étrangers...). Cette diversité des situations explique en partie pourquoi les effets de la pénurie se répercutent différemment selon les cas observés.

Quelques fois, les mesures prises en réaction à la pénurie peuvent provoquer des tensions. Ceci est le cas, par exemple, pour l'inégalité d'alimentation en eau entre zones aménagées et non-aménagées au sein et au-delà de la zone d'action de l'ORMVA. Les vols d'eau sur le réseau, particulièrement fréquentes en période de sécheresse, peuvent alors provoquer des tensions voir des conflits, qui nécessitent parfois même l'intervention de la police.

L'accès à la terre

La distribution des terres et les statuts fonciers ont surtout été façonnés par les politiques de répartition et l'acquisition avant, pendant et immédiatement après l'indépendance du Maroc. Les projets de réforme agraire puis de réforme agricole n'ont pas fondamentalement modifié ces répartitions (Akesbi 1996). La taille très modeste de la majorité des terrains est un autre facteur témoignant des inégalités structurelles : 70% des exploitations ont moins de 5ha, 87% moins de 10ha (Jouve 2002). Cette petite taille des exploitations, davantage aggravée par leur morcellement suite aux héritages successifs, rend la production très vulnérable aux aléas climatiques comme aux changements politiques. Elle ne permet pas en général l'accumulation d'un capital important qui pourrait atténuer les effets d'une sécheresse ou rendre possible un investissement majeur. La taille des exploitations d'une part et les faibles revenus financiers qui y sont générés d'autre part ne facilitent pas la mise en place de techniques d'irrigation localisée. Concernant la répartition du foncier cependant, on observe aujourd'hui des changements importants avec une emprise grandissante du secteur privé (marocain ou étranger) sur les terres. D'une part, surtout dans le Sud du pays où les conséquences de la pénurie d'eau sont importantes, le nombre de terres abandonnées croît rapidement. Pour une part, ces terres sont définitivement abandonnées, dans le cas de la pénétration des nappes salines, suite à une surexploitation des ressources souterraines par exemple. D'autres terrains sont rachetés par le privé disposant de davantage de moyens pour investir dans des techniques coûteuses de mobilisation de l'eau et d'irrigation.

Un autre facteur altérant les structures foncières est la mise en location des terres étatiques. Même si le titre de propriété reste détenu par l'Etat, les concessions d'exploitation des terres, et surtout des ressources en eau souterraines, sont délivrées pour une longue période (17 ou 40 ans). 44.000 hectares sont ainsi actuellement attribués, 86% des 174 projets choisis concernent des nationaux (Ghannam 2005).

L'enjeu de l'eau potable

Un autre aspect de la crise hydraulique, relativement peu thématiqué, concerne l'eau potable. La pénurie de la ressource et les coûts de l'élargissement et du maintien de l'infrastructure induisent ici également des processus de transformation importants. D'une part, la disparité évoquée ci-dessus entre les zones urbaines et rurales se poursuit dans ce secteur. Les

⁷ Une raison peut être l'impossibilité d'installer un système d'irrigation localisé sur des terres relativement petites. Une autre, la nécessaire autorisation de creusement de forages qui peut être refusée dans le cas, par exemple, où il existeraient déjà plusieurs autres forages dans les alentours immédiats. Une autre raison, malgré les subventions, est certainement la faible disponibilité de capitaux pour le financement.

agglomérations rurales paient l'eau plus cher que les citadins alors que leurs revenus sont bien plus faibles et aléatoires (Bennacer 2003). Les effets de la pénurie se traduisent par ailleurs par une concurrence accrue entre l'alimentation des zones urbaines et du secteur agricole, par exemple dans les régions de Marrakech et d'Agadir. Cependant, des mutations importantes dans les stratégies de certains ORMVAs se dessinent. Alors que leur mission était jusqu'à présent d'assurer la répartition de l'eau entre les usagers agricoles au sein de leur zone d'action, les ORMVAs se trouvent aujourd'hui de plus en plus souvent confrontés à des décisions d'arbitrage entre ces usagers et d'autres groupes d'intérêt ou simplement forcés d'exécuter les décisions d'autres instances politiques. La vente de quantités importantes d'eau par l'ORMVA au secteur touristique (alimentation des hôtels et arrosage des espaces verts et des terrains de golf) au double prix de celui facturé aux agriculteurs illustre ce basculement. Par ailleurs, la répartition arbitraire de l'eau potable peut également provoquer des conflits, tels que les protestations observées dans certaines régions en été 2005. Des gouverneurs avaient alors été accusés de répartir l'eau potable envoyée en aide pendant une sécheresse prolongée aux habitants de certaines zones rurales, de manière arbitraire (Bentak 2005).

On peut généralement distinguer les ressources suivantes déterminant les capacités et les stratégies d'adaptation des agriculteurs face aux problèmes d'alimentation en eau d'irrigation et potable:

Le capital financier permet de creuser des puits ou des forages et ainsi de rendre les agriculteurs plus indépendants de l'irrigation; et peut également servir à « payer » l'aiguadier pour profiter d'un service plus avantageux. Il dépend d'une part des revenus par et en dehors de l'agriculture, d'autre part de l'accès aux crédits et de l'immigration de membres de la famille. Dans le Gharb et dans le Souss nous avons constaté que des ressources financières même faibles en dehors de la récolte annuelle servent souvent à diversifier la production et à varier les sources de revenus par un investissement en dehors de l'agriculture, par exemple dans un petit commerce. Dans les cas observés dans le Gharb, ces initiatives reposaient largement sur des individus ou leur vaste réseau familial. Dans le Souss, comme cela a souvent été observé pour d'autres domaines de développement, de telles initiatives sont souvent prises par des associations locales et généralement au delà des liens familiaux (Roque 2005).

Le capital social constitue un facteur clé des capacités d'adaptation, puisqu'il permet une obtention plus facile des permis de forage mais facilite également les démarches nécessaires lors de la commercialisation et de l'accès au marché. Ces ressources sociales concernent donc autant la qualité des relations avec le secteur étatique (sucreries, administration, agences de crédit agricole ...) qu'avec le secteur privé (commercialisation) ou avec d'autres agriculteurs (profit mutuel d'un engagement collectif pour une meilleure irrigation ou commercialisation, constitution de lobbies...). Elles permettent d'atténuer la pauvreté et d'accroître les perspectives générales le développement (Charvin and Hammoudi 2003), que cela concerne l'agriculture ou encore l'éducation ou des projets de mobilisation d'eau potable.

Le capital humain est ici défini comme le niveau d'éducation et de formation professionnelle. Dans les processus d'adaptation à la pénurie, ce capital peut surtout aider à échapper aux conséquences financières de la pénurie d'eau. Un membre de famille travaillant en dehors du secteur agricole peut atténuer les pertes de la production. Des agriculteurs qui ne peuvent plus cultiver leurs terres à cause de la sécheresse ou de la salinisation, mais qui ont bénéficié d'une éducation scolaire de base sont souvent aptes à assurer leurs revenus par d'autres moyens. Cette stratégie de diversification des revenus a toujours joué un rôle dans le monde agricole (Chiche 2003), mais devient d'autant plus importante à l'égard de ces nouveaux défis.

Après une certaine phase d'euphorie sur l'apport des associations locales au développement rural, il semble aujourd'hui prévaloir pour le secteur de l'eau une condamnation quasi unanime des associations d'usagers d'eau agricole (AUEA) considérées comme non-fonctionnelles. Dans la réaction aux conséquences directes et indirectes de la pénurie d'eau, que cela concerne l'irrigation ou l'eau potable, nous avons pu cependant observer que des nombreuses stratégies collectives sont déployées par les agriculteurs. Elles sont très diverses et peuvent s'appuyer sur des réseaux formalisés et établis, comme dans le cas des associations de développement préexistantes qui se mobilisent autour de nouveaux enjeux. Elles peuvent également, de manière informelle, s'appuyer sur d'anciens réseaux de famille élargie, de tribu ou de voisinage, ou encore se constituer autour d'un objet précis pour un certain temps (réparation du réseau commun d'irrigation par exemple), puis se dissoudre. Nous constatons surtout que les réseaux formels et informels qui interviennent dans les processus d'adaptation au changement des conditions de production sont multiples et concernent des domaines très divers de la vie rurale. Ces réseaux peuvent par exemple se regrouper autour des enjeux de développement rural, d'éducation ou d'alimentation en eau potable, puis se consacrer aux problèmes de l'irrigation ou de la commercialisation. Ces activités renforcent souvent les capacités d'adaptation des populations à la pénurie d'eau et aux autres transformations en cours. Elles impliquent aussi fortement les femmes, notamment dans le secteur de l'eau potable où ce sont souvent elles qui prennent l'initiative d'une amélioration de l'alimentation.

Dans l'analyse du secteur agricole marocain, nous constatons une forte influence des conditions de production par les structures sociales, économiques et politiques établies. Ces structures, souvent ancrées dans l'histoire des rapports de force, déterminent aussi dans une certaine mesure les capacités des acteurs à s'adapter à l'actuelle crise hydraulique. Plusieurs processus de transformation contenant un potentiel innovateur se distinguent. Mais la portée de ces évolutions ne semble pas encore claire et dépendra certainement aussi de la capacité du système politique et social à s'ouvrir à ces revendications. L'expression et la participation paysanne, peuvent-elles être renforcées par un rôle différent des organisations paysannes, comme le suggèrent certains (Elloumi 1996)? Est-ce que le retrait relatif de l'Etat ne se limite pas fréquemment à une délégation de la prise en charge de l'entretien des systèmes d'irrigation, sans créer de nouvelles opportunités d'autonomie des agriculteurs sur leur production ?

Parmi d'autres facteurs de transformation, la crise hydraulique joue un rôle important à la fois dans l'aggravation des écarts existants et dans l'émergence de nouveaux espaces permettant la redéfinition progressive des rapports de forces entre les agriculteurs, l'Etat et le secteur privé. Un renforcement des inégalités et de la marginalisation de certains groupes de population risque d'entraîner des crises sociales au-delà des phénomènes d'exode rural et de tensions entre usagers d'eau observés actuellement. Notre hypothèse, qui s'appuie sur nos observations sur le terrain, est que l'évolution de cette crise sociale dépendra avant tout d'un facteur clé : l'objectif fixé à la mobilisation collective. Nous l'avons vu plus haut, celle-ci peut entraîner des conflits tout comme elle peut innover progressivement dans la répartition des différentes ressources de production et d'organisation.

Ce résumé des observations concernant les capacités d'adaptation des sociétés rurales et surtout agraires montre la variété des défis actuels entre crise hydraulique et crise sociale. En ce qui concerne les nombreuses initiatives locales non-étatiques observées au Maroc depuis environ dix ans, nous pouvons par la suite questionner leur capacité à atténuer ces effets et à accompagner les processus de transformation.

3.2 L'action collective, catalyseur de la crise sociale ?

Considérant les liens entre les structures de la production agricole et l'allocation de l'eau tels que nous les avons évoqués ci-dessus, nous considérons qu'une analyse pertinente du potentiel innovateur de l'action collective à ce niveau ne peut être entreprise sans prendre en compte d'autres sphères et structures régissant les régions rurales. Il apparaît alors que le phénomène de redéfinition des rapports de force et la renégociation des ressources disponibles entre les différents groupes de population ne se limite pas au secteur agricole et à ses moyens de production. Il s'inscrit plutôt entre deux tendances plus générales : l'incapacité grandissante de l'Etat à satisfaire les attentes économiques et sociales d'une partie de la population, phénomène surtout visible depuis les effets des plans d'ajustement structurels (Desrues and Moyano 2001) ; l'émergence à travers le pays d'associations et d'organisations non-gouvernementales dans de nombreux domaines de la vie urbaine et rurale. Dans les deux domaines, les jeunes jouent un rôle important : la population entre 15 et 34 ans au chômage représente 84 % de la totalité des personnes au chômage, ils sont de plus en plus dans cette situation à être hautement qualifiés (26% diplômés de niveau supérieur), et ils s'engagent dans la vie associative urbaine ou rurale. Les femmes constituent également une force de mobilisation importante dans ce milieu et leur implication est susceptible d'influencer les rapports sociaux mais également économiques. Dans le Souss, connu pour la l'activité importante des associations, le taux de chômage parmi les femmes n'est ainsi que de 4,4%, alors que cette région est beaucoup plus touchée par le chômage que, par exemple le Gharb, où 20% des femmes sont sans emploi (DRS 2002).

De nouvelles plate-formes de discussion et d'action mais également de nouvelles contradictions sociales sont apparues. La mobilisation collective liée à ces évolutions réactive en partie d'anciens réseaux de solidarité (Ameur and Filali Belhaj 1997; Hegasy 1997; Belghazi and Haddad 2001). La légitimité de ces « nouveaux » acteurs se construit à travers leur impact sur la vie quotidienne des personnes dans des domaines où l'Etat est défaillant. Rappelons que dans les régions rurales en particulier ces dynamiques surviennent au moment d'un retrait relatif de l'Etat de l'organisation des processus de production agricole. Les changements perceptibles dans l'organisation de la mobilisation et de la répartition de l'eau témoignent des actuelles renégociations des « règles du jeu ». Ces modifications peuvent avoir un impact au-delà de l'application de nouvelles règles, si elles contribuent à engager des dynamiques par un effet d' « empowerment », tel que l'ont analysé Mathieu et. al. pour le Nord du Maroc (Mathieu, Benali et al. 2001). Ces processus de mobilisation des citoyens, comme le constatent Mahdi et Chattou, peuvent être « créateurs de cohésion et d'intégration politique, mais (...) également porteurs de capacité critique de parole et d'action vis-à-vis du politique institué et se trouver alors assimilé à des formes plus politisées, contestataires ou radicales de participation » (Mahdi and Chattou 2002).

3.3 Conclusions

En conclusion, il nous semble important de revenir sur ce potentiel d'innovations des sociétés rurales à travers les facteurs déterminants de leur conditions de vie : le secteur hydraulique et la production agricole. Des innovations importantes sont en cours dans ces secteurs, parfois renforcées par la crise hydraulique. L'acceptation des innovations passe toujours par un processus de négociation qui peut aussi perturber l'ordre social établi. Nous avons vu plus haut pour le cas du monde rural, que cet ordre est intimement lié à la répartition des facteurs de production, répartition a priori très inégale et accentuée par la crise hydraulique.

Ces évolutions peuvent mener à des crises sociales plus ou moins violentes, dont l'issue dépendra en grande partie des interactions entre les groupes marginalisés. Nous concevons ces

interactions dans le sens de la notion de « transformation des conflits » introduite précédemment. Dans la transformation de la crise sociale en une évolution constructive et innovatrice, les institutions médiatrices entre les différents groupes sociaux et entre ceux-ci et l'Etat jouent un rôle clé. Nous entendons par institutions ici des organisations où les différents types d'acteurs sont impliqués ou encore des institutions informelles, à savoir les règles, les normes et les valeurs structurant ces interactions (Ostrom 1990; North 1991; Ostrom, Gardener et al. 1994). Dans les deux cas, il s'agit de lieux et de modes de négociation d'intérêts, de constitution d'alliances et de luttes de pouvoir ou encore d'évolution de relations de confiance ou de méfiance.

Dans le cas présent, la négociation de la crise sociale liée à la crise hydraulique ne pourra évoluer de manière coopérative que si elle prend en considération les origines structurelles des polarisations observées, i.e. les mécanismes de marginalisation décrits ci-dessus. Dans cette évolution, les mobilisations collectives, formelles ou informelles, jouent un rôle important. Elles articulent des transformations de la société, de ses normes et de ses valeurs, et peuvent jouer un rôle de catalyseur entre les acteurs non-étatiques et les responsables administratifs ou politiques. En traduisant ces aspirations et ces besoins, elles accumulent un capital social et un savoir-faire essentiels pour une fonction d'intermédiaire entre l'autorité publique, les agriculteurs et le secteur privé. Ces capacités peuvent alors servir à faciliter un changement graduel des difficultés mentionnées. L'adaptation aux enjeux économiques, techniques et sociaux de la crise hydraulique peut ainsi, en passant par ces catalyseurs, contribuer à la gestion de la crise sociale potentielle, déjà perceptible dans plusieurs domaines.

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ONG société civile – NGO civil society

Atelier 3a	Ivan Cisneros (Ecuador) Bertha Nherera N°56 (Zimbabwe) Dr. Juan M. Picolotti N°30 (Argentina)	Water and civil society in Ecuador IUCN Rosa Experiences In Water Resources Management In Southern Africa The Right to Safe Drinking Water as a Human Right
Atelier 3b	Chcikhna Haidara N° 48 (Mauritanie) Basema Bashir (Palestine) N°42 CK Ganguly (Timbaktu Collective) (India) Karam Saber (Egypt)	Maintenance des petits équipements de pompage de l'eau et ses conséquences sur l'approvisionnement en eau potable et la lutte contre la pauvreté Water Access Constraint in the Occupied Palestinian Territories (OPT) Natural Resource Management LCIIR's Expertise In Supporting Farmers

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IUCN ROSA EXPERIENCES IN WATER RESOURCES MANAGEMENT IN SOUTHERN AFRICA

12-15th December 2005, Agadir, Morocco

*International workshop on Water Poverty and Social
Crisis: Perspectives for Research and Action*

Bertha Nherera- Water Programme

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THE RIGHT TO SAFE DRINKING WATER AS A HUMAN RIGHT

By Romina Picolotti¹

Introduction

During a research programme studying the dimensions of poverty, human rights and environment, an Argentinian NGO, CEDHA, identified the lack of access to safe drinking water in outlying poor neighbourhoods as a critical problem in the city of Córdoba, Argentina. This two-year research programme focused on specific geographical areas around Córdoba with high levels of poverty. It revealed that the lack of access to safe drinking water was a common and recurring problem in the poorest local communities.

The problem had four principal dimensions:

1. Lack of access to the local public water distribution network;
2. Contamination of water distributed by the existing local network, primarily due to a lack of State control over contracted cooperative providers who are charged with providing water to poor communities;
3. Contamination of groundwater, principally because of inadequate sanitation infrastructure and spill-over of contaminated water from homemade sanitation systems (domestic cesspools); and
4. Contamination of domestic water-storage tanks. This was caused by a number of factors, including: inadequate covers; poor maintenance and hygiene; a lack of regular checks; and atmospheric contamination due to the use of agro-pesticides and chemicals too close to areas of high population density, as well as the presence and/or use of pathogenic waste incinerators, crematories and other industrial pollution nearby.

Argentina's legal system guarantees a broad range of economic, social and cultural rights (ESC rights). The right to a healthy environment is guaranteed in the Constitution itself, while the rights to health, an adequate standard of living, and food have constitutional status because the international instruments providing for them have been incorporated into Argentina's Constitution.² In light of this legal framework and the pressing need for the State to perceive the problem of access to safe drinking water as a human rights problem, CEDHA decided to begin to litigate cases addressing the various dimensions of the problem in the city of Córdoba.

Deciding to litigate

When selecting cases, CEDHA uses the following criteria: population density; the degree of poverty; existing lack of access to safe drinking water; proximity to the public water distribution network; social organisation of the affected community, and the judicial viability of the case.

The principal obstacles that CEDHA encountered when litigating were the lack of a tradition of judicial enforcement of ESC rights, and the limited capacity and willingness of the judicial sector

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² The National Constitution incorporates 11 human rights instruments. These include the International Covenant on Economic, Social and Cultural Rights, the Universal Declaration of Human Rights, and the Convention on the Rights of the Child.

to influence public policy decisions.³ Other hurdles included the economic crisis being experienced by the country as a whole, as well as by the provincial and municipal governments.

Facts of the case

This article focuses on a case addressing the lack of access to safe drinking water in three poor neighbourhoods of the city of Córdoba, Argentina, which are not connected to the public water distribution network, and whose domestic groundwater wells are heavily contaminated with faecal matter, nitrates and nitrites.⁴

The affected neighbourhoods are *Chacras de la Merced*, *Villa la Merced* and *Cooperativa Unidos*. They have a combined population of around 4 500, approximately 43% of whom are minors under 17 years of age and nearly 5% of whom are older than 64. Approximately 30% of the neighbourhood's population is actively employed, while unemployment exceeds 23%. The average monthly income per household (in families with at least one employed member) is US\$ 175. The level of illiteracy is nearly 3%.⁵

Towards the end of the 1960s, the city built a sewer-water treatment facility called the *EDAR Bajo Grande* (henceforth 'plant' or 'facility') on the banks of the Suquia River, two kilometres upstream from *Chacras de la Merced* community, whose existence predates construction of the facility by 30 years. *Chacras de la Merced* borders the *Villa la Merced* and *Cooperativa Unidos* communities. The *EDAR* facility was inaugurated in 1987, under municipal control, with the capacity to treat 120 000 cubic meters per hour (m³/h) of sewer-water.

As the city of Córdoba kept on growing, the Municipality continued authorising new sewage connections, thereby progressively increasing the volume of sewer-water going into the plant. As a result, the plant now has two extremely pressing problems. The first has to do with the lack of maintenance and supplies of basic products needed to treat the sewer-water. Due to these limitations, the plant is currently operating at 70% of its full capacity. The second problem relates to the quantity of sewer-water flowing into the plant. Even if the plant were functioning at 100% capacity, it could only treat 120 000 m³/h. At present, the plant receives an average of 140 000 to 150 000 m³/h. This data indicates that the plant is receiving between 20 000 and 30 000 m³/h of sewage water that it could not treat even if it were operating at 100% capacity. The large disparity between the quantity of incoming sewage and the capacity of the facility to treat it results in daily spillage of untreated sewer-water directly into the Suquia River.

In July of 2003, on CEDHA's invitation, a representative of the CEQUIMAP laboratory⁶ arrived at *Chacras de la Merced* to take five water samples from the community. The faecal bacteria (*faecal coliform*) content of the river water collected downstream from the plant was 40 times higher than that of the sample taken upstream.

The samples taken from homes in the community also indicated severe contamination of water with faecal matter; the level of contamination increasing in direct proportion to the proximity of the home to the plant. Some of the samples showed up to 2000 *faecal coliforms* per 100 ml. The World Health Organisation (WHO) has stated that no *faecal coliforms* should be present in water destined for human consumption.

Legal strategy

The case was litigated by CEDHA's Human Rights and Environment Clinic. The legal strategy chosen in the case parallels CEDHA's general legal strategy, which is grounded in the objective

³ This is due to, *inter alia*, the fact that the judiciary is convinced that influencing public policy constitutes interference with the powers of the other branches of government. Under Argentinian law, such interference by a judge may result in his or her dismissal. Therefore, judges are extremely careful to avoid such behaviour.

⁴ MARCHISIO José Bautista y otros – AMPARO (Expte. N° 500003/36).

⁵ Statistics from *Perfil de la Pobreza en Córdoba* [Profile of Poverty in Córdoba], SEHAS.

⁶ A laboratory of the National University of Córdoba.

of enforcing ESC rights. CEDHA is working with environmental and human rights law to create positive jurisprudence, which will enable continual progress towards the complete enforcement of all ESC rights. With the approval of the respective plaintiffs, the organisation distinguishes between *all* the rights that have been violated and a selection of these rights, which they choose to present to the courts for enforcement. Thus, in this case, while the contamination of the water source led to the violation of multiple human rights, CEDHA only sought judicial enforcement of certain rights. These included the right to safe drinking water, the right to a healthy environment, the right to health, and the right to an adequate standard of living.

With a view to expediting the process as much as possible, CEDHA chose to present an '*amparo*' petition based on two main criteria. The aims of the case were principally limited to securing safe drinking water for the affected parties and ensuring that contamination of the Suquia River immediately cease.

Actions were filed against the Provincial State and the Municipality of Córdoba. The action against the Provincial State was based on its obligation to ensure that the water of the Suquia River is suitable for human and industrial use, and on its duty to provide direct or indirect access to safe drinking water to the public, in conformity with previous jurisprudence and internal legislation. The action against the Municipality centred on the injurious and dangerous environmental degradation and its human consequences. This strategy enabled CEDHA to broaden the range of parties potentially responsible for violating rights, and to hold them accountable in differentiated but collective terms. The NGO argued that the State is the guarantor of human rights, irrespective of the internal organisational structure it might choose to adopt.

This approach enabled CEDHA to capitalise on existing and ongoing internal conflict between the Municipality and the Province. Rather than claiming innocence in the matter, the two parties proceeded to point the finger of responsibility at each other. However, although the duality and conflict between political levels operated in favour of the litigants at this stage of the case, it proved problematic later on when it came to execution of the court order, as the political differences created significant barriers to implementing the order.

As part of its strategy, CEDHA requested that members of affected communities be present at various stages of the process. This practice, which is quite unusual for the kind of legal action brought in this case, exerted strong political pressure on all the parties involved. The filing was jointly made by CEDHA and four community members, who had previously made their homes available for water sampling.⁷ The strategy involved utilising the legal action as a political pressure mechanism. The objective was to confront the State with a 'Pandora's box' of thousands of potential subsequent cases to be brought by other affected community members, should the first action not result in a permanent solution to the problem of inadequate access to safe drinking water.

The following international human rights instruments were invoked in the case filing presented to the court: the Universal Declaration of Human Rights (UDHR); the International Covenant on Economic, Social and Cultural Rights (ICESCR), and the Convention on the Rights of the Child (CRC). The case was ultimately sustained by evidence coming primarily from the State's own reports on the functioning of the treatment facility and the levels of contamination of the Suquia River.

The ruling

The case was resolved in the first instance by the Civil and Commercial Court of the 8th Nomination. Having accepted the standing of the NGO (CEDHA) and the four affected community members, the judge ruled that the State was responsible for violating the rights to a

⁷ CEDHA carefully selected sites where they felt they could obtain solid evidence that the Suquia River and domestic water wells were heavily contaminated because of the plant. For example, they took samples from the river upstream and downstream of the plant, and from a school in one of the neighbourhoods which is attended by approximately 300 children who eat there and drink water from a local water well on a daily basis.

healthy environment, to an adequate standard of living, to access to safe drinking water, and to health. The Court recognised the human right to safe drinking water, which is implied by the right to health. The judge explicitly cited the UDHR, the ICESCR, and General Comment No. 15 on the right to water of the Committee on Economic, Social and Cultural Rights.⁸ The Court also recognised the immediacy with which the State must address the environmental situation, and that such immediacy implies the obligation to adopt urgent measures with a view to avoiding irreversible damage to the ecosystem and – consequently – to those individuals who inhabit the environment in question. The Court stated that:

[T]he environment is not only a collective good, but a requisite sine qua non for [the existence of people], [it] therefore is an individual patrimony and at the same time, a collective one, with implications for present and future generations, for which we must not only act in defence of present values, but in the name of future persons and environmental values.

With respect to the judicial enforcement of the rights at issue in this case, the Court declared that:

[W]hile it is good that in a State of rule of law ... a judicial entity [does] not conduct activities that are the responsibility of the Parliament or Presidency, the discretionary and privative competence of an organ of the State has limits, and ... the action of the Judicial power, in the face of the degeneration of those responsibilities, does not imply an invasion of one power over another, but rather the framing of public authority to uphold the Constitution and the law.

The Court ordered that:

[T]he Municipality of Córdoba adopt all of the measures necessary relative to the functioning of [the facility], in order to minimise the environmental impact caused by it, until a permanent solution can be attained with respect to its functioning; and that the Provincial State assure the [plaintiffs] a provision of 200 daily litres of safe drinking water, until the appropriate public works be carried out to ensure the full access to the public water service, as per decree 529/94.⁹

Full costs were awarded to the plaintiffs.

Execution of the order

In the process, CEDHA succeeded in compelling the Municipality to present an 'integral sewage plan' under which US\$ 1.75 million was to be invested for rehabilitation of the existing infrastructure, and US\$ 6 million in order to increase plant capacity. CEDHA requested formal clarification of the ruling in order to ensure that the Judge would order precisely the measures necessary with regard to the functioning of the plant, in order to minimise its environmental impact until a permanent solution was reached, including specifying activities and their implementation timeframe.¹⁰

In December 2004, the Province of Córdoba commenced the public works required to provide fresh and safe water to the affected communities.¹¹ The Provincial State has since finished construction of the main section of the water system. The second phase of building – establishing connections to homes in the communities – is now due to begin. Work has also begun on the

⁸ See Committee on Economic, Social and Cultural Rights, General Comment No. 15, The right to water (29th session, 2003), U.N. Doc. E/C.12/2002/11 (2003), reprinted in *Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies*, U.N. Doc. HRI/GEN/1/Rev.6, p. 105 (2003).

⁹ Decree 529/94 is the internal legislation with which the provision of access to water must comply.

¹⁰ The judge is expected to respond to this request in March or April.

¹¹ The works include the digging of a new water well, the construction of new public water-storage facilities and the installation of a pneumatic pump.

piping necessary to supply water to the neighbourhoods. This will eventually provide *Chacras de la Merced*, *Cooperatives Unidos* and *Villa la Merced* with permanent access to safe drinking water. The Municipality has undertaken to furnish the necessary pipes for home connections.¹² Construction work is expected to be completed by March 2005.

There have been several other developments as a result of the Court's ruling. The Municipal Executive ordered by decree that "*the Executive will not authorise new sewage connections until [the Municipality] improves the capacity of the sewage plant*".¹³ This has had one interesting result — the coincidental alignment of the position of important economic actors such as the Construction Council and the Engineering, Architects and Real Estate Associations with that of CEDHA. As these actors cannot publicly call for new connections to be authorised, they are instead using economic arguments to exert pressure on the Executive to improve the plant as fast as possible. Their principal arguments are that as construction work has ceased because no new buildings can be connected to the sewage system, construction workers, architects and engineers, etc. are losing their jobs. In addition, real estate associations are losing money because nobody wishes to buy new apartments with no sewage connections.

In addition, the Municipal Congress recently passed a law dictating that, from now on, all revenue from sewage and sanitation taxes is to be invested exclusively in the sewage system. Annually, the Municipality collects around US\$ 10 million in sewage taxes. Previously, this money was allocated at the Executive's discretion. As the facts that led up to this case reveal, they were obviously never invested in improving the sewage treatment system.

Conclusion

A request for the provision of permanent access to safe drinking water is not merely a simple request for the provision of a public service. Rather, it is founded on the desire to assure the full realisation of the human rights to health, food, an adequate standard of living, a healthy environment and of access to safe drinking water. The Court in this case established itself as the guarantor of the human rights of the residents of these neighbourhoods. This decision constitutes an important step towards the judicial enforcement of these rights.

¹² CEDHA is still negotiating the quality of pipes to be used in construction.

¹³ Resol. D-79/04, 26 Oct. 2004.

**ASSOCIATION POUR LA PROTECTION DE L'ENVIRONNEMENT ET
LA GESTION DE PROJETS D'EAU EN MAURITANIE**

**Maintenance des petits équipements de pompage de l'eau
et ses conséquences sur l'approvisionnement en eau
potable et la lutte contre la pauvreté**

**Par Cheikhna A. AIDARA
Coordinateur de l'APEM-GPE**

Octobre 2005

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ACRONYMES

AGR	Activités génératrices de revenu
BAD	Banque Africaine de Développement
BM	Banque Mondiale
CDHLCPI	Commissariat aux Droits de l'Homme, à la Lutte Contre la Pauvreté et à l'Insertion
CDMT	Cadre de Dépenses à Moyen Termes
CSLP	Cadre Stratégique de Lutte Contre la Pauvreté
DCL	Direction des Collectivités Locales
DDS	Direction de Développement Social (MAED)
DHD	Développement Humain Durable
FAPONG	Fonds d'Appui à la Professionnalisation des ONGs
IEC	Information, Education et Communication
MIPT	Ministère de l'Intérieur des Postes et Télécommunications
NTIC	Nouvelles Technologies de l'Information et de la Communication
OMD/MDG	Objectifs du Millénaire pour le Développement
ONG	Organisation Non Gouvernementale
ONS	Office National de la Statistique
OSC	Organisations de la société civile
PANE	Plan d'Action National pour l'Environnement
PIB	Produit Intérieur Brut
PNBG	Programme National de Bonne Gouvernance
PNUD	Programme de Nations Unies pour le Développement
PV / VIH	Personnes Vivant avec le VIH
VIH / SIDA	Virus de l'Immunodéficience Humaine / Syndrome d'Immunodéficience Acquis

Résumé

La Mauritanie est un pays désertique qui appartient à la zone Saharo-sahélienne où l'eau est rare. Il est plutôt difficile et coûteux d'y accéder et il est souvent nécessaire d'utiliser des méthodes mécaniques et d'acquérir un équipement importé pour l'extraire de puits dont la profondeur est parfois supérieure à 20 mètres. Au niveau des zones rurales, entre 80 et 90 % des besoins en eau proviennent des eaux souterraines, notamment à travers les puits.

L'un des principaux problèmes pour rendre ces puits utiles, est la maintenance des équipements de pompage : ces équipements tombent très souvent en panne après une courte période de fonctionnement à cause notamment des mauvaises et sévères conditions d'utilisation. Il faut des techniciens qualifiés pour pouvoir procéder à la réparation. Les autorités locales disposent de peu de ressources budgétaires pour assurer cette réparation ou louer les services de techniciens qualifiés.

C'est ainsi que la plupart des petits projets d'accès à l'eau potable échouent.

Pour faire face à cette situation, le village de NimJatt (situé dans la région du Trarza, au Sud mauritanien) a bénéficié de l'appui de deux ONG et grâce à une méthode participative simple, s'est organisé pour gérer efficacement ses puits d'eau équipés de motopompes : l'eau n'est plus gratuite et chaque famille doit payer une somme calculée selon sa consommation en eau (pour les besoins de boisson, de cuisson, de toilette, de culture et d'élevage). L'argent ainsi collecté est confié à un Comité de Gestion qui veille à la maintenance des puits et à l'utilisation des ressources restantes pour financer d'autres AGR. Au début, plusieurs difficultés se sont dressées devant le projet (positionnement par rapport aux pouvoirs locaux étatiques et traditionnels, difficulté de collecte des recettes), mais il a fini par réussir car il répondait à un besoin vital pour les bénéficiaires.

Les conséquences de cette réussite sont presque inattendues et importantes : le projet s'est pérennisé, l'approvisionnement en eau est devenu régulier et suffisant, les jeunes filles qui consacraient beaucoup de temps à la corvée d'eau ont pu mener une scolarité plus normale, la malnutrition et les maladies diarrhéiques ont reculées, le niveau de vie des villageois a augmenté et ils ont appris à s'organiser et à compter sur eux-mêmes.

Cette expérience démontre d'une part qu'un projet ordinaire et tout à fait simple pourvu qu'il soit pertinent et réponde à un besoin réel, peut aider à améliorer les conditions de vie des populations et d'autre part l'accès à l'eau potable est parfois facilité par des mesures simples et accessibles et cet accès à l'eau reste importante pour une lutte efficace contre la pauvreté. A condition que les bénéficiaires soient impliqués et aidés à s'organiser pour prendre leur destin en main.

Mots Clefs :

Rareté de l'eau, eau et développement, équipements de pompage, lutte contre la faim et la pauvreté, sécurité alimentaire, gestion de l'eau, création et augmentation des revenus, équité sociale, changement de comportement, autonomisation des femmes, approche genre, implication des acteurs, approches participatives.

Summary

Water is scarce in Saharan and Sahel areas. Mauritania belongs to this area and It is expensive and difficult to access water here and often necessary to use mechanical methods and to acquire imported equipments to rise it from wells of more than, in many areas, 20 metres of depth. About 90 % of rural needs of water come from groundwater. And one of the sharpest problems is maintenance of equipment for rising water: they often breakdown after a short time of working, because of misuse and local hard conditions. Technical skills are necessary to repair pumps and to install equipment of distribution. The local authorities have little budget for maintenance of such equipments. And hiring good technicians is out of their reach. Thus most of small water projects fail, in particular those of drinkable water in rural communities mainly because of absence of repair.

To face this situation, the village of NimJatt (in the region of Trarza, South of Mauritania), empowered by two NGOs, experiences a new and until now good method for managing efficiently its water project of several wells equipped with water pumps. The quantity of water needed by each family is no longer free. Each user has to pay an amount for the quantity he wants. The price per quintal varies according to the activity for which the water is needed (drinking and other health necessities, farming, cultivating). The collected money is managed by a village committee (composed of two men, two women and a young person, who can be male or female; the president of the committee is the older of its members and 75% of the committee is changed every year). The money serves in the beginning to maintain and replace breakdown pumps and other equipments. There were some difficulties in the first time: how to choose the committee, how to manage the money, how to collect it from the householders... The project also faced some disagreement from the administration which is jealous of its authority and privileges. Difficulties come also from some important personalities who wish to run every thing in their area. But the noticeable success after few months encourages the inhabitants to continue.

And the consequences were very important and unexpected: the project becomes perennial, they have no longer periodic break off water provision; and thankful to the water supplying regularity a lot of positive effects happened: girls and young women have more time to go to school, the money remaining after maintaining the wells was invested in new income generating activities like vegetables culture, aviculture, livestock farming, etc. The poverty and hunger are now reduced by half. Other villages and communities are now interested by this method but a minimum of education is always necessary, particularly for the members of management committee.

This study shows how an ordinary but relevant idea can bring an efficient solution for better local water management with a lot of positive effects like water supplying regularity, poverty reduction, women equality, food security ... Water can become an important source of health and wealth if it is relevantly managed. The project shows how citizen involvement and participative process can change positively water management at local level.

Key words:

water scarcity, water equipments, poverty and hunger reduction, life-style changes, local water resources management, food production, income increasing and generation, action oriented strategies, social equity, women empowerment, stakeholders responsibilities, participative and decentralized policies, citizen involvement.

Introduction

"Nous ne devons pas laisser les objectifs économiques diriger nos vies au détriment du développement humain et social. L'histoire nous enseigne que l'ordre inverse fonctionne bien mieux : la poursuite d'objectifs sociaux est un moyen efficace de contribuer au progrès général du développement".

Sir Richard Jolly, Président du Conseil de Concertation pour l'Approvisionnement en Eau et en Assainissement (CCA EA) :

La réalisation des Objectifs du Millénaire pour le Développement (OMD) est, en ce qui concerne l'eau, de réduire de moitié le nombre de personnes ne disposant pas de la couverture minimale en eau et en assainissement à l'horizon 2015. Ce but, très difficile à atteindre dans la plupart des pays en développement, en particulier ceux désertiques et pauvres comme la Mauritanie, implique le renforcement de capacités des communautés, des partenariats efficaces entre les autorités administratives, le secteur privé et les organisations de la société civile (OSC) et aussi des partenariats globaux à l'échelle régionale et internationale.

Ce colloque vient donc à point nommé. Et je voudrais ici saisir l'agréable occasion que m'offre cette tribune pour remercier, au nom de tous les membres de l'APEM-GPE, les organisateurs du Colloque Internationale 'Pauvreté Hydrique et Crises Sociales' pour nous avoir permis de participer à cette très importante et instructive manifestation. Je voudrais également remercier les partenaires du Colloque, en particulier l'IRD, l'Université d'Agadir, le CRDI et la Fondation Ford.

Enfin, je remercie M. Habib Ayeb et Madame Nathalie Finot dont le contact régulier et la disponibilité constante pour répondre à nos interrogations, ont permis une organisation optimale de notre participation.

Les organisateurs du Colloque ont très bien raison de souligner que 'l'articulation entre les modes de gestion de l'eau et la persistance de la pauvreté est relativement peu abordée dans les travaux de recherche' et pourtant les réalités du terrain que les ONG connaissent souvent très bien, montrent la relation corollaire entre Accès à l'Eau et Pauvreté d'une part et l'importance d'une bonne gestion de la ressource en eau (qu'elle soit par ailleurs destinée à un usage domestique ou à l'agriculture irriguée) et la résolution des crises sociales établies ou latentes d'autre part.

C'est dans ce cadre que se situe la présente modeste communication qui vise à exposer une expérience que nous avons jugé pertinent de vous relater et d'en tirer avec vous les leçons mais cette communication, qui concerne les conséquences de la maintenance des petits équipements modernes des puits sur la lutte contre la pauvreté et le renforcement des capacités des communautés de base serait, serait tronquée à mon avis si elle ne vous permettait pas de situer le contexte dans lequel se situe l'expérience dont il est question ici, à savoir la Mauritanie.

Le Contexte

La République Islamique de Mauritanie (RIM) compte une population d'environ 2,5 millions d'habitants répartis inégalement sur un vaste territoire de 1.030.700 km². Indépendante depuis 1960, la Mauritanie est un pays désertique à plus de 90%. Les principales ressources du pays proviennent du commerce, du secteur minier et de la pêche. Depuis le début des années 70 le pays a été confronté à des sécheresses sévères et une accélération dramatique de la désertification des zones précédemment habitées et cultivées. Cette situation a affecté les performances du secteur agricole et de l'élevage et a contribué à la sédentarisation et à l'urbanisation rapide des populations. Ainsi, la population urbaine, dont une bonne partie se retrouve à Nouakchott, représente plus de la moitié de la population nationale.

Les conditions de vie des femmes mauritaniennes sont encore difficiles. En effet, bien qu'elles représentent 52% de la population totale, elles demeurent analphabètes à 53% (contre 65% des hommes alphabétisés). Le taux de chômage féminin est de 34% alors qu'il s'élève à 26 % pour les hommes. Aux niveaux politique et décisionnel, la représentativité des femmes demeure encore faible: 4,5% des sièges parlementaires (dans l'ancien parlement) et 7% des postes de responsabilité dans la fonction publique. La mortalité maternelle est alarmante (747 décès pour cent mille naissances vivantes) et certaines pratiques sociales néfastes demeurent: mariages et maternités précoces, excision qui touche 75% des femmes, etc.

Depuis plus d'une décennie, la RIM s'est engagée dans des politiques de réformes qui ont touché l'ensemble de la vie politique, économique et sociale du pays.

La mise en œuvre du programme de réformes économiques, engagé depuis 1992, a favorisé un taux moyen de croissance annuelle de 4,4% entre 1992 et 1999 et réduit sensiblement les déséquilibres financiers. Mais cette croissance a jusqu'ici peu d'incidence sur la réduction de la pauvreté car elle ne parvient pas à s'encrenir dans les milieux pauvres (la pauvreté atteint encore au moins officiellement 46,3% en 2000).

En outre, des progrès significatifs restent à faire dans le domaine de la démocratie, de la gouvernance et des droits humains. L'émergence d'une société civile de plus en plus active dans les actions de développement économique et social est encourageante mais celle-ci manque encore de capacités et d'expériences et est encore faiblement impliquée dans l'exécution de projets de développement. Les questions de genre ne sont pas suffisamment prises en compte dans les politiques publiques en vue de réduire les inégalités citées plus haut.

En Mauritanie, la référence aux organisations de la société civile concerne l'ensemble des associations, des organisations socioprofessionnelles, des groupements de base et des organisations non gouvernementales qui jouent un rôle d'intermédiaires entre les citoyens et les institutions politiques et administratives de l'Etat (associations de droits de l'homme et associations féminines, Ordres professionnels, ONG d'action pour le développement et l'environnement, Réseaux et groupes de base d'activités génératrices de revenus, associations culturelles, Ulémas, syndicats, secteur privé, presse et médias)..

Les conditions d'émergence et de structuration de la société civile en Mauritanie n'ont pas permis jusqu'ici de clarifier le débat sur la nature et les modalités d'intervention des

composantes de cette société civile en gestation. Cet effort de clarification doit être mené dans le cadre d'un large débat national qui aiderait, par ailleurs, à préciser la contribution de l'ensemble de ces instances aux activités de promotion du développement économique et social. Ce débat reste encore à faire.

Les principaux handicaps pour une action efficace des ONG demeurent :

- la jeunesse du mouvement associatif en général ;
- la forte concentration des ONG à Nouakchott ;
- l'absence de sièges ou d'adresses et de pages Web ;
- la difficulté d'accéder aux financements nécessaires à leur action ;
- l'insuffisance d'organisation ou d'encadrement des populations ;
- le manque de spécialisation ou de professionnalisation ;
- la faiblesse des moyens financiers pour faciliter l'auto prise en charge ;
- l'absence de plans stratégiques (vision à moyen et long terme) ;
- la faiblesse du nombre de personnel qualifié permanent travaillant pour les ONG ;
- la dépendance des ONG des leurs partenaires financiers.

Cependant, en Mauritanie comme partout ailleurs, on pense de plus en plus qu'il n'y aura jamais de vrai développement sans une participation de qualité de la société civile dans la dans tous les domaines et en particulier ceux du développement.

Le Projet

En général, la gestion des ressources naturelles pose beaucoup de problèmes et la problématique de l'accès à l'eau en constitue, au moins en pays de désert comme la Mauritanie, l'essentiel. C'est autour des points d'eau et pour leur contrôle ou leur partage que se sont formés, perpétués ou résolus les plus grands conflits de notre pays.

L'accès à l'eau enrichit et renforce et sa rareté appauvrit et déstabilise aussi bien les communautés que les Etats.

C'est en Avril 2002 que, lors d'une enquête auprès de villages pour examiner l'applicabilité des approches participatives sur le terrain, que nous nous sommes réunis avec les habitants du village de NimJatt ; c'est au cours de cette réunion d'identification des problèmes pour les prioriser et essayer de leur trouver une solution, qu'est né le Projet de Gestion Participative des Puits d'Eau de NimJatt (que nous avons baptisé par son acronyme et du mot espoir en arabe, PGPEN-Amel). Au cours de cette réunion, nous avons identifié, avec la communauté locale, 24 problèmes en tout, à partir desquels nous avons donné la priorité à 7 d'entre eux : (a) difficulté d'approvisionnement en eau ; (b) difficulté de faire de l'agriculture et de l'élevage ; (c) malnutrition des enfants et des femmes ; (d) déperdition scolaire chez les jeunes filles ; (e) manque de revenus pour les besoins essentiels ; (f) absence de liaison avec le centre urbain le plus proche ; (g) la difficulté de faire prendre en charge leurs problèmes par les autorités locales.

Sur le plan géographique, le village de NimJatt est situé dans la région du Trarza, au Sud-ouest Mauritanien ; une région caractérisée par un relief plat (dunes de sable), une végétation désertique, sans courant d'eau sauf vers la rive droite du Fleuve Sénégal, situé à environ 250 KM de NimJatt. Les puits sont moyennement profonds : entre 10 et 15 mètres, souvent à eau douce mais parfois aussi salée (pour les puits moins profonds).

Sur le plan humain, le village de NimJatt compte environ 200 familles, soit plus de 700 personnes dont 300 adultes, pour la plupart des femmes chefs de ménages (les hommes ont émigrés pour diverses raisons mais reviennent saisonnièrement). Ces familles vivent toutes ici depuis plus d'un siècle. Elles appartiennent presque toutes à un même ensemble tribal, maraboutique et conservateur.

Sur le plan économique, les habitants vivent des produits de l'élevage et, accessoirement de culture limitée de légumes ; mais les principaux revenus proviennent de l'argent envoyé par les membres de la communauté ayant émigré pour gagner leur vie (généralement au Sénégal, en Gambie et dans certains pays arabes du Golfe.) Ces envois d'argent sont tributaires des aléas de l'émigration.

Le village est doté d'une école primaire, dont la fréquentation par les enfants de la communauté est irrégulière notamment en ce qui concerne les filles (souvent occupées à aider leur maman pour les travaux ménagers dont la corvée d'eau et de bois de chauffe constituent les plus accaparants).

Le village compte quatre puits d'inégal rendement ; trois de ces puits sont dotés de motopompes, qui tombent périodiquement en panne, empêchant ainsi le village d'avoir un approvisionnement régulier et suffisant en eau.

En temps normal, ces motopompes sont maintenues par les services de l'hydraulique via les autorités administratives mais trois facteurs rendent cette maintenance hypothétique et insatisfaisante : a) le peu de moyens dont dispose les autorités locales dont relèvent NimJatt, b) l'éloignement du centre administratif et la difficulté de déplacement pour signaler à temps les pannes et c) l'indisponibilité fréquente de technicien capable d'effectuer les réparations.

Apparemment, ce problème d'approvisionnement en eau était à juste raison le principal souci des villageois.

La démarche participative que nous avons préconisé et appliqué après validation avec les membres de la Communauté de NimJatt était la suivante (toutes les couches ont été impliquées) :

1. Le diagnostic participatif avec la communauté
2. L'identification des priorités
3. Classification des priorités
4. Elaboration du projet visant à solutionner la maintenance des puits
5. Recherche des financements
6. Exécution des projets
7. Suivi évaluation

Nous avons suggéré, pour commencer, de mettre en place un comité de développement élu par la communauté.

Le Comité, assisté par notre ONG pour la méthodologie de conduite des débats et, après des échanges de points de vue avec tous les membres de la communauté au cours de réunions publiques, a décidé avec l'accord de tous que l'accès à une eau potable et suffisante est la priorité N° 1. Notre ONG a alors proposé de les aider à réaliser ce rêve (voir annexe I : la problématique de l'eau en Mauritanie).

Nous avons en effet constaté que toutes les priorités arrêtées ne peuvent être réalisées que s'il y a d'abord un accès adéquat et suffisant à l'eau potable. Par exemple, dans de nombreux cas, les femmes ont mentionné les puits comme étant des zones de grand risques : des nombreuses femmes ont été victimes d'agressions sexuelles et de viols pendant qu'elles allaient chercher de l'eau. Par conséquent, le creusage des puits et leur dotation en permanence d'une motopompe éliminent les risques d'aller très loin du village pour chercher de l'eau. Cette eau permettra également aux femmes de réaliser des périmètres maraîchers et d'élever des volailles et de petits ruminants, et donc de mieux se nourrir et nourrir leurs enfants, d'avoir des rentrées d'argent pour mener d'autres activités ou faire des investissements sociaux pour leur communauté (véhicule de liaison avec la ville, participation à la construction de salle de classe, pérennisation des puits, etc.). Puiser l'eau à côté et en abondance, permet également aux filles de pouvoir continuer leur scolarité.

Mais la réalisation de ce projet, en l'absence de financements externes, implique que la communauté locale accepte de couvrir la totalité des charges du projet. Ceci est essentiel pour promouvoir l'appropriation locale ; les membres de la communauté peuvent contribuer en espèces, en nature ou par le travail. Une flexibilité est ainsi instaurée dans ce mélange pour que chacun contribue. Au fur et à mesure que la communauté s'enrichit, la contribution en espèces augmentera vraisemblablement en importance.

Pour avoir une eau permanente et suffisante, il faut que les puits et les motopompes fassent l'objet d'un entretien régulier et efficace, ce qui suppose d'avoir les moyens nécessaires pour louer les services d'une équipe professionnelle (un puisatier, un electricien-mecanicien et un plombier).

Le projet consistait à rendre l'eau payante (chose que les habitants n'avaient jamais connu auparavant) ; chaque ménage aura accès à l'eau qui lui convient pour ses besoins et activités (cuisson, toilette, culture, élevage) mais à titre payant avec des tarifs modestes et modulés selon la vitalité des besoins et activités :

Tarif 1 pour les besoins de boisson et de cuisson

Tarif 2 pour les besoins de toilettes

Tarif 3 pour les activités agricoles et d'élevage

Tarif 4 pour la construction et autres

Un Comité de Gestion et de Supervision de 5 personnes est élu par la communauté pour gérer les fonds générés et réguler l'utilisation de l'eau.

Après quelques hésitations, les habitants se sont enthousiasmés pour le projet ; cependant des difficultés inattendues sont venues des autorités administratives qui voulaient au départ que la gestion de la maintenance soit de leur exclusivité. Elles n'avaient également pas prévu que l'eau puisse être distribuée à titre onéreux mais après des réunions d'explications tripartites (ONG impliquées, représentants du village et autorité administrative de l'arrondissement et ses collaborateurs techniques), les choses sont rentrées dans l'ordre et même un appui moral a pu être obtenu pour faciliter l'aboutissement du projet. Les notabilités du village ont également essayé au début du projet de le bloquer car elles pensaient qu'elles devaient désigner le Comité de gestion dont l'élection constituait un précédent incompréhensible ; il a fallu là aussi mener une campagne d'explication et de plaidoyer pour faire passer le projet.

Le Comité de Gestion (sans le mot 'Supervision' dont certains notables ne voulaient pas entendre parler) est composé de deux hommes et deux femmes (une première) et un représentant des jeunes. Le plus âgé préside le Comité (il ne fallait pas trop bousculer ici les habitudes) ; la trésorerie est confiée à l'une des dames et le représentant des jeunes tient la comptabilité et effectue les éventuels achats.

Tous les six mois, se tient une assemblée du village pour renouveler le Comité : deux membres restent et trois sont changés en tenant compte toujours de la parité ; cela semble convenir aux villageois.

Pour démarrer, une collecte volontaire est organisée pour remettre les motopompes en marche ; notre ONG participe à cette collecte qui permet de mobiliser assez de fonds pour déjà mettre les puits sur les rails et commencer l'application du projet.

Durant les premiers 6 mois, l'eau vendue permettait juste d'assurer la maintenance des puits ; en effet, plusieurs familles étaient réticentes pour acheter l'eau et d'autres en achetaient le moins possible mais grâce à une action IEC, les habitants de NimJatt ont fini par appréhender l'utilité d'investir dans l'eau : une santé meilleure, un bien être accru, des revenus plus importants et une nourriture plus abondante.

Deux conséquences de ce projet nous ont surtout semblé très importantes : les filles qui passaient beaucoup de temps à la recherche de l'eau d'un puits à l'autre et dans une longue file d'attente, sont maintenant libérées en grande partie pour suivre normalement leur scolarité.

L'autre conséquence : le projet dégage maintenant un surplus d'argent après les opérations de maintenance ; nous avons conseillé au Comité avec lequel nous avons maintenu des contacts réguliers, de faire avec ces fonds du micro-crédit pour encourager des AGR au sein du village ; cela semble marcher très bien.

Conclusion

L'expérience de la conduite de ce projet a mis en évidence plusieurs leçons pour nous :

- ⇒ L'importance des démarches participatives pour aider les communautés de base à se prendre en charge et à améliorer durablement leur niveau de vie à condition que le processus de participation soit bien mené et même s'il y a des risques que l'élite puisse faire main basse sur le processus de développement, les groupes vulnérables sont renforcés s'ils sont activement impliqués dans les exercices de diagnostic et de définition des priorités, dans la planification des actions et dans la mise en œuvre de ces plans. Ces démarches permettent aussi visiblement de promouvoir avec des moyens modestes, l'habilitation économique et sociale de la population rurale y compris avec des moyens modestes, de promouvoir l'habilitation économique et sociale de la population rurale y compris les femmes, les jeunes et les groupes marginalisés. La gestion des projets d'accès à l'eau peut être l'occasion privilégiée et pertinente de l'application de ces démarches ;
- ⇒ L'accès à l'eau a une incidence directe et visible sur la lutte contre la pauvreté et l'amélioration du bien être en général des populations ; en effet, la plupart des autres facteurs de progrès dépendent de cet accès ;
- ⇒ Enfin, c'est la dernière leçon évoquée et non la moins importante, l'accès à l'eau est parfois handicapé par des obstacles que des mesures relativement simples et faciles

peuvent aider à lever efficacement ; il en est ainsi de la maintenance efficiente des équipements des ouvrages d'approvisionnement en eau.

ANNEXES

- I- LE SECTEUR DE L'EAU EN MAURITANIE***
- II- REPARTITION DES LOCALITES MAURITANIENNES SELON LEUR NOMBRE D'HABITANTS***
- III- MENAGES ET SOURCE D'APPROVISIONNEMENT EN EAU EN MAURITANIE***
- IV- CARTE HYDROLOGIQUE DE LA MAURITANIE***
- V- OUVRAGES HYDROLOGIQUES EN MAURITANIE***
- VI- LES ENJEUX MAJEURS EN MATIERE DE GESTION DE L'ENVIRONNEMENT EN MAURITANIE***

ANNEXE I

LE SECTEUR DE L'EAU EN MAURITANIE

1. Aperçu général

La problématique de l'eau de la République Islamique de Mauritanie doit prendre en compte de multiples facteurs géographiques et anthropiques. Le pays se caractérise en effet par un territoire très étendu, une faible pluviométrie, une population de 2,5 millions habitants concentrée dans la capitale et assez dispersée dans les wilayas. Les ressources en eau de surface et souterraine sont peu abondantes et mal réparties dans l'espace. La gestion de ces ressources pour l'alimentation en eau potable et l'agriculture nécessite des dispositions spécifiques adaptées.

Parmi les problèmes majeurs à résoudre, on peut citer :

- a) Le manque d'accès à l'eau potable pour un nombre important de communautés sédentarisées :

En dépit d'un forage équipé d'une pompe manuelle, plusieurs villages disposent en général d'une source alternative d'eau polluée (puits, puisard, mares,...) qui arrive en général à résorber partiellement le déficit des besoins en eau en saison des pluies avec tous les risques sanitaires qui peuvent en résulter.

- b) L'insuffisance des moyens d'exhaure pour permettre de subvenir aux besoins des populations :

Les forages réalisés et équipés de pompes manuelles dans le pays n'arrivent pas couvrir les besoins de la population en dépit de la présence d'un débit important qui ne peut être mobilisé par absence d'un moyen d'exhaure adéquat.

Les profondeurs élevées de la plupart des forages exécutés et de leurs niveaux dynamiques, rendent l'usage d'une pompe manuelle pratiquement impossible.

Ce problème reste conjugué au débit faible par définition de la pompe manuelle.

- c) Le taux élevé de maladies d'origine hydriques

Le taux d'affection des maladies hydriques reste élevé. Ces maladies affectent généralement la couche la plus vulnérable à savoir les enfants. Selon l'annuaire des statistiques sanitaires (1998), le motif majeur des admissions dans les centres de réhabilitation nutritionnelle (CREN), est la diarrhée qui est souvent liée à la consommation des eaux polluées. Les maladies gastro-entériques, parasitoses intestinales, typhoïde, hépatite virale sont également fréquentes chez les enfants. On dénombre par ailleurs des cas de vers de Guinée et de bilharzioses dans la zone du fleuve. Le manque d'eau dans les villages entrave les pratiques d'hygiène en particulier chez les enfants, ce qui empêche aussi de pouvoir éviter la prolifération des trachomes.

- d) La production des coopératives féminines est faible en absence de la mobilisation d'une ressource d'eau capable de répondre à leur besoin

La plupart des coopératives féminines sont directement impliquées dans les activités maraîchères, artisanales. Ces activités qui constituent une source de revenu importante pour ces associations, sont affectées par l'absence d'un approvisionnement adéquat en eau potable

e) L'éloignement du point d'eau des habitations des ménages

L'éloignement de la source d'approvisionnement en eau, consomme un temps considérable du temps de travail des forces productives des villages. La création de branchements particuliers et de bornes fontaines pour l'abreuvement du cheptel, permettra de recycler le temps investi par les populations dans des activités de production.

f) Le taux de scolarisation faible de certains centres

Le Ministère chargé de l'Education Nationale a mis en place une politique de création d'écoles qui pose comme critère essentiel l'existence d'un système d'approvisionnement en eau potable éligible à la création de nouvelles écoles. La création de réseaux d'eau potable permettra le renforcement de l'éducation et de l'hygiène en milieu scolaire dans les villages cibles.

g) l'exode rurale vers les grands centres urbains

Le manque d'activité génératrice de revenu, l'absence d'approvisionnement en eau adéquat sont souvent une origine de l'immigration vers les grands centres urbains.

h) l'abreuvement du Cheptel durant la saison sèche

Durant la saison sèche, l'abreuvement du cheptel, devient un problème sérieux pour les habitants du village. Les animaux épuisés par les mois de sécheresse ne peuvent plus assurer l'exhaure animale de même les mares finissent par tarir. La présence d'un système d'approvisionnement en eau permettra d'alléger ce problème et peut aider à la régénération du milieu naturel par la plantation d'espèces locales qui peuvent servir d'éléments de fourrage pour les animaux en période de soudure.

i) réduction de la pauvreté dans le pays

L'approvisionnement en eau potable des villages aura certainement un impact sur le seuil de la pauvreté. Le temps investi dans la recherche de l'eau pourra être utilisé pour la production d'activités génératrices de revenu. L'amélioration de la santé des populations aura également un impact sur leur revenu par la diminution de la facture des soins curatifs.

2. La réforme institutionnelle

La réforme du secteur e l'eau engagée en 1998 et mise en œuvre à partir de 2001 a abouti au paysage institutionnel suivant :

2.1 Les attributions de la Direction de l'Hydraulique sont étendues au sous-secteur assainissement par le décret de réorganisation du ministère: Elle devient en 2002 la **Direction de l'Hydraulique et de l'Assainissement (DHA)**. Le service assainissement a pour objectif de définir et de mettre en œuvre une politique et stratégie nationale, d'élaborer des plans directeurs et de contrôler l'exécution des programmes. Le service Normes et réglementation est chargée d'initier les textes législatifs et réglementaires et des études relatives aux normes de construction des ouvrages et infrastructures.

2.2 Le Centre National des Ressources en Eau (CNRE) est créé en 2001 (décret n° 2001 – 077 du 12 juillet 2001). C'est un établissement public à caractère administratif en

charge de l'exploration, de l'évaluation, du suivi et de la protection des ressources en eau à l'échelle du territoire national.

2.3 La Société Nationale d'Eau (SNDE), issue de la scission avec l'ex société d'eau et d'électricité la SONELEC, est créée en 2001 (décret n° 2001-88 du 29 juillet 2001), et a pour objet la production, le transport, la distribution et la vente de l'eau en milieu urbain.

2.4 Afin d'assurer le désengagement de l'administration des tâches d'exécution la Société Nationale de Forages et de Puits (SNFP) est créée en décembre 2004. Elle assure les activités opérationnelles de la DHA, à savoir la réalisation de forages et de puits mais n'est pas encore opérationnels. Elle dispose notamment d'un matériel insuffisant. Le Budget national a prévu un appui financier en 2005 pour aider au démarrage de la société.

2.5 L'Agence Nationale d'Eau Potable et d'Assainissement (ANEPA) a un statut d'association et est créée en 2001 (régie par la loi n° 64-098 du 9 juin 1964). Elle est entre autres en charge de la mise en place des mécanismes appropriés de gestion et de financement des programmes d'entretien et de renouvellement des ouvrages hydrauliques et d'assainissement en milieu rural et semi urbain. L'une de ses missions est d'élaborer avec l'autorité multisectorielle de régulation des cahiers de charges et des contrats d'exploitation organisant la gestion des ouvrages, qui auront atteint un certain seuil, par des promoteurs privés. L'ANEPA bénéficie d'une délégation (Convention signée en 2001 avec le gouvernement) pour les centres ruraux et semi urbains. Avec l'adoption du nouveau code de l'eau, la délégation accordée à l'ANEPA est d'une durée de trois ans pendant laquelle elle devra sélectionner des délégataires de service en collaboration avec l'autorité de régulation.

2.6 L'APAUS a été créée en 2001 par l'ordonnance n° 2001-06 pour promouvoir l'accès universel aux services régulés dans les secteurs de l'eau, de l'électricité et des télécommunications. L'ordonnance de 2001 est révisée en 2005 et précise les prérogatives de l'Agence afin d'éviter les chevauchements de compétences avec les autres intervenants. La programmation des infrastructures est clairement du domaine du MHE. L'Agence peut obtenir une délégation de maîtrise d'ouvrage de la part de l'autorité sectorielle compétente notamment le MHE en ce qui concerne les projets multisectoriels d'eau et d'électricité et peut être autorisée à entreprendre des travaux dans ce cadre.

Un nouveau cadre réglementaire est institué pour le développement du secteur :

- a) La loi portant sur l'Autorité multisectorielle de régulation (ARM) adoptée en 2001 élargit les compétences de l'Autorité au secteur de l'eau et de l'électricité et crée un organe indépendant de régulation.
- b) Le Code de l'Eau est adopté par le parlement le 4 janvier 2005 et crée un contexte juridique favorable à l'ouverture de partenariats avec le secteur privé pour le financement et la gestion des infrastructures de production et de distribution d'eau potable et d'assainissement.

3. Les Contraintes

3.1. Les besoins en investissements

Ils restent très importants malgré l'effort entrepris ces dernières années. La finalisation du CDMT pourrait être un instrument de mobilisation pour de futurs financements aussi bien auprès des bailleurs de fonds qu'auprès du budget national. L'écart entre les budgets alloués au fonctionnement sur le budget national et les budgets d'investissement sur financements extérieurs est très important et rend difficile la mise en œuvre des projets.

3.2. L'assainissement

La responsabilité de l'assainissement reste à clarifier. Le service assainissement de la direction de l'hydraulique et de l'assainissement est faible en moyens financiers et humains. Une note d'orientation sur le sous-secteur assainissement a été rédigée par le Ministère de l'Hydraulique et de l'Energie et est annexée à la présente note de cadrage.

3.3. La gestion des ouvrages et la mise en œuvre du partenariat public-privé

La Déclaration de 1998 et les réformes prises à partir de 2001 ont une forte orientation vers le développement du partenariat public privé. La SNDE, l'ANEPA, l'APAUS sont les principales structures concernées par la mise en place de mécanismes innovants pour améliorer la rentabilité du secteur et assurer la durabilité des investissements.

3.4. Le renforcement des capacités des services

- (i) Le renforcement des capacités est un des aspects principal du renforcement des services. Actuellement de nombreuses formations sont dispensées de façon ponctuelle pour les services publics impliqués dans le secteur eau au niveau central et régional. Il serait souhaitable que les formations puissent s'intégrer dans un véritable plan de développement des ressources humaines comprenant à la fois les formations, les perspectives de rémunération et de carrière. D'autres acteurs impliqués dans le sous secteur eau sont aussi à considérer dans un plan de formation : secteur privé, société civile parmi lesquelles les ONG
- (ii) La planification, la programmation et la réglementation sont des activités essentielles des services centraux. La cellule de planification et de programmation de la DHA sont à renforcer de façon à fournir un tableau de bord à jour et fiable des activités entreprises par les différents services impliqués dans le secteur de l'eau et s'assurer d'atteindre les objectifs fixés par le gouvernement à l'horizon 2010.
- (iii) La déconcentration des services est encore limitée et les besoins en formation, en moyens financiers et humains restent un impératif.
- (iv) L'homogénéisation et la mise en réseau des bases de données est un impératif pour la planification et le suivi du sous secteur eau en milieu rural et semi urbain. Il existe plusieurs bases de données qui ne sont pas toujours à jour et qui ne sont compatibles entre elles ou compatibles avec la base de données des localités selon

le recensement de l'ONS. La planification et les activités de suivi évaluation du secteur sont ainsi rendues plus difficile.

- (v) La communication entre les institutions travaillant dans le même sous secteur sont peu développées et ne facilite pas la planification sur le plan national.

Annexe II

Répartition des localités mauritaniennes selon leur nombre d'habitants

<i>Localités ayant entre 150 et 500 habitants</i>	2105
Localités supérieures à 500 habitants	705

Taux de desserte

Taux de desserte en points d'eau moderne	81,2%
Taux de desserte en AEP en zones urbaines et semi-urbaines	34,9%

Population en 2015 par classe

Classe : 150-500 habitants	2215
Classe : 500-1500 habitants	931
Classe : 1500-3000 habitants	163
Classe : 3000-5000 habitants	48
Classe: Sup 5000 habitants	47
Total localité sup. 500 habitants	1189

Nombre de localités desservies en 2004

PEM	1709
AEP	366

PEM : puits cimenté, pompe à motricité humaine, pompe éolienne, forage d'exploitation.

AEP : station de pompage motorisé, mini-réseau, réseau sommaire...

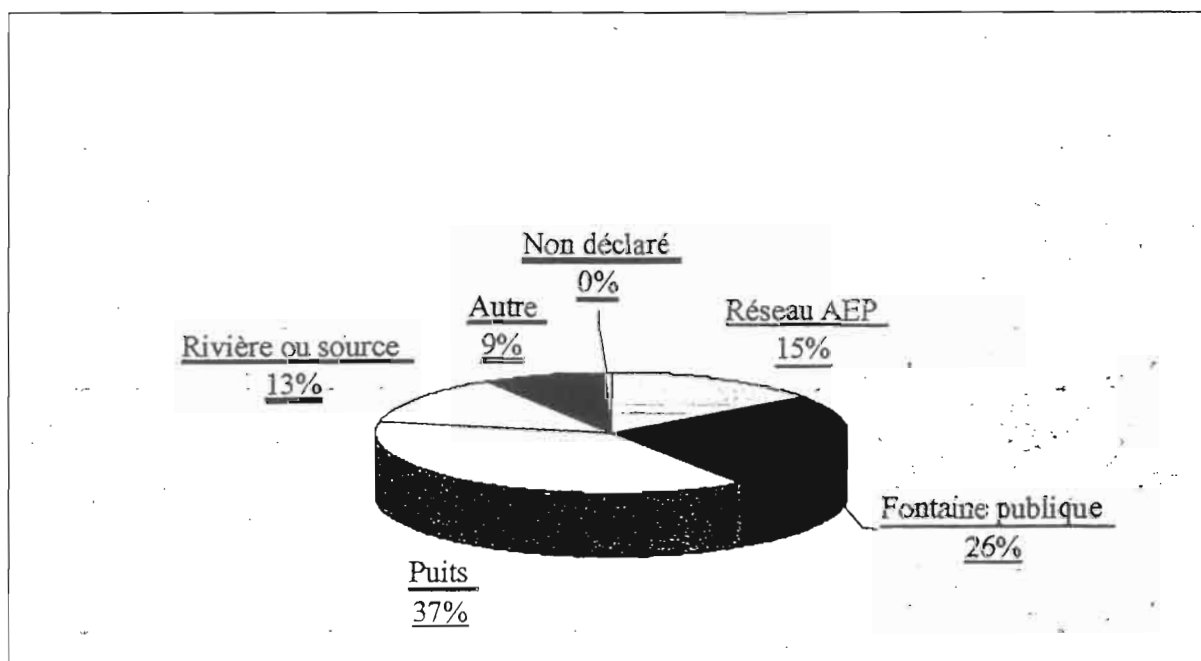
✳ Remarques

Parmi les PEM desservant les 1709 localités, un nombre important n'est pas opérationnel (abandon, pannes, etc.)

parmi les 366 localités desservies par une AEP, on en dénombre 104 dont la population est inférieure à 500 habitants.

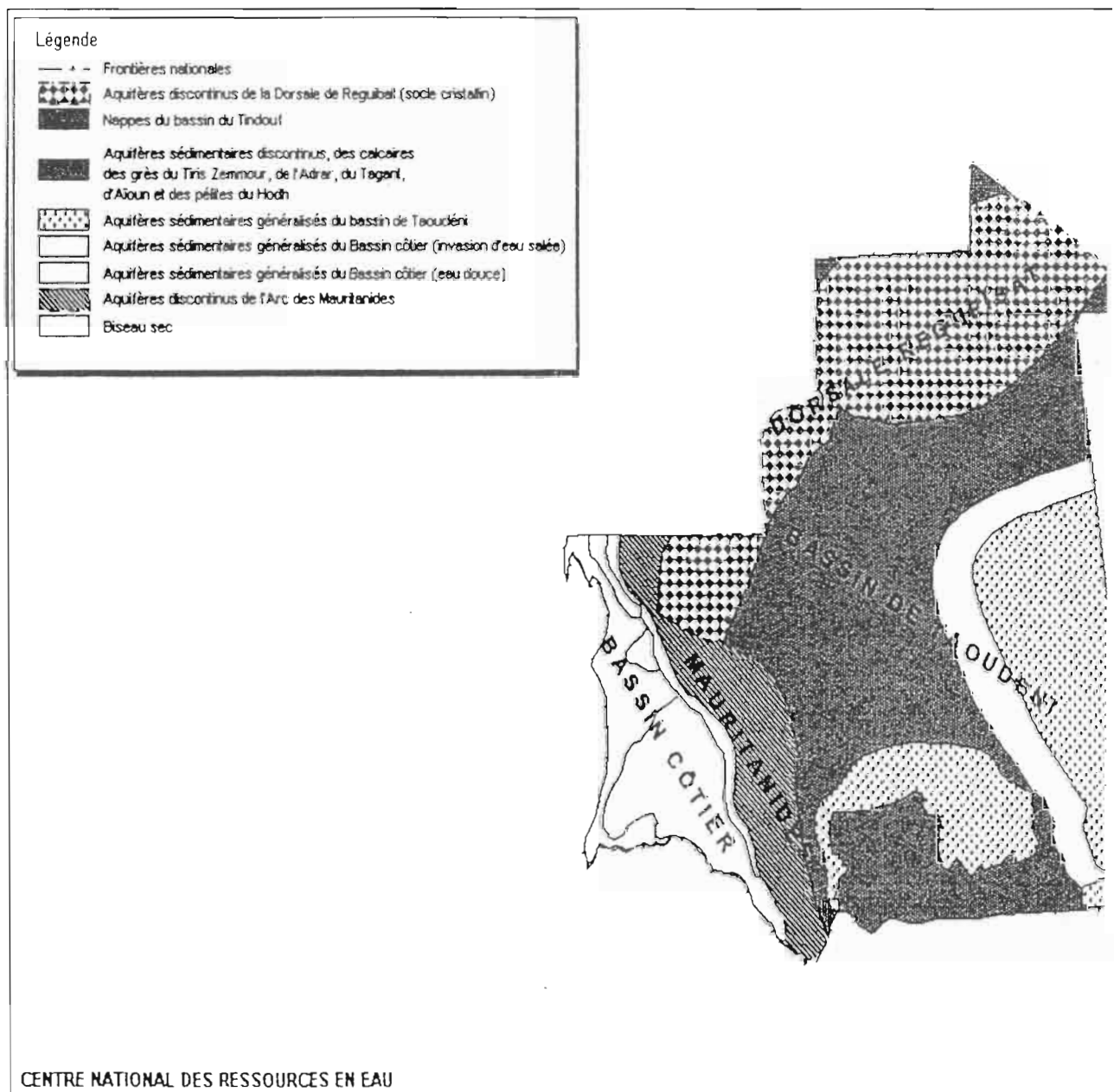
Annexe III

Ménages et source d'approvisionnement en eau



Annexe IV

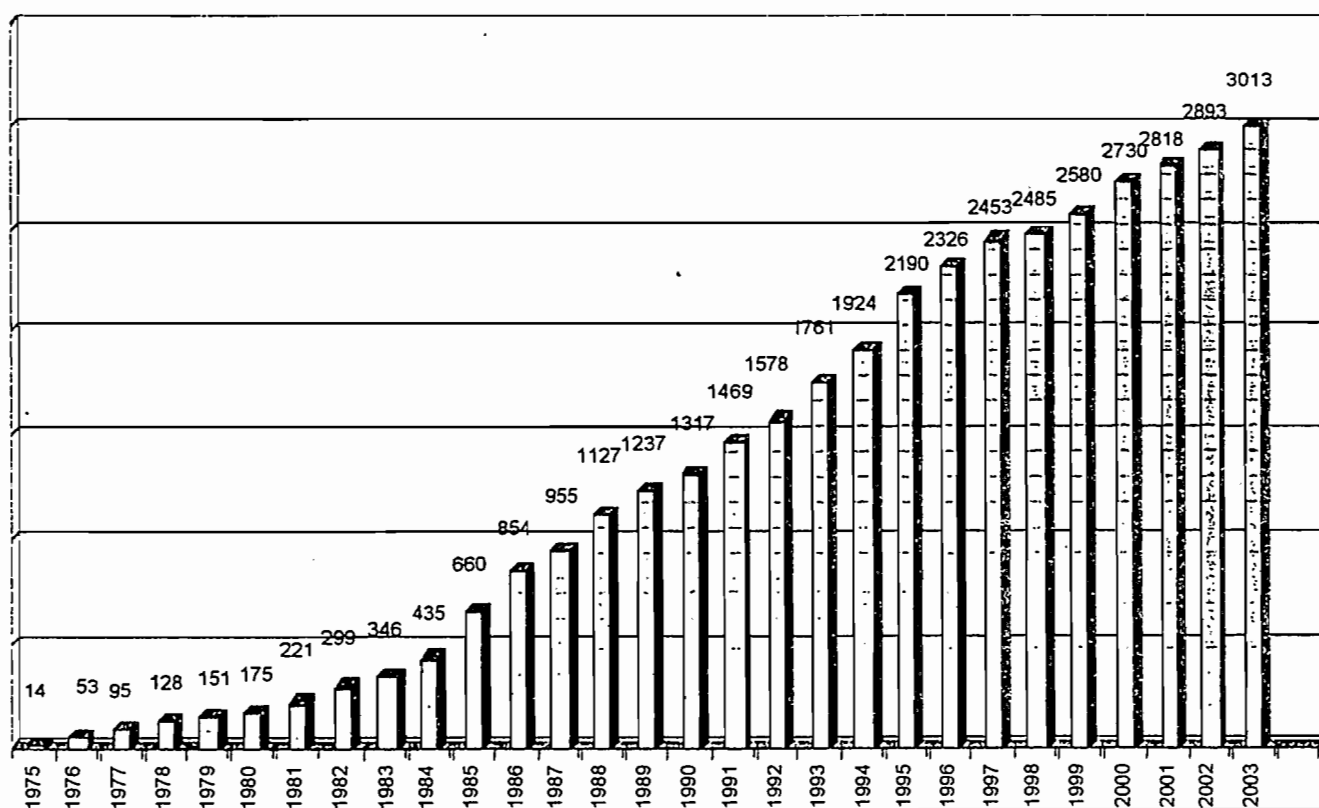
carte hydrologique de la Mauritanie



Annexe V

Ouvrages hydrologiques en Mauritanie

CUMUL DES OUVRAGES HYDRAULIQUES:
de 1975 à 2003



Annexe VI

Les enjeux majeurs en matière de gestion de l'environnement en Mauritanie

La Mauritanie est située en zone aride. Cela la rend particulièrement vulnérable aux variations climatiques défavorables qui exercent, dès lors, des répercussions négatives immédiates, persistantes et même permanentes sur les milieux naturel et humain. C'est un des pays sahéliens les plus exposés aux affres de la désertification. Dans ce contexte, les pressions sont énormes sur les ressources forestières et hydriques dont la gestion exige une attention toute particulière pour en assurer la préservation de même que l'utilisation judicieuse et durable. Cette rareté et cette précarité posent comme enjeux et dans toute sa plénitude et sa complexité, le problème des équilibres à établir et à maintenir entre les modes d'exploitation agricole et forestière, la survie des populations qui dépendent de ces activités, et les potentialités réelles offertes par les ressources naturelles en cause (eau, sol, végétation).

Le sous-sol mauritanien ne pose pas ces problèmes de rareté et de précarité de manière aussi aiguë. Au contraire, la variété et l'importance relative des réserves exploitables en ressources minières (fer, cuivre, gypse, or) présente en fait un axe stratégique à considérer dans la recherche des équilibres globaux à établir et maintenir à l'échelle du pays tout entier. Et qui plus est, l'exploitation imminente des nappes pétrolifères découvertes récemment au large des côtes mauritaniennes, ajoute à l'arsenal stratégique dont dispose désormais le pays pour tirer profit des potentialités globales qu'offre l'exploitation des ressources naturelles dans le pays. L'enjeu est double ici : 1) assurer que l'exploitation des ressources minières et pétrolières respecte partout les bonnes pratiques en matière d'environnement et qu'elle ne mette nulle part en péril les équilibres naturels établis ou ne menace la santé et la sécurité des citoyens, et 2) assurer que les bénéfices de cette exploitation contribuent à faire évoluer positivement la situation de grande précarité qui caractérise les autres secteurs de l'activité économique et l'environnement dans lequel évolue la population mauritanienne au quotidien.

Les côtes de la Mauritanie comptent parmi les plus poissonneuses du monde. Les ressources halieutiques y sont donc importantes et constituent elles aussi un capital et un patrimoine national dont l'exploitation s'inscrit comme élément stratégique majeur du développement économique du pays. Au-delà de la gestion éclairée et efficace des stocks, l'exploitation durable des ressources halieutiques mauritaniennes s'inscrit aujourd'hui dans une problématique de « gestion des risques » associés à l'exploitation des nappes pétrolifères que l'on s'apprête à lancer dans les mois qui viennent. Il s'agit là d'un véritable enjeu puisque toute fuite ou déversement accidentel pourrait causer des dommages sérieux à l'environnement marin et côtier et porter atteinte de manière considérable à une ressource fragile dont l'exploitation demeure vitale pour une partie importante de la population du pays.

L'environnement ne réfère pas qu'au milieu naturel et aux ressources qu'il recèle. C'est aussi le milieu dans lequel vivent les populations urbaines et rurales et qui sert de support aux

activités quotidiennes. À ce titre, ce sont les problèmes d'assainissement et d'accès à l'eau potable qui se posent avec le plus d'acuité en Mauritanie.

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-

Water Access Constraint in the Occupied Palestinian Territories (OPT)

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ABSTRACT

Water is a very limited resource in the region of historic Palestine. The ongoing Israeli Occupation and more recently, the Israeli Military response to the second Intifada, has directly affected access and quality of water available for Palestinians which have grown far worse. On the other hand, the current political hardship and closure have complicated the water transport via tankers which is considered a major way of water transport for communities not connected to a water network in the OPT. It often encountered some life risks of the drivers and they were obliged to follow much longer roads to fetch water from any available source. This in turn has caused substantial increase in the water price. The impact of such increase is even more dramatic when combined with the decrease in employment and income. According to the Palestinian Central Bureau of Statistics (PCBS), poor households amount to 58.1% in the OPT. The number of poor Palestinians is more than 2.2 million: approximately 1.27 million in WB and 945,000 in GS. Every working individual supports 6.4 none-employed persons. The average increase of water price at these communities is estimated at 8% of the Median family income. Therefore, many communities are suffering from very limited supply of water and drop in per capita water use from the average daily per capita domestic water use.

In the case of communities that are supplied with water through a water network, a high percentage of families in almost all of these communities cannot afford to pay their water bills, in many cases the percentage of these people has reached 100% or 99% of the households. It is also worth noting that at least 266 communities in the West Bank and Gaza (38% of communities) depend on the Israeli Mekorot Water Company as a primary water supply source. According to Palestinian Water Authority (PWA), the total quantity of water supplied to Palestinian communities by Mekorot is approximately 32.1 mcm / year, which is equivalent to 53% of the total quantity supplied to Palestinians in the West Bank. About 13.8 mcm of this water supply actually comes directly from wells within the West Bank, while the remainder (including supply to settlements, is about 21.86 mcm) comes from wells drilled on the western side of the Green Line but tap the Western Aquifer Basin that is replenished mainly from the West Bank. Since September 2000, the start of the current Intifada, Mekorot has severely limited the water supply to the OPT. About 22% of communities are reported to receive their regular water supply, which in many cases already insufficient to meet basic needs, while 30% reported receipt of 50% or less of their "regular" supply. At least 5% of the communities have reported a complete cut in water supply during some periods.

This paper will present major constraints limiting access to water for Palestinian communities during the past five years of Intifada. It will shed light on access difficulties to water and draw up some conclusions to overcome such situation.

Key words

Water Access, PHG Monitoring Program, Separation Wall, Closure, Water Tankers

BACKGROUND

As this paper is prepared for publication, the second Intifada, which erupted on September 28th, 2000, will be entering its sixth year. The already brutal Occupation in the 1967 Occupied Palestinian Territories (OPT) has further magnified in this second Intifada, under the usual pretenses and lead by ideology and policy that together seek to control maximum Palestinian land. The intensification of land and resource control by the Occupation in the 1967 OPT has had an overwhelming impact on all Palestinian natural as well as socio-economic resources. Violations of Palestinian rights are being carried out on daily—in fact, in each passing moment—basis included in which is the right to clean and ample water as well as adequate sanitation and hygiene that are affected in a very clear way and in all Palestinian communities during the current situation. The violation of this essential right, which since 1948 and then again since 1967 has been systematically assaulted, is directly causing a social and public health crisis, which is only one of the major sectors affected during occupation and more severely during the current Intifada. The large scale expansion and creation of new settlements, particularly since the Oslo Accords, is synonymous with Occupation appropriation of Palestinian lands and water resources, and which is only accelerating with the building of the Wall.

The Palestinian Hydrology Group (PHG), as a leading Palestinian NGO working in the water sector, has undertaken the responsibility of monitoring the impact of the current crisis on the water, sanitation, and hygiene (WaSH) situation in the West Bank and Gaza Strip examining the extent to which this sector could be affected under the deteriorated, political, social and economic conditions in the OPT. Therefore, in June 2002, PHG has launched its **Monitoring Program (MP)** in order to define the main constraints facing Palestinians. Such constraints can be grouped under three subtitles, Natural, political and economic constraints respectively.

The *natural* constraints are represented in the natural water scarcity in the region in general and in the OPT in particular. Total groundwater replenishment capacity is nearly 672 Mcm / Year in the West Bank, as agreed under Oslo Interim agreement (1994) and it is nearly 60 Mcm / Year in Gaza.

The *Political* constraints represented in the Israeli control of both ground and surface water resources in the OPT. Despite the fact that nearly 50% of the regional groundwater potential (nearly 1.5 Bcm) occurs in the West Bank, Palestinians are allocated only 25% of such potential. In the mean time, they are not allocated any drop from the Jordan River, while previous allocation plans (i., e. Johnston – 1955) allocated the West Bank some 200 Mcm / Year. Furthermore, the current restrictions imposed on access to water supply, destruction of water infrastructure occurred during the past five years, the physical limitations imposed on the supply infrastructure and the water confiscation, resulted from the construction of the Separation Wall, have all negatively influenced the water availability to Palestinian people.

The *economic* constraints represented in the increasing unemployment rate and the drop in GNP which is caused by the current Israeli restriction on movement and access to job. This in turn have increased the number of Palestinian families who are not able to pay their water bills which led to increase the dept of the local councils toward the bulk water suppliers and hence, weakened their capacity to upgrade and operate the water infrastructure in the West Bank and Gaza efficiently. The unaccounted for losses is still more than 45% in some areas.

Furthermore, the unavailability of wastewater collection and treatment systems in the rural areas and some 40% of urban areas increases the potential threat of water quality deterioration of the limited resources. Furthermore, the Israeli Settlements in the West Bank is discharging the untreated wastewater into the nearby valleys and open spaces which worsen the situation further.

Having listed such constraints, it is expected that per capita fresh water availability may not exceed 250 m³ / year in the OPT under any optimistic scenario of water allocation. This rate classifies the OPT as a region with absolute water stress, where water unavailability is considered a limiting factor of social and economic development, Falkenmark (1993). Furthermore, meeting the Millennium Development Goals

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(MDGs) adopted at the United Nations Millennium Summit in September 2000, where the largest-ever gathering of the world leaders took place, will be a very challenging task, if possible at all.

This paper focuses on the recent acceleration of water control in the West Bank and Gaza Strip and its implications on the Palestinian communities and their access to clean, ample water.

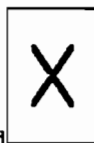


Image to add

Figure 1: Water Basins in Palestine

Current Status of Water Supply in Palestine

Communities that are both connected and not connected to water networks face difficulties in access to major sources of water in Palestinian 1967 Occupied Territories. It should be emphasized here that in communities connected to water networks, the conditions of old networks is a major issue, and where the problem precedes the current Intifada, spanning the duration of the Israeli occupation of the 1967 OPT as the water sector was completely neglected by the Israeli Occupation. This is reflected in the severe neglect of the water infrastructure and networks during the past several years. In general, water networks need regular maintenance in order to function properly and as networks age, their quality diminishes significantly, especially without necessary upkeep. However, for Palestinian communities and during the current crisis, more often, maintenance teams were not able to reach communities to perform necessary work mainly due to the access restrictions imposed by Israeli forces (Curfew and Closure).

According to survey conducted in the past year, it was realized that 69% of the communities are connected to water supply networks. However, network coverage is not fully in most of these communities. 165 communities have leaking water networks, 5 communities with leaking and bad water networks, in addition to 87 communities with water networks in bad condition. In addition, most of the surveyed communities reported poor conditions of the water networks. The average age of water networks in these communities is about 18 years. Some 39% of them have water networks of over 20 years old. Figure 2 shows the different communities with various age of network in the West Bank and Gaza.

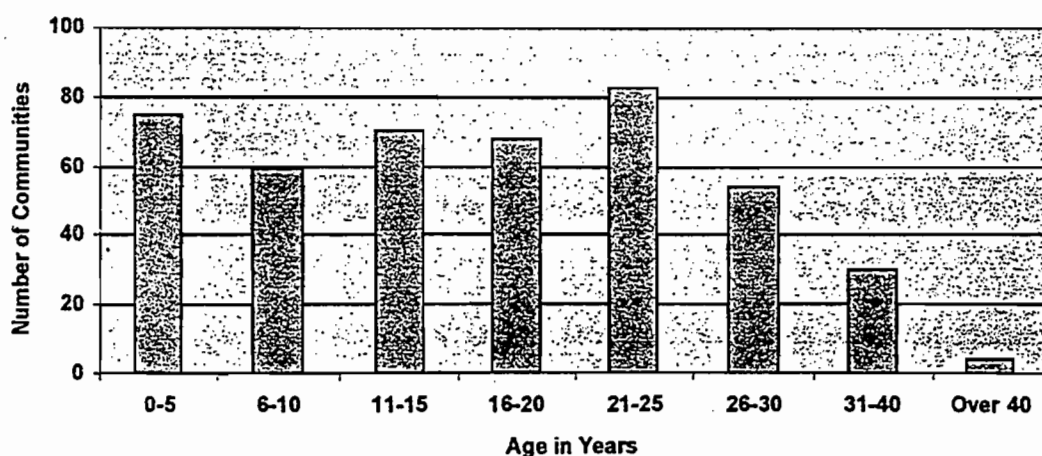
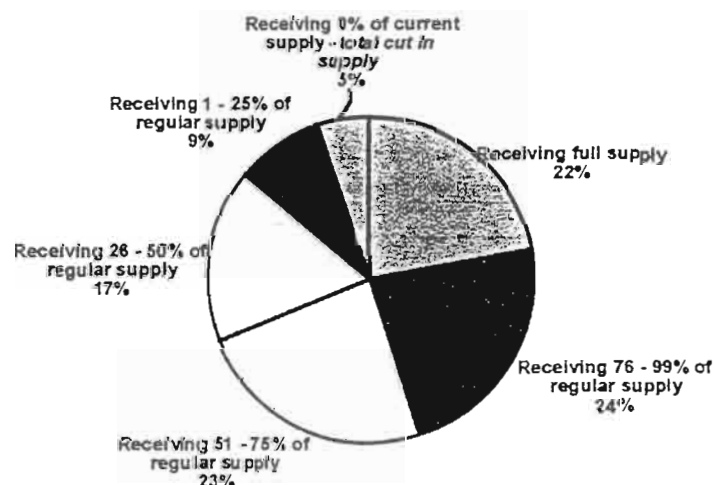


Figure 2: Age of water Network in Surveyed Communities

Meanwhile, communities that have water networks face continued problems due to the control by and forced dependency on the Israeli water supplier, Mekorot, which routinely cuts services and limits supply to Palestinian communities (See Figure 3). People in these communities expected that this situation will worsen and affect even more communities during the 2005 summer months. As this was in fact the case, more communities relied on water tankers. **Mekorot** controls Palestine's confiscated water resources and severely restricts the amount of water available to the majority of communities. According to Palestinian Water Authority (PWA), the total quantity of water supplied to Palestinian communities by Mekorot is approximately **32.1 mcm / year**, which is equivalent to **53%** of the total quantity supplied to Palestinians in the West Bank. About 13.8 mcm of this water supply actually comes directly from wells within the West Bank (9.22 mcm comes from WBWD wells and 4.6 from Israeli wells in the WB), while the remainder (including supply to settlements, is about 21.86 mcm) comes from wells drilled on the western side of the Green Line but tap the Western Aquifer Basin that is replenished mainly from the West Bank (PWA, 2002).

Through the **Joint Water Committee (JWC)**, the Israeli Occupation Forces continue to veto most Palestinian permit requests for water and sanitation projects. Hence, Palestinians are unable to access West Bank water resources and in general no permits are being given for the drilling of new wells. There are currently around 150 water and sanitation projects still pending JWC approval because of "technical and security reasons". Donors are increasingly discouraged from funding this sector due to the threat of new infrastructure being destroyed by the Israeli military because of lack of "permits", in addition to the long and complicated procedure of applying for permits through the JWC.



**Impact may shift over time. These figures reflect levels at some point during the reporting period.*

Figure 3: Reduction in Mekorot Supply in Palestinian communities (June 2002 – July 2003)

In communities that have no water networks, almost 31% of the 1967 OPT, rainwater harvesting in cisterns has become a main source of water supply. Although sufficient water was collected this winter due to a higher rainfall compared to recent years, the quality of this water remains a major concern taking into consideration that many cisterns still require rehabilitation. Water shortages, as in previous years, were greater during the summer months (July to September) where many communities, often the poorest, were forced to rely on more expensive water tankers. With no

improvement in the economic situation, many Palestinian households are increasingly unable to pay their water bills or buy supplies from tankers. Limited domestic supplies inevitably adversely affect the health and hygiene of communities.

It is worth noting here that in the 1967 OPT and during the current Intifada, reliance on agricultural production and livestock has increased, especially after complete closure and the cessation of work for Palestinian laborers in the Israeli market. Therefore, Palestinians have been forced to rely on agriculture as a major source of income for families whereas, in general, income has been dramatically decreasing in the West Bank and Gaza as poverty noticeably increases.

Furthermore, the number of available water tankers owned by Local Councils is not enough to provide needed quantities of water for the community. This leaves the delivery of water in the hands of private tanker owners. The current political hardship and closure have complicated the water transport via tankers. It often encountered some life risks of the drivers and they were obliged to follow much longer roads to fetch water from any available source. This in turn has caused substantial increase in the water price. Figure 4 below illustrates the significant price increases that have occurred over the first three years of the current Intifada. The impact of such increase is even more dramatic when combined with the decrease in employment and income. According to the PCBS, poor households amount to 58.1% in the OPT. The number of poor Palestinians is more than 2.2 million: approximately 1.27 million in WB and 945,000 in GS. Every working individual supports 6.4 non-employed persons.

Table 1: Median Monthly Income, Ninth Round: April -June, 2004.

Region	Median Monthly Income		Percentage Drop of Income
	Prior to Intifada	Second Quarter 2004	
Palestinian Territory	2500	1600	36.0
West Bank	3000	2000	33.3
Gaza Strip	1500	1200	20.0

Source: Palestinian Central Bureau of Statistics, 2004. Statistical Monitoring of the Socio-Economic Conditions of the Palestinian Society, (Second quarter, 2004). Ramallah- Palestine

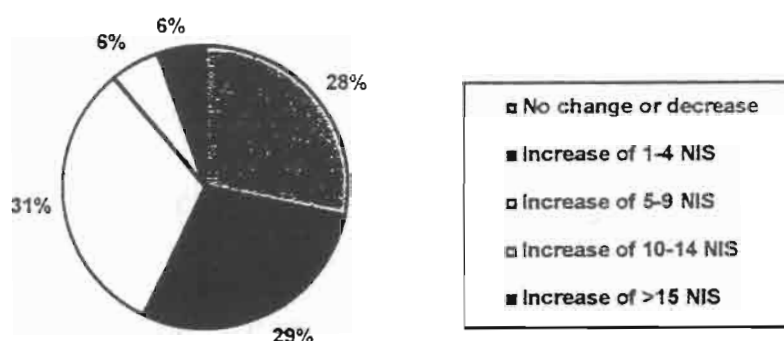


Figure 4: Changes in Cost of Tankers Before and During the Intifada (NIS) in Surveyed Communities

In the case of communities that are supplied with water through a water network, a high percentage of families in almost all of these surveyed communities cannot afford to pay their water bills, in many cases the percentage of these people has reached 100% or 99% of the households. On the other hand, the impact of closure and curfew on water shortage is particularly felt in communities that are not connected to a water network which usually buy water with a several times higher than water through network.

Average increase of water price at these communities is estimated at 8% of the Median family income. This percentage has been calculated based on the following assumptions:

1. Average family size is 7
2. Per capita water use is 50 l/c/d
3. Average increase of in the price of one cubic meter of household water is 15 NIS/m3

Therefore, many communities are suffering from the very limited supply of water and the drop in per capita water use from the Average daily per capita domestic water use of 50-70 liters to 7 l/c/d in Ad Deirat, Kharsa, and Al Heila in the Hebron Governorate.

No Access to Water: Checkpoints and Curfews

Checkpoints and curfew have been, since the start of the Occupation but having particularly worsened since Oslo and now the second Intifada, the cause of severe restriction to movement, affecting water access and sanitation services in almost all Palestinian communities.

During the current Intifada, the consequences of the scarce availability and cost of water tankers was tremendously felt, as tankers are the ones that transport water to communities that do not have water networks as well as to those communities that though having water networks are provided with insufficient and limited quantities of water through the network. This limited available water to communities with water networks is caused by either the reduction of the Occupation Mekorot-controlled water quantities that communities are forced to purchase (from confiscated water sources that in most cases from the 1967 Occupied Territories); or when the available source of water managed by Palestinian entities is insufficient.

Checkpoints are often central means in which the Occupation assaults and endangers health and hygiene in Palestinian communities. The majority of Palestinian communities do not have wastewater networks, and therefore depend predominantly on vacuum tankers for evacuation of wastewater from septic tanks and cesspits, to be evacuated in wadis or manholes of other communities that do have wastewater networks. Checkpoints cause delays and in many cases completely prevent the passage of these tankers—as well as tankers transporting solid waste—forcing them to turn back or find other alternative roads including dirt roads that are in bad condition and hard on vehicles. The risk faced by drivers on their lives and the longer route they are obliged to use has caused an increase in the price of water through tankers and the accumulation of solid waste nearby communities. Checkpoints are often the main cause of people's inability to reach Public Health Centers, therefore affecting the entire public health situation.

Checkpoints can be fixed or mobile. **Fixed checkpoints** are permanent military stations where all movement of people and vehicles is inspected and wholly limited in mobility. It affects all, including children, the elderly, the ill and disabled. Fixed checkpoints are visible throughout the 1967

Occupied Territories. Random criteria, unknown to Palestinians, are normally used to allow—or, that is, not allow—people and vehicles to pass. At times the Occupation criteria are related to age or acquisition of certain permit. **Mobile or “flying” checkpoints** on the other hand are put at any place and at any time and for different periods. **Curfew** is another form of restriction and humiliation, where people are forced to stay inside their homes as they are completely banned from movement, be it for several hours, days, or sometimes weeks.

As a consequence of these restrictions on movement, people are forced to use secondary roads that are in most cases dirt roads and are hard on vehicles, making it difficult to reach the needed destination. This has had a direct effect on water prices through tankers and on wastewater evacuation. With the current high percentage of unemployment and poverty in the 1967 OPT, this has meant a serious and direct effect on the ability of people to get the required quantity and quality of water, therefore affecting the general hygiene and health situation in Palestinian communities.

Earth mounds are another form of continuous harassment and purposeful obstacles placed by the Israeli Occupation Forces on Palestinians. On average, almost each Palestinian community suffers from this kind of closure, either directly at the entrance of the community or in nearby communities. This, of course, includes the closure by earth mounds of roads that lead to major urban areas; such roads are common and directly serve smaller communities throughout the West Bank and Gaza.

The results of the survey conclude that mobile checkpoints were most severe in the northern West Bank and the central and southern parts of the Gaza Strip. In addition, one checkpoint can have consequences on water tankers, maintenance teams, as well as on access to Public Health Centers by community residents. It was found that 51% (331) of the WaSH MP surveyed communities were affected by mobile checkpoints, and that 10% (66) were affected severely by these checkpoints. It was also found that 31% (198) of the surveyed communities were affected by earth mounds, 15% (100) of which were highly/severely affected. Communities affected by curfew constitute about 37% (239) of the surveyed communities, and 9% (55) were highly affected.

Table 2: *Sample of Fixed Checkpoints and Communities Affected during the Survey Period of the WaSH MP.

No.	Name of Fixed Checkpoint	Governorate	Number of Communities Affected	Affect on Water Tankers	Affect on Access of Maintenance Teams	Affect on Access to PHC
1	WALL	All Governorates (north WB)	12	9	6	9
2	Qalqiliya	Qalqiliya	5	1	4	4
3	Taybeh	Ramallah	1	1		
4	Tayaseer	Tubas	5	2		5
5	Shave Shomron Settlements	Nablus	4	2		3
6	Sarra	Nablus	1	1	1	1
7	Ni'lin	Ramallah	2	1	1	1
8	Morag settlement	Khan Yunis	4	1	4	1
9	Jericho	Jericho	1	1	1	1
10	Jamma'in	Nablus	1	1		
11	Howwara	Nablus	10	1	8	10
12	Gush Qatif Settlement	Khan Yunis	5	2	5	4
13	Gush Etzion	Hebron	1	1		1
14	Idhna	Hebron	1	1	1	1
15	Border of Khuza'a	Khan Yunis	1	1	1	1
16	Beit Jala	Betlehem	5	2	1	5
17	Beit Iba	Nablus	16	2	1	15
18	Beit Awwa	Hebron	2	2		2
19	Araba	Jenin	1	1		
20	Al Walaja	Betlehem	1	1	1	1
21	Al Tuffah	Rafah	1	1	1	1
22	Al Hamra	Tubas	1	1	1	1
23	Za'tara	Salfit	6		3	6
24	Yasuf	Salfit	3		3	3
25	Salim	Nablus	1		1	1
26	Qadumim Settlement	Qalqiliya	1		1	1
27	Beit Amin	Qalqiliya	2		2	1
28	Qalandia	Jerusalem	2		1	1
29	Netsareem Settlement	Gaza Strip	2		2	1
30	Khirbet Jubara	Tulkarem	1		1	1
31	'Atara	Ramallah	5		5	3
32	Burya	Tulkarem	1		1	1
33	Beit Furik	Nablus	1			1
34	Halmish	Ramallah	2		2	
35	Kfar Darom Settlement	Deir Al-Balah	1		1	1
36	Nareem Settlement	Deir Al-Balah	1			1
37	Deir Ballout	Salfit	1		1	1

* Impact may shift over time. These figures reflect levels at some point during the reporting period.

Military Targeted Destruction and Settler Brutality

Occupation Forces incursions, destruction and damage to infrastructure, and settler harassment are all major parts of the daily reality of Palestinian life, particularly during the past five years of the Intifada, affecting all aspects of life. The Water, Sanitation and Hygiene sector was overwhelmingly and severely targeted during this time.

Although some improvements were seen in the overall water and sanitation situation in the 1967 OPT during 2005 with the relative decrease in widespread Israeli Occupation military destruction and damage of water and sewage networks through massive incursions, the cumulative affect of the destruction since the start of the Intifada, especially in Gaza and the northern part of the West Bank, continues to seriously affect water supplies and quality in numerous areas. Therefore, providing emergency water supplies and repairing damages, in addition to meeting basic Palestinian water needs, remain just as much a priority. Meanwhile, settler violence continues unhindered and is a major cause of destruction and damage in the 1967 OPT. Palestinians living nearby Occupation settlements are the most vulnerable and threatened by settler harassment and brutality. Settlers aim at forcing Palestinians to leave their lands and houses, with the goal of taking over and controlling further land and resources.

Incursions into the Gaza Strip were constant during the past year of the survey. In the case of the wide scale incursion into **Beit Hanun in the Gaza Strip** (population of about 31,000 capita), which began on July 28th 2004 and ended on August 5th 2004, massive damage was caused to the community. During the same period, incursions also took place in **Beit Lahiya (Tal Al Za'tar) and Jabalya areas**. During the incursion into Beit Hanun, all entrances to the area were shut down by the Occupation, which imposed a strict curfew on virtually the entire area, but particularly harshly in the southern and western parts of Beit Hanun. At the time and due to the incursion, there was a serious water shortage, which severely affected the following areas: the western area including Al Sekka street, Al Sultan Abdul Hameed area, and the western entrance of Beit Hanun near Salah Al Deen street; the eastern parts including Al Fartah, Al Nazazah, Al Masryeen street, Al Amal neighborhood, and Sharrab area; and the southern entrance of Beit Hanun in addition to the industrial area.

Often, settler brutality can have the same consequences as checkpoints and even worse. Though there are endless examples of general violations to Palestinian lives in the face of settlements in relation to water and sanitation, the WaSH MP partially monitored this overwhelming reality in order to highlight their impacts. During the survey period, settler harassment was particularly harsh for the communities nearby the settlements of Shave Shomron and Qedumim in Nablus and Qalqiliya Governorates respectively, settlements built on the confiscated lands of many of these same communities. The Halmish settlement settlers continue to control the water supply of **Bani Zeid Algharbyah community in Ramallah Governorate**. The water supply of Bani Zeid Algharbyah services the following communities: Beit Reema, Deir Ghassaneh, Kufor Ein, Qarawet Bani Zeid, and An Nabi Salih with a total population of about 10,000. The water supply is controlled by/comes through Mekorot from a main line that runs nearby Halmish settlement while the Halmish settlers control the valve-opening on the water line and therefore completely determine the water supplied to all of the above communities.

On August 15, 2004, settlers in Halmish completely closed the valve and therefore shut down the water supply to Bani Zeid Algharbyah. Settlers, protected by the Occupation Forces, prohibited the Bani Zeid Algharbyah municipality maintenance team from opening the valve to supply the needed water to the communities. The maintenance team was detained for several hours and their IDs as well as the keys for the main valve were confiscated. At the same time, settlers decreased the

main line's diameters from 4" to 3" to ensure a decreased supply of water to the Bani Zeid Algharbyh villages. The municipality contacted Mekorot to prevent this from happening; although on August 22 Mekorot opened the valve, immediately after its technicians left the scene, settlers closed it again. This was not the first time settlers closed the valve. During the same period, Mekorot claimed that they were doing maintenance work on the network and as well cut the supply to the communities.

The case of these communities is not at all unique as many other communities that are supplied with water controlled by nearby settlements throughout the West Bank face the same problem: control of supply by Mekorot and settlers. Residents of these communities justifiably worry that in the near future, or at any time, the supply to them will be completely halted, which is especially assured in areas affected by the construction of the Apartheid Wall.

Table 3: Sample of water infrastructure damages during the past year of survey.

Item Damaged	# of Communities Affected	Number of Items Damaged		
		Completely	Partially	Total
Wells	11	5	32	37
Springs	9	5	9	14
Water Tankers	6		6	6
Roof Tanks	53			1439
Cisterns	15			135
Reservoirs		1	2	3

The WALL: Confiscation, Destruction, Access and Control

One of the greatest disasters facing Palestinians is the construction of the WALL. Its effects are on all Palestinians and every aspect of their daily lives. Along with the massive construct itself, gates and permits are central elements of the Wall project in which the Occupation magnifies the closure and siege policy while forming, on the ground, the Palestinian open-air prisons that are to ensure massive land confiscation and mark the worsening reality of life under Occupation.

Israel claims that the WALL is a temporary structure erected for "security purposes", but overlay of the map of the WALL on a map of the West Bank's aquifers will clarify Israeli future plans. The path of the WALL runs with the main basin of the Western Aquifer; therefore, complete control over water resources is one of the major purposes of this WALL. To satisfy future needs, the Western Aquifer is the center of focus for Israel in relation to resource control. Consequently, the Israeli Occupation authorities have all along prohibited Palestinians from digging wells in those areas. Since 1993, only one Palestinian-controlled well was given a license to be dug in the Western Aquifer; on the other hand, Israeli officials publicly stressed the importance for Israel to maintain control over the mountainous regions of the West Bank located exactly over the Western Aquifer.

The Western Aquifer is under the most fertile lands in the West Bank thus water usage in the area is closely linked with agriculture production. With complete Israeli control over the Western Aquifer, Palestinian agriculture is to be—is already—targeted in the northern areas of the West Bank, leaving farmers with no choices. Communities living on or near the WALL's path have been most tragically hit by the WALL in relation to access, water, sanitation and hygiene services. Most of the affected villages are unable to survive; and many are forced to become cheap labor in the nearby settlements or to look for alternative employment in other Palestinian communities. Nazlat 'Isa,

Baqa ash Sharqiya, 'Khirbet Jubara, and many other communities affected by the WALL are facing the greatest suffering. Jayyus for example, just east of Qalqiliya, has lost 72 percent of its irrigated land to the WALL, seven groundwater wells, and 300 families have lost 100 percent of their income. Therefore, the Israeli goal of control over Palestinian land is completely supported by these actions. All the while, communities isolated from their lands by the Wall face inaccessibility to the lands because of the WALL which has deemed these lands dry and useless.

The impacts on water supply in the communities around the WALL are also of serious concern. The climate of Palestine is semi-arid, and water sources are precious. In villages around Qalqiliya and Tulkarem, more than 36 wells were lost due to the WALL's construction. These wells, located in the Western Aquifer Basin, were dug before the 1967 Occupation. This loss of water resources due to the Wall has meant an 18 percent loss of available water quantities to Palestinian communities.

Conclusions and Recommendations

It can be concluded that complete and comprehensive ends to the Occupation, including the Palestinian control and rights over their water resources, in addition to the full removal of the WALL, are the basic solutions to all problems related to water access in the OPT.

Other specific findings and recommendations:

1. Ample and good quality water, at least of the minimum quantities assigned by the World Health Organization, must immediately be made available to all Palestinian communities. All checkpoints, fixed and mobile, must be removed in order to assure access to necessary water supply and other resources.
2. Immediate attention must be directed toward the health crisis facing numerous Palestinian communities related to the poor and insufficient water supply. The currently devastating Water and Sanitation, Hygiene situation has a direct impact on health in Palestinian communities. Reports of considerably high percentages of water related diseases exemplify the need for a swift response to Israeli policies of closure, siege and the denial of resources and rights.
3. All communities currently unconnected with water and wastewater networks, or with networks that are not functioning, must be equipped with functioning networks. Cisterns should only be seen as a secondary tool for water management since, in most cases, the quantity of water is only enough for part of the year (basically during winter time).
4. The fact that large percentage of the Palestinian communities depend on Mekorot as a main water supplier, render them as vulnerable. The frequent water supply reductions to those communities need to be stopped. Until rights over water management are handed back to Palestinian control, Mekorot Water Company must increase supply levels in light of community needs and population increases. Mekorot Water Company "normal" water quantities to Palestinian communities have been the same since 1967 until before the beginning of the Intifada in September 2000, when the Company began reducing the supplied quantities and even completely stopping supply in some cases. Taking into consideration the increase in population, needs and standard of living, the "normal" quantities must be increased.
5. The construction of the Separation WALL confiscated more than 36 Palestinian groundwater wells and hence reduced the available water to Palestinians by nearly 7 Mcm / year. This of course is in complete negation of target # 10 of the MDG #7. In the time that

this target calls for increasing the amounts of water supply and the percentages of served communities, the Israeli practice on the ground reduces available quantities further. Therefore Construction of the Wall must be stopped immediately, sections already built must be dismantled and people must be compensated for damages to land and resources lost. The WALL is a new version of an old plan, based on discrimination and land resource confiscation. The Western Aquifer, located almost entirely in the West Bank and among the most valuable water resources in the region, must be under Palestinian control in order to ensure consistent water supply to Palestinians.

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Natural Resource Management the Timbaktu Collective

The story

1990 – Three friends purchase 32 acres of dry barren land to heal and regenerate this land.

1991 – A voluntary organisation called Timbaktu Collective is formed to work in the villages of Anantapur district.

1992 – It begins work in 10 villages nearby Timbaktu with 3 team members.

2005 – It is working in over 100 villages with 70 team members.

What we believe in

- &Celebration of life
- &Dignity & self-respect for all
- &People and their wisdom
- &Local self governance
- &Traditional industry, crafts and arts
- &Equitable access to and control over local natural resources
- &Gender equality
- &Joyful spaces for children
- &Cooperation
- &Excellence

Where we work...

The Timbaktu Collective works in Anantapur district in the Rayalaseema region of Andhra Pradesh, a southern state of India

Once part of one of the most powerful and rich kingdoms of South India – The Vijayanagara Kingdom.

Anantapur district is today one of the most impoverished and drought-affected districts of India.

Situation of Anantapur district

- Resource poor
- Low & erratic rainfall
- Poor quality agricultural land
- Traditional industry not encouraged
- No modern industry
- Common lands
 - Heavily deforested
 - Converted to cultivation
 - Burnt
 - Overgrazed

Our response

Natural Resource Management (NRM)

NRM - Work at Timbaktu

Timbaktu –home for experimentation

- & 32 acre barren stretch of land, bought in 1990.
- & Regeneration of 700 acres of dry deciduous forest.
- & Numerous trials,, to restore degraded terrain and create an Agroforest habitat.....

Prevention of

- & forest fires
- & over grazing
- & tree felling
- & soil erosion
- & water run-off

Construction of...

- & small earthen bunds and gully plugs to conserve soil and water.
- & bigger check-dams and rock filled dams on the larger streams to slow water run-off.

"The best place to store water is underground." –
Bill Mollison

Seed centre

- & Collection and storage of a wide variety of indigenous seeds, grasses, bushes and trees
- & Distribution for propagation
- & Display to promote awareness on bio-diversity in the region

Timbaktu Today

NRM - Village forests

Regeneration of Community Forests

- & 8,000 acres of contiguous revenue waste lands in 8 villages - Kalpavalli
- & 150 acres of Panchayat waste lands in 4 villages - Haritha forests
- & Protected by Forest Protection Committees and Women's thrift groups
- & Construction of hundreds of contour trenches, rock filled check dams, gully plugs
- & Prevention of Forest fires, over grazing, tree felling, etc

Impact

- & Revival of springs, a perennial stream, tree and grass species
- & Significant source for minor forest produce
- & Improvement of ground water recharge
- & Reduction of soil and water run-off

Tamarind groves have been grown in common lands of ten villages to increase green cover and create community assets.

- & Over 10,000 tamarind saplings planted in 246 acres

Com. N° 57 - atelier....

- & Peoples' participation very laudable, sense of ownership almost total.
- & Contributions in cash and kind.
- & Activities include watch & ward, pitting & planting, fencing, watering, manure application etc..

NRM - Water

- & One of the finest rain water harvesting systems (tanks) dying – silted or damaged
- & Built between 900 AD and 1500 AD - sizes of tanks vary from 2 to 1000 acres
- & 2 such tanks, about 500 acres in size, have been partially desilted
- & Silt from these tanks have been applied to over 400 acres of degraded agricultural land

Impact

- & Increased water storage for irrigation
- & Revival of open wells
- & Revival of Pisciculture
- & Drinking water available for cattle in summer months
- & Increased yields from agricultural lands to which silt has been applied

Watershed Management

- & The Collective appointed Project Implementing Agency (PIA) for 14 watersheds spread across 3 mandals
- & Each watershed has a geographical spread of over 500 hectares each
- & Supported by APRLP of GoAP with DFID funds

Activities related to water

Through various user groups the Collective has

- & Initiated work on revival of 250 water bodies (Desilting springs, open wells, repairing & strengthening kunda bunds)
- & Completed 14,000 contour trenches in common lands
- & Completed 125 RFDs and Gully Checks in common lands
- & Awareness building on importance and future

NRM – Land & Agriculture

- & Marginal lands of marginalised people
- & Highly degraded
- & Main crop Groundnut
- & Environmentally damaging agricultural practices (extreme mono-cropping, pesticides, etc) .
- & Silt application
- & Contour bunding
- & Field bunding
- & Stone bunding
- & Gully plugging
- & Pebble and stone clearing
- & Dry land horticulture
- & Traditional agro seed conservation documentation & popularisation
- & Popularisation of low water consuming food crops & recipes
- & Issues highlighted and alternatives demonstrated during the Environment Day Celebrations, held every year
- & organic composting
- & biological pest control
- & low energy consuming practices
- & low water consumption practices

Com. N° 57 - atelier....

- & method of rice cultivation developed in Madagascar
- & increases yields
- & reduces pest attacks
- & reduces water consumption by over 50%

Promotion of Millets –

- & a group of diverse food crops
- & hardy rain fed crops
- & capable of growing in low fertility soils
- & provide nutritious fodder for livestock
- & food grains rich in essential micro-nutrients

Nelavanka Demonstration Farm

- & 2 acre plot with a percolation pond & open well
- & experiments, field trials, seed multiplication & demonstrations of improvement in soil conditions through organic means
- & demonstration facility for preparation of vermi-compost

Funding collaborations

Land Center for Human Rights

LCHR's Expertise In Supporting Farmers Rights In Clean And Adequate Drinking And Irrigation Water

**Prepared by
Karam Saber**

**A Paper Presented To The International Workshop About Water
Poverty And Social Crisis
(Agadir 12 – 15 December)**

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Introduction:

The LCHR is a nonprofit NGO established in 1996 to support and reinforce farmers rights in a better and decent life for them and their families. To achieve such goals, it tries to raise the awareness of these groups with the importance of solving problems especially related to water, mobilize them and help them organize themselves, in addition to presenting their complaints to the specialized authorities and filing lawsuits in case of conflict between farmers and the state foundations. Therefore, it has issued this document as an attempt to tackle some of the water problems in the Egyptian countryside. In this document, we will try to present the expertise of the LCHR as an NGO that works with farmers to guarantee their rights in adequate and clean drinking and irrigation water, and guarantee justice in distributing water among citizens.

This document is composed of four sections: the first introduces the international and regional as well as the legal contexts regulating water issues. The second section of the document illustrates farmers files and complaints presented to the LCHR. The third section of the document includes farmers testimonies. The fourth section undertakes LCHR's expertise in this field.

First: Water Issues in Egypt

Water is the pivot of any agricultural economy. For Egypt, the Nile is the vein of life and the basis of the agricultural system. Therefore, Egypt depends primarily on the river Nile as the main resource of water. There are other eight African countries sharing water quotas from the river Nile. At the regional level, Egypt and the Nile countries are subject to numerous conventions regulating the quotas and distribution of water among the respective countries.

There are many international laws, conventions and instruments ensuring the right to water to the Egyptian citizens, to which Egypt is a signatory and is whereby committed before the international community in general and before the Egyptian citizens and farmers in particular. For instance, it is stipulated in the International Convention on the Economic, Social and Cultural rights that water is of the limited natural resources in the world. It is a basic prerequisite of life and health. Human right to water is an infallible right. Moreover, the Commission on the Economic and Social Rights underscores the significance of guaranteeing sustainable access to water resources for agriculture purposes in order to maintain the right to sufficient food resources.

As for the Egyptian legal framework regulating water, it is mainly represented by Law No. 12 of 1984 on irrigation and drainage enacted on February 22, 1984. The said law abolished the Law No. 74 of 1971. The 1984 Law suffers many deficiencies in provision and enforcement – boosting corruption and unfair distribution of water quotas. The said law prohibits any works to be pursued on state lands unless through an authorization and license of the Ministry of Irrigation and Water Resources.

It is noteworthy that corruption and the lack of planning breach the aforementioned law rendering the enforcement thereof ineffective. The complaints presented to the LCHR indicate that thousands of farmers had to build waterwheels to push water upwards to irrigate their families after some state agencies block the canals. These farmers were punished as per the provisions of Law No. 12 of 1984. What is even worse is that their lands would have turned into barren lands – even if they would not have been punished, which is even a severer penalty.

Second: Farmers Files And Complaints At The LCHR:

During the year 2005, farmers have presented complaints to the LCHR related to water issues, and the LCHR has presented them to the different governmental bodies to achieve farmers demands in clean and adequate water. In case the governmental bodies have refused to solve farmers problems, the LCHR files lawsuits for these farmers before the courts.

According to these complaints. water problems in Egypt range from lack of irrigation water, contamination of potable water, lack of drainage services, etc. In fact, most of these problems are related to governmental negligence, lack of planning schemes, the corruption spread all over the municipal councils and maintaining water resources for certain areas at the expense of others. The main persistent irrigation problem is the shortage of irrigation water and insufficient accessibility to the farmers at the end of small canals and the limitedness of water alongside the main canals.

Other problems are due to the length of the main and branch canals – making supervision hard with the few numbers of irrigation inspectors in the various governorates. Other problems are posed by the excessively growing riverbed and bank plants due to the same reason of the length of the canals. Moreover, there are many ruined areas alongside the canal banks due to the wrong practices of the farmers. Accurate statistics on the water needs for the various crops are not available due to the violation of the agricultural cycle¹.

Such problems are not stereotypical of the countryside villages only, they occur in the newly reclaimed lands as well. The fresh graduates who receive pieces of land to be reclaimed suffer from the unfulfilled promises by the government to provide sufficient water resources. In the villages, the farmers in some instances resort to using drainage water in irrigation due to the shortage in water supplies.

Potable water is the second major water problem encountering farmers in the countryside. The villages suffer from the lack of pure water supplies or it either reached them contaminated. Most of the villages face problems of cease of water supplies due to technical problems. The state does not properly assume its role in providing solutions for such issues. Rather, in most cases, corruption prevailing in the municipal councils and the intervention of the members of the Parliament to their own personal benefits help hindering solutions.

Among the grave aspects of the issue of potable water is its contamination in many villages through getting mixed with drainage waters. A blatant example is all villages of Atfeeh center which lack any potable water supply due to the fact that waters get mixed with drainage water. This draws attention to another major problem i.e. drainage crisis. Many villages do not have drainage networks and tubes – leading to health problems. The inhabitants of the villages file complaints continually to the officials at the governorates; however, the complaints are flagrantly neglected.

Administrative corruption gives rise to another major problem in the countryside, namely: unfair distribution of irrigation water. Farmers do not get the water quotas necessary or suitable for their agriculture purposes. The unfair distribution of water entails crops losses affecting in turn economic development on both the short and long runs. Shortage of irrigation water results in ruining crops, spoiling lands, increasing unemployment among farmers and augmenting hostile instances among the farmers. In some areas, the civil society exerts concerted efforts to help implement projects to solve water problems – the role that is supposed to be assumed by the municipalities.

Third: People In The Egyptian Countryside Talking:

The following testimonies are dialogues and interviews between the LCHR researchers and farmers whom the LCHR has provided with legal assistance. These interviews provide testimonies in farmers words on the daily dilemma they are facing regarding irrigation and potable water and drainage.

Among the most important testimonies collected by LCHR, is that by **Saber Shindi**, 50 years old, from **El Rahawi village – Giza**. Wells contractor. He is one of the most cultivated in the village. He and his sons have a great knowledge in agriculture and politics as well. He says: "the village space does not exceed 3 thousands feddans. Half of the space was dedicated to buildings after enforcing the law regulating the landlord-tenant relationship. The farmers evacuated the lands. Some travel seeking job opportunities abroad and other started working in digging wells, which is as serious. Agricultural lands in *El Rahawi* are irrigated through wells; that's why you can find most of the farmers digging a well to share in irrigating their lands by turn. This is despite the fact that we are by the banks of the Nile. However, the Nile here is too lo and raising water is too expensive.

Potable water reaches the village through the water salination plant which was established through collecting the cost from the farmers. This water is not pure as it is so close to the *El Rahawi* drainage canal. Some people buy potable water from the neighboring villages, however the majority are too poor. They drink the plant water and many of them already got infected with kidney and liver diseases. There are no drainage channels in the village. It is conducted through digging storages to be emptied from one time to the other – another expensive process".

Saber further talks about pollution and the economic and social implications on the village. He adds: "*El Rahawi* village is a contaminated one, on ground, underground and even the cattle are getting weaker. Also the lesser crops are planted, the lower is the family income. Our main problem the drainage canal. None of the officials provide us with assistance. We contact civil society institutions and the media on our own to try to find solutions. We call for drying the drainage canal or diverting its direction because it is the root cause of the pollution we are living in. some of the farmers go as far to irrigate their lands by the contaminated waters of this drainage canal which ends by throwing all its contents in the Nile. We also call for providing job opportunities for the youth of the village and establishing a hospital for the village. There is not a single hospital in the village, however, there are some private clinics".

Shehab El Din Abu Zeid, 37 years old, a daily worker from **Gabal El Nour village – Bany Swief**. He states that he doesn't have an agrarian land neither by rent nor ownership, he says that in Gabal El Nour village they drink desalinated water from a desalination station, and that this water is not always clear, as they sometimes find dregs in it which cause some diseases, like kidney failure. This water reaches the village for only 2 or 3 hours a day because of neglecting and un-maintaining the desalination station which was built in 1996.

Shehab further talks about water in the agrarian land, as it is very rare because of its expensiveness and the wide area of reformed agrarian land that consumes a large amount of water specialized for the village, which led to land beginning to loose its' value and production decreased notably. The village doesn't have a drainage system, while drainage in the village is about tanks dug inside the ground, and when these tanks are filled up, special trucks come to empty them, which costs a lot of

money. These tanks raise the water level, which have led to the collapse of some houses since the year 2000, and because of the water pollution and saltiness, 20% of the agrarian land area was wasted.

Then he presents the demands of Gabal El Nour people saying that the government must consider the unused underground water and establish a desalination station to use this water for drinking and irrigation, establish a covered drainage network and desalinate wasted water and reuse it in irrigation. The village doesn't have members in the local council. And the village has many other problems, like unemployment, as the village has 12 thousand people in it, only 1000 of them are employed, the people demand governmental working opportunities and loans for small projects.

Fourth: LCHR's Experience In Supporting The Right In Water:

There are millions of people in Egypt who strive to obtain adequate and clean water especially in the countryside, but there aren't enough water resources to satisfy the needs of the people especially the poor people in the countryside.

The LCHR aims from working with farmers to guarantee justice in distributing water to support farmers right in adequate amounts of irrigation water for their agrarian lands, as hundreds of Egyptian villages still suffer from lack of irrigation water and water pollution (when mixed with drainage water), these villages still suffer of shortage in irrigation water because of the unjust distribution, neglecting waterways and not improving water lifting stations. The LCHR also works with farmers to guarantee their right in a fair access to clean drinking water.

In Egypt, the rural society needs more effort to guarantee farmers rights in clean and adequate water and drainage systems. In addition to that, farmers need a lot of awareness and training to be able to obtain their rights. Therefore, an integral system must be established to maintain the sustainability of both drinking and irrigation water and process drainage water.

LCHR's expertise in the countryside confirms that the aspects of the irrigation water problems in Egypt are as follows:

- Water doesn't reach the end of waterways in some areas.
- The irregularity of water shifts and the low water level in some waterways.
- Conflict and dispute among farmers because of the unjust distribution of water.
- The ruin and impairment of some plantations because of the water shortage in some areas.
- Defect and interlock between the state's administrative bodies.
- The deterioration of productivity in some lands because of the water shortage.
- Using drainage water in agriculture because of the lack of irrigation water which affects clean plantation in Egypt.
- Using underground water which leads to increasing the farming expenses and the land saltiness.
- The nonexistence of waterways and canals that suit some of the expansions in the new lands.
- The increase of social problems and violence in the countryside because of competing for the priority in irrigation.
- The deterioration of the soil and wasting land resources in some areas.
- Clean drinking water doesn't reach most villages in the Egyptian countryside, which forces some farmers to use polluted drinking water.

LCHR works with farmers in aim of:

- Reinforcing and supporting farmers rights in clean, adequate and a fair share of drinking and irrigation water.
- Provide guidance in using irrigation water and reusing agrarian drainage water to protect citizens health and stop wasting water.
- Raising farmers awareness about the dangers of drinking polluted water or not having an adequate share of irrigation water or the nonexistence of systems to process drainage water.
- Supporting farmers capabilities in the countryside and establishing rural CSOs concerned with guaranteeing farmers rights.
- Issuing reports and publications to raise farmers awareness and teach them about water rights stated by the law.
- Providing legal aid for the farmers whose rights in clean and adequate drinking and irrigation water have been violated by filing lawsuits before courts and presenting their complaints to the specialized officials at the ministries of irrigation and agriculture to solve water problems in the countryside.

The most important issues undertaken in the LCHR activities:

- The importance of cleaning rural waterways and maintaining waterwheels.
- The importance of increasing the number of dredging machines to clean waterways and drainages.
- The importance of increasing the days of shifts in waterways that suffer of lack of irrigation water.
- Closing some stations and renewing some water lifting machines.
- The importance of increasing the punishment for those who violate irrigation and drainage laws.
- The importance of lining waterways and canals to stop wasting water resources in Egypt.
- The importance and necessity of clean drinking water to reach all Egyptian villages for the protection of farmers health and life in Egypt.
- The importance of national associations in the countryside and rural pioneers to participate in supporting farmers rights in adequate irrigation water to improve their incomes.
- The importance of raising the awareness of agrarian guides and governmental officials about their positive social and economic roles in this field.
- The importance of presenting complaints and filing lawsuits in case state foundations didn't do their role in guaranteeing these rights.
- The importance of coordinating between the different bodies (farmers, national associations, local councils, the ministry of agriculture, the ministry of irrigation) to solve water problems.

We hope this document be useful for the workshop attendances, and we hope we benefit of your expertise in supporting farmers rights.

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Pauvreté Hydraulique
et crises sociales

Water poverty
and social crisis

Perspectives de recherche
et d'action

Perspectives for research
and action

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Water Governance, Participation, and Poverty: A Critique with Reference to Irrigation Projects and Water User Associations in Morocco

Paper to be presented at the International Workshop on 'Water Poverty and Social Crisis: Perspectives for Research and Action', Agadir, Morocco; 12-15 December 2005.

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Work in progress – **please do not cite** – comments are welcome.

This paper addresses the third aspect of the overarching conference theme of 'Water Poverty and Social Crisis', namely that of active and effective participation in the management of water resources, and in administrative, legal, political and economic processes of decision-making.

As Franks (2004: 7-8) points out, since water governance is about the way water is allocated and managed, it is essentially about decision-making and hence constitutes a political process. This paper aims to support Franks' call that this needs to be freely acknowledged and internalized in the water sector, where there is still a tendency to want to operate outside the political sphere. Franks also asserts that while participation is often seen as the panacea to the problems of water governance, further research needs to be done on the forums and settings (platforms) in which people can participate. This paper intends to contribute to such research by examining the functioning of (irrigation) water user associations in Morocco.

The paper is organized as follows. First, we will discuss the global water consensus, the conceptual underpinnings of its participation element and possible critiques thereof. Second, the World Bank's overall record on this issue will be examined. Third, this paper will provide some brief background on Morocco's agriculture and irrigation sector, and highlight some issues concerning its Water User Associations (WUAs). Fourth, three examples of the World Bank's experiences with Community-Driven Development (CDD) and WUAs specifically in Morocco will be reviewed. The last section will then illustrate the issues raised in this paper by presenting some preliminary findings from a case study of a World Bank irrigation project in Morocco.

Recent water sector policies in Morocco fit well into the (revised¹) global water 'consensus', which holds that 'participation offers people the opportunity to meet their responsibilities, as well as the opportunity to claim their rights' (UNDESA: 378). Other expected benefits of participation are that it facilitates more informed decision-making, eases conflict resolution, and brings in the voices of relatively powerless groups, such as women and indigenous people. In the irrigation sector, attention has been shifted towards promotion of local governance and transfer of irrigation management to user groups commonly referred to as Water Users Associations (WUAs) (Khanal 2003: 1).

However, the same international organisations which promote this new consensus acknowledge that 'the actual progress in participatory approaches has been modest and uneven.' (UNDESA: 378) Indeed, a wealth of recent research on water-user associations and village level management structures demonstrates the limitations of community and the ways in which such institutions can reproduce hierarchies of power, and reinforce exclusion of the marginalized (see Cleaver 2004 for a bibliography). One reason for this is that during structural adjustment reform

¹ This refers to the move away from conventional forms of water governance, which have usually been dominated by a top-down approach and professional experts in the government and private sector, towards the bottom-up approach, which combines the experience, knowledge and understanding of various local groups and people (UNDESA: 378).

processes, the state was encouraged to withdraw but adequate user associations had not been allowed to grow strong enough to take over the state's former functions, often merely remaining empty shells (Ruf no date: 1). A second reason for lackluster performance of participatory arrangements is that many governments have a very instrumental view of local communities and related community-based organizations, whose active involvement is normally sought only at the project implementation stage, and not throughout the whole policy or project cycle (UNDESA: 378).

Arguably, a more deep-seated reason for these mixed results is that the 'functional model' of the WUAs has dominated the consensus. This model assumes that the WUAs are non-partisan, non-political and homogeneous bodies, and perform the irrigation management tasks as designed. It neglects the conditions under which accepted rules and organizations come into being, i.e. the local socio-political dynamics in organizational evolution. Hence this model does not recognize the WUAs' political character (Khanal 2003: 4).

Franks and Cleaver (2003: 1) point to the underlying approach behind this functional model, namely the idea of institutional crafting, as epitomized in the work of Elinor Ostrom who specifies 'Design Principles' for robust and enduring institutions for common property resource management (Ostrom: 1990). This and subsequent works (see Franks and Cleaver: 2003 for references) tend to emphasize the formalization of institutional arrangements (e.g. the principle of representation of users), the codification of rules and regulations (i.e. internally efficient mechanisms for conflict resolution and resource allocation), and the strict exercise of sanctions against free-riders. These design principles were then (often crudely) translated into policy and practice, and soon showed their shortcomings. As hinted at above with regard to WUAs, these shortcomings include first, the functionalist assumptions underlying institutional thinking; second, the evolutionism on which it is based (i.e. 'making good' the deficiencies of traditional or indigenous institutions) and third, the over-simplification of the social world and processes within it (see Franks and Cleaver 2003: 2ff. for a detailed discussion).

This last point refers to the fact that neither communities nor resources consistently exist with clear boundaries, and that natural resources are not simply commodities but invested with social and symbolic meaning to people. Moreover, people's decisions about natural resources may rarely correspond to external perceptions of efficiency and optimization. Most importantly, authority structures and the social norms of resolving competition and conflict over resources are rarely clear and consistent but diverse and contingent, subject to negotiation and messy compromise (Franks and Cleaver 2003: 3).

For example, Khanal (2003: 8) describes a WUA in Nepal that was seen as platform to check the strength of the political parties. Hence, WUA agendas were heavily focused by party politics. While this might be an extreme case of politicization, preliminary findings from our case study in Morocco seem to confirm this possibility (see discussion below).

Having briefly discussed the global water consensus, the conceptual underpinnings of its participation element and possible critiques thereof in a first section, the second part will now examine the World Bank's overall record in this area.

With the renewed importance given to the poverty reduction agenda in the 1990s, the World Bank invited civil society organizations to play a bigger role in the development process. This was based on the assumption that compared with the state or the private sector, such organizations would be closer to the poor (and thus be able to provide services to the poor as sub-contractors of the State), promote transparency and 'accountability', be less bureaucratic or corrupt, and to provide legitimacy to reforms (Hatcher 2005: 11-12). Indeed, the Bank's financial support for projects with community approaches has increased from less than 5 percent of total Bank lending in 1989 to about 25 percent in 2003 (World Bank/OED 2005).

As Kamat (2004: 160) points out, 'in a curious flip-flop of what served as a universal conceptual frame for development planning, the state, today, is represented as fragmented by private interests (otherwise referred to as corruption), and hence inept at representing the will of the people, whereas civil society is seen as the honest broker of 'the people's interests'.' This means that civil society becomes the key site of socio-economic struggle, replacing political society as the key site of political struggle. It also signifies the decline of the concept of citizenship and the accompanying political, civil and socio-economic rights; this in turn allows donors such as the World Bank to avoid issues of power relations and resource allocation (Hatchet 2005: 15-16). Indeed, it could be argued that the fashionable concept of 'social capital' serves to perpetuate this trend. As Harriss (2002: 102) holds, 'the main effect of the language of social capital in World Bank-speak is to suggest that 'getting the social relations right' is a technical and not a political process.' In sum, the World Bank's and other donor's enthusiasm for 'participation' and partnership with civil society organizations can be explained by referring to their giving the 'possibility of a kind of democracy through 'popular participation', but without the inconveniences of contestational politics and the conflicts of values and ideas which are a necessary part of democratic politics' (Hearn 1999: 4).

However, as the World Bank itself acknowledges (see World Bank/OED 2005), there are several shortcomings with the CDD approach. Most interesting for our purposes here is that despite community participation, it has been difficult to reach the poorest. This is because apart from data problems to identify them, the new, sophisticated targeting strategies have been difficult to apply since political concerns have often forced governments to include non-poor regions. And within the community, it is difficult to reach the poorest because they have the least amount of time to participate in meetings and training events and hence often do not benefit from the capacity enhancing efforts. Moreover, the poor often lack the resources to contribute and the "better off" in the community contribute on their behalf. This has the potential of changing the local balance of power even more against the poor.

With regards to World Bank watershed projects, an internal Bank review² (Boerma 2000: 13-14) found that in many projects the two main purposes for securing participation in the implementation of projects are not achieved. These purposes are first, to ensure that project activities and funds are appropriately targeted to meet problems and issues as defined by communities themselves; and second, to achieve a sense of ownership of the process so that longer term sustainability can be ensured. Most importantly, only a quarter of all projects have actually included specific measures for targeting the most vulnerable groups in project areas and ensuring their ability to benefit from project inputs. The review also found that the impact of project investments on the poorest populations is being actively monitored in only slightly less than a quarter of all projects. However, this trend is improving, since the percentage of projects that included specific measures to target the poor has risen from 8% in the early 1990s to 47% in the late 1990s (ibid.: 32). This is also supported by the OED evaluation of the World Bank's 1993 water sector strategy (Pittman 2002: 12), which notes that the poverty focus of irrigation and drainage projects rose by 23 percent after the Strategy.³

Apart from emphasizing a lack of focus on poverty, the watershed review challenges the 'design principles' view described above, since it pointed out that 'in reality most communities are more often socially and economically quite fractionalized and subject to a variety of political, economic and other vested interests.' Similarly, it notes that vulnerable people tend to be more risk-averse than better-established farmers and thus are often reluctant participants in project activities unless there is an immediate prospect of short-term gain (ibid.: 33).

² This review examined 42 watershed projects that contain some element of 'participation' and that were approved by the Board between mid-1990 and the end of 1999.

³ However, the evaluation also noted that 'substantial room remains for targeting the poor and vulnerable populations within water sector operations. Of most concern across the Bank is the scant attention given to the direct impact of these operations on the poor.' (Pittman 2002 : 13)

There are other signs that the World Bank is becoming increasingly aware of the shortcomings of the functionalist approach. The Bank's Senior Water Advisor, David Grey (2005), mentioned that the main management challenge is not a vision but more effective implementation, and that the Bank needs to be more attentive to the political economy of water. Similarly, the OED's Rural Water Projects evaluation (2000: 31) warns that 'great care must be taken to base projects on local practices and traditions rather than internationally generalized models that specify how villages ought to behave.'

As for the Middle East and North Africa region, it receives the largest (as a proportion of regional lending) water portfolio in the Bank,⁴ and the trend is rising (World Bank 2004: 34). This is because the Middle East and North Africa Region has the highest level of water stress. The recent 2004 Water Strategy recommends technical innovation and more efficient allocation and use of surface water and groundwater. It notes that 'the challenges of re-use of water, desalination, irrigation modernization and orderly mechanisms for the voluntary transfer of water from low-value uses (especially agriculture, which uses 85 percent of the water) to high-value uses (especially urban and industrial) are of high priority.' Finally, it stresses that the primary focus in the region is on better management rather than building new infrastructure (ibid.: 30).

Turning now to the third part of this paper, the particular case of Morocco and its irrigation sector, it seems to partly contradict this last point. While better management has been sought in the form of creating WUAs, the government is also continuing its considerable investments in irrigation infrastructure, as we will see below.

First however, it might be useful to briefly consider some background information about Morocco and its agricultural sector. Morocco is a lower middle-income country with a GDP per capita of US\$1,250 and a population of 30.5 million growing at 1.8 percent annually. Since 1991 the rate of growth of GDP fell by more than half, averaging only 1.9 percent during the 1990s, and per capita incomes stagnated causing the country to lag behind others in the MENA Region. Agriculture contributes about 12-17 percent of GDP depending on rainfall, and employs about half of the work force and 60 percent of the female labor force. The main challenges for the agricultural sector are the doubling of the frequency of severe droughts to one year in two in the 1990s, limited use of selected cereal seeds (in the 2002/03 season usage actually fell by 20 percent to 488,000 tons), fertilizer and mechanical equipment, as well as the fragmentation of holdings (85 percent of farms are under 10 hectare and 49 percent under 3 ha). A measure of the inefficiency of cereal farming is that the government's guaranteed price for cereals is roughly twice the world price and that the authorities raised wheat import tariffs to 135 percent in order to protect cereal farmers (World Bank OED 2005: 1-2).

Only about 14 percent (1.2 million hectares) of the 8.4 million hectares of arable land is irrigated which makes agricultural production highly vulnerable to drought. Even so, public investment in irrigation has been substantial, typically accounting for almost half of all agricultural sector expenditures or six to eight percent of national investment, until well into the 1990s. Morocco's irrigation sector is split among public sector capital-intensive large-scale irrigation schemes covering 485,000 hectares that are operated by nine Regional Authorities for Agricultural Development (ORMVAs: Office Regional de Mise en Valeur Agricole), traditional small and medium-scale irrigation covering 400,000 hectares owned and operated by local communities (mostly producing for auto-consumption only), and about 100,000 hectares of private development (World Bank OED 2005: 1-2). Water user associations now cover 71 percent of Morocco's irrigated area. Not all these organizations, however, are active. For example, although the Moulouya region has 77 WUAs, only 16 are operational. Similarly, in Doukkala only 24 of 39 WUAs are active (World Bank OED 2005: 18).

⁴ Lending for water-related projects accounts for 31 percent of Bank lending in the region over the last decade, compared with 16 percent Bankwide (World Bank 2004 :34).

In terms of the small and medium-scale irrigation schemes (both traditional and 'modern' i.e. recently built or improved by the government), there are about 3,000 irrigation areas, whereof 66% have a size of less than 100ha and account for only 11% of the total irrigated surface; on the other hand, 5% of the total number of areas are bigger than 1,000ha and account for 53% of the total surface. Three-quarters of all such irrigated areas are privately owned (Elbouari 2004: 2). In the traditional small and medium-scale irrigation schemes, where canals are made of earth and customary water rights determine access to water, it is estimated that only 10% of the irrigation networks (which are 25,000km long) function well. This is why the government plans to improve the networks on 195,000ha between 2000 and 2020 - though the potential area to be improved is double the size (Elbouari 2004: 4). The works aim to both improve the 'efficiency' of the networks to reduce leakages and their management by the users, hence the preference to create WUAs on the areas to be improved.

These current and future works build on twenty years of experience of mostly World Bank and German-funded improvement schemes in the traditional small-and medium-scale irrigation sector, which started in the 1980s and include the following projects:

- 1984-1988 : First small- and medium-scale irrigation development project on 12,880ha.
- 1988-1994 : Second small- and medium-scale irrigation development project (PMH 2) on 28.000 ha ;
- 1997-2005 : Small- and medium-scale irrigation development project in the North on 29.000 ha ;
- 2001-2006 : First phase of the Irrigation Based Community Development Program on 9.500 ha.

The last project is our case study and will be discussed in more detail below. Between 1990 and 2000, more than 1032 WUAs were created on these perimeters (Elbouari 2004 :4).

In order to justify the investment in these projects, the donors applied strict selection criteria. These were: the rate of return (over 12%), the cost of the works per hectare (not exceeding 12.000 DH/ha) and the obligatory participation by the beneficiaries (at least 10% of the investment costs). The application of these criteria required long, detailed and costly studies. An internal government evaluation concluded that the technical requirements should be simplified and that the beneficiaries should be involved in the preparation of the studies, in particular concerning the choice of the course of the canals which should be paved/cemented; the location of the diversions over the rivers (*prises de dérivation sur les oueds*) and of the openings for the distribution inside an irrigated area, as well as the modalities of water distribution between the different arms of the irrigation network (Elbouari 2004: 5). However, the role of the WUA is not limited to the preparation phase. It is also supposed to: First, participate (financially or by providing labor) in the improvement of the irrigation infrastructure; second, manage and maintain the infrastructure on a given perimeter; third, distribute the water to its users ; fourth, define and apply the internal rules of the association; and fifth, the committee is in charge of the administrative and financial management of the WUA (Benomar 2004: 102).

This participation was to be achieved by creating a legal status for the WUAs (law 2/84 published in December 1990 and applied on a large scale with the publication of the application decree in May 1992). Between 1990 and 2000, more than 1032 WUAs were created on the newly improved small- and medium scale irrigation areas. The government administration concluded that the WUAs should be initiated by the administration as soon as the projects are pre-selected, and if necessary, base their membership on the traditional organizations. That way, the administration can consult the WUA about the planning of the works and its financial participation in the costs. However, it became clear that for the WUA to be able to take on their intended roles, they needed to be trained in irrigation management. Hence, a training course was developed from 1994 onwards (Elbouari 2004: 4, 6).

In terms of the actual functioning of the WUAs, there are numerous issues to be discussed. We will highlight just three here. First, their '*conseil d'administration*' (board of directors/committee)

consists of seven posts, i.e. six farmers' representatives and one member from the government administration (usually an agricultural extension officer) who is supposed to supervise and facilitate the working of the WUA. However, as Benomar (2004: 27) points out, this seventh member is not present in all the WUAs yet. This is important to mention here since he is also an essential element in ensuring the monitoring of agricultural development and increased yields that would in turn facilitate the estimation of increases in incomes. This data could then serve as arguments for the committee vis-à-vis the WUA's members to justify the requirement of paying for operation and maintenance costs, and would also help the donor to compare the performance of different WUAs (Zahry and Rchid no date: 12).

Second, the WUAs are also aimed at facilitating the temporary exchange of water rights between members so that the water can be used more flexibly according to the irrigation needs of different crops. However, members of the committee are in most cases still hesitant to allow such an exchange, given that they are often members of the '*jemaa*' (the traditional village council of elders) who have the rights to most of the water shares. In fact, these persons might believe that the WUA will limit their decision-making power and hence be opposed to its creation, or in the opposite case, they might consider the WUA as an opportunity to extend their power and defend their personal interests. (Benomar 2004: 91-92, 99) Indeed, according to a staff in the Provincial Agricultural Directorate in Marrakech, the '*jemaa*' is always present behind the scenes and the WUA represents merely an institutionalization of this purely 'verbal' association. Often the president of the *jemaa* is also the president of the WUA (Mrabti 2005).

Third, due to the frequency of droughts, many farmers have dug wells using individual pumping and have disassociated themselves from the activities of the WUA (Zahry no date: 8).

Having outlined some of the main characteristics of the irrigation sector and WUAs in Morocco, the fourth part of this paper will now review the record of three recently completed World Bank projects in the water sector before turning to our case study from the traditional small-and medium scale irrigation sector.⁵ Although two of the three examples are drawn from the Large-Scale Irrigation sector, they still provide interesting insights concerning the extent to which the participatory approach in the irrigation sector has helped reduce poverty.

The first project to be reviewed briefly is an example from the traditional small and medium-scale irrigation sector, the Lakhdar watershed management pilot project (in the province of Azilal) whose objective was to test on a pilot basis participatory approaches to improve land use and natural resource management (NRM) in mountainous areas. The implementation completion report (ICR) notes that even though increased income from agriculture and protecting the natural resource base constitute the ultimate outcomes - as community participation is expected to lead to better sustainable resource management and to higher income generation - the project did not specify measurable targets or baseline/benchmark for these outcome indicators (World Bank 2005: 3). However, field surveys carried out by the project implementation unit in the Ministry of Agriculture indicate significant increases in the incomes of the more than 2,000 farmers that the project worked directly with (ibid.: 5).

For our purposes, the outcome of the rehabilitation of small-scale irrigation schemes is most relevant. In total, 554 ha of irrigation schemes were rehabilitated, 111% of the appraisal target of 500 ha. No formal WUAs were created but this component, like all the other components, was based on the participation through village committees. Beneficiary participation averaged 14%, somewhat lower than the 20% estimated at appraisal, mainly because the contractors, in trying to meet their obligations, did not always wait for beneficiaries to undertake the land preparation, while the beneficiaries disputed the project's arrangements to pay the contractors for days which

⁵ As for World Bank lending to Morocco, it numbers over US\$6.1 billion for 105 loans and credits since 1965. Thirty of these, totaling US\$1.8 billion, have been to the agricultural sector (World Bank OED 2005 : 1-2).

the communities regarded they had already contributed (ibid.:6 and Saadani 2005 :13). This example shows that the practicalities of implementing the participatory approach are not straightforward. Overall, the evaluation report rated the sustainability of the participatory approach as 'likely', mainly since 16 of the 26 *Douar* (Village) Committees (DC) created under the project, have evolved into 13 Local Development Associations (LDA) with legal status. Nine of the LDAs have established bank accounts and seven have women as members, which is a new feature in the rural areas of Morocco (ibid.: 10). A further insight from this project concerns the choice of the most appropriate unit for intervention; at first, the *douar* (village) was chosen but it became clear that in terms of social cohesion and homogeneity in terms of spatial management, smaller units such as a group of sub-villages would be more appropriate (Saadani 2005 :12). The village committee was deemed an appropriate structure since it is very close to the traditional organization, the '*jemaa*', while being more open for the representation of women and young people (ibid: 13-14). To sum up, while the poverty alleviation impact of this project can only be estimated roughly due to missing baseline indicators, it did prove that the participatory approach could successfully be put in practice in Morocco.

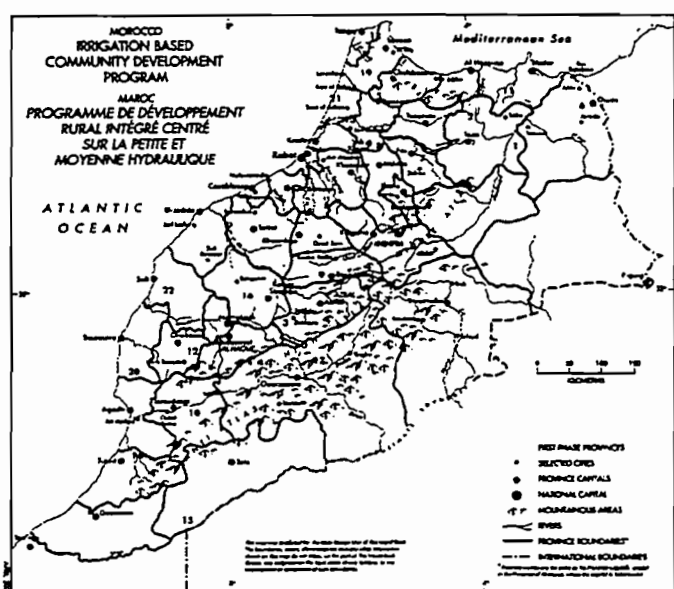
The second example is drawn from the large-scale irrigation sector, i.e. the Second Large Scale Irrigation Improvement Project (1993-2000, total project costs were US\$199.8 million). Its main objective was to raise the efficiency of water distribution and use through rehabilitation of infrastructure, improved operation, and on-farm investment. However, the evaluation notes that the absence of adequate monitoring and evaluation precludes assessment of impact, and on-farm water-use efficiency improved only locally at a much smaller scale and with fewer innovations than planned. The second objective, to preserve public investments through appropriate replacement and maintenance was not met, since overall maintenance expenditures per hectare declined by almost a third between 1995 and 2000, because falling revenue from water billings are used to cross-subsidize the ORMVA's agricultural extension activities. The third objective was to increase recovery of operation and maintenance (O&M) costs from beneficiaries through better management by the ORMVAs, thus reducing the need for the government's budgetary support. However, farmers' willingness to pay declined because the quality of water service fell and ability to pay was undermined by low value irrigated crops encouraged by agricultural subsidies. Even though government has had to increase its budgetary support for large-scale irrigation - contrary to project objectives - the norms for O&M are not met (World Bank OED 2005: ix).

The third example is also drawn from the large-scale irrigation sector, the Irrigated Areas Agricultural Services Project (1993-2001, total project costs were US\$21.7 million). Its objectives were to raise agricultural production and farmers' income in the irrigated areas with special efforts to reach women, improve the organizational and operating efficiency of the ORMVAs' agricultural research activities and extension services, and promote farmer organizations to take an increasing share of development responsibilities. The evaluation notes that agricultural production and farmer incomes increased, but this is not clearly attributable to the project. Outreach to women led to the formation of several cooperatives and producer organizations but was dropped for budgetary reasons on project closure. Agricultural services were partially reorganized and the volume of services increased, but it is not clear to what extent farmers adopted new technologies due to lack of monitoring and evaluation. Similarly, while the number of farmers' organization rose significantly, their effectiveness is unknown.

These three examples illustrate the Bank's difficulty to adequately assess the poverty impact of its projects, mainly due to the fact that during implementation attention to monitoring and evaluation was poor. The second lesson to be drawn from these examples (especially the last two) is that although a large number of farmers' organizations were formed in the large-scale sector, in general they have neither relieved the ORMVAs of their service delivery role nor led to increased payment for these services. Most importantly, the evaluation notes that there is a marked contrast between WJAs in the traditionally managed areas and those within the modern irrigation perimeters which clearly indicates that farmers' leaders are willing to take responsibility for water distribution, management and cost recovery - if given water rights and empowered to do

so through enabling laws and regulations. In short, the vigor of local organizations is highly correlated with the level of autonomy given to farmers and is most apparent in the three traditional schemes (Haouz, Ouarzazate, and Tafilalet) where old water rights still apply and public investment costs are not recovered. However, it seems that neither the government nor the ORMVAs (in modern perimeters) currently appear willing to cede any real authority to the WUAs (World Bank OED 2005: 18, 25).

In this fifth and concluding part of the paper, we now turn to our case study, the first phase of the Irrigation Based Community Development Program (*Projet de Développement Rural Intégré centré sur la PMH : DRI- PMH*). Our case study location is a rural commune in the Haouz province south of Marrakech in the High Atlas Mountains. This province is ranked 32nd out of 57 predominantly rural provinces in terms of poverty in rural areas, with a poverty headcount of almost 25%, vulnerability of 56.6%⁶ and an average annual expenditure of 7,464 DH, i.e. about 740 Euros (World Bank 2004: 87).



From: World Bank (2001: 94)

This program is split into three phases, and its overall objective is to improve the incomes and quality of life of rural communities centered on small and medium irrigation (SMI) in 15 provinces over a 13-year period (2001-13), primarily through demand-driven, coordinated investments in SMI rehabilitation and improvement and complementary community infrastructure, including rural roads, water supply/sanitation, electrification, health and education facilities. Apart from the poverty reduction objective, two expected social benefits are of particular relevance to the theme of this paper, i.e. improved participation and access of beneficiaries to decision-making processes and investment opportunities, thus enhancing ownership for project investments and their sustainability; and increased organizational capacity for the rural communities⁷ [municipalities] involved and user groups, contributing to the formation of social capital (World Bank 2001: 3, 7).

The philosophy behind this 'integrated' project is that by using the irrigation component and the associated social organization as the 'hard core' of the project, social priorities can be formulated

⁶ Vulnerability reflects the percentage of the population falling under a level of consumption which is 50 percent higher than the poverty line (World Bank 2004: 19).

⁷ In the Project Appraisal Document (World Bank 2001), the rural communes or municipalities, i.e. the basic unit of local government in Morocco, are slightly confusingly referred to as the "Rural Communities (RC)".

more easily by the community living on a given irrigated area (Elbouari 2004: 7). The project effectively started in July 2002, and went through a long planning stage made up of three phases. In theory, these are as follows: First, the communes (municipalities) within the three provinces that are part of the project (Khénifra, Azilal and Al Haouz) were selected on the basis of socio-economic criteria and consultations with the communes. Within the municipality, the irrigated areas were selected according to similar criteria; second, the needs and priorities of the beneficiaries were assessed through a 'participatory diagnostic' in order to define and estimate the activities to be carried out under the project. All the villages in or bordering an irrigated area (*douars associés*) are part of the project. This diagnostic is then used to develop an irrigated area development plan (*plan de développement du périmètre - PDP*). The third phase is the elaboration of a communal investment plan which aggregates the different PDPs in the same commune (Elbouari 2004: 7-8), and which constitutes a "partnership agreement" between the commune and the provincial administration, since the communes are also contributing financially to some of the infrastructure costs (World Bank 2001: 10).

In this paper, we will focus on the first and second phase since they are most relevant to our topic. At this time, the actual infrastructure works have still not started in the Haouz province. Therefore, this paper cannot say anything about the poverty impact of the project, but it will instead focus on the underlying assumptions guiding the project design as well as its planning phase.

This project tried to take into account some of the lessons learned from earlier projects, though these are not necessarily the same lessons that we discussed above. The project appraisal document (World Bank 2001: 15) states that 'community-based, demand-driven approaches have had mixed success in the promotion of rural infrastructure and social investments because of excessive involvement of local authorities; consequently, it is important that MARDWF [Ministry of Agriculture] and the other Ministries only provide the required technical support, do not interfere in community organization and decisions and do not try to take over infrastructure O&M&R [operation, maintenance and replacement], productive tasks or commercial functions from the beneficiaries.' While this might be a valid point with regard to the large-scale irrigation sector and the ORMVAs, it seems to me that the danger of the Ministry of Agriculture being too dominating in the running of traditional small-and medium scale perimeters is quite low, given the limited human and material resources of the Provincial Agriculture Directorates and their extension services.

Instead, it could be argued that the main lesson that should be addressed by this project is to ensure that the project is well targeted to the poor, that it has a substantial poverty impact, and that this is adequately measured.

In fact, due to the technical criteria for SMI investments described above such as the rate of return and investment costs, it could be argued that a SMI project can never be properly focused on the poorest; since the areas with a poor population are not necessarily the same as those which 'merit' the investment from a technical point of view, i.e. those which have enough water resources to begin with that will guarantee profitable infrastructure investments. In addition, there is the possibility that political influences take precedence over the strictly 'technical' choice. For example, in our case study, while one area has never benefited from any development project, it might not have enough irrigated land and water resources to justify the investments. Furthermore, the vice-president of the commune hails from this area. As for the choice of the other area, it seems to be motivated almost exclusively politically, given that both the president of the commune as well as the richest and most influential councilor are natives from this area, and that it has already benefited from two previous irrigation-based development projects. It is also likely that the fact that the consultants were accompanied mainly by commune councilors during their field visits in the 'participatory diagnostic phase' has had some influence on whom they talked to and what information was included in the PDP.

As for the poverty impact monitoring issue, while the project appraisal document includes the customary (and rather optimistic) financial benefit calculations,⁸ it does not stress the need to establish reliable poverty baseline indicators in order to track the poverty impact of the interventions.

Similarly, the calculations regarding affordability of O&M charges and participation in capital investments are rather optimistic and it is not known on what basis they were calculated. The project appraisal document (World Bank 2001: 17) notes that (as with all SMI schemes in Morocco) 'farmers are expected to contribute initially about 10% of the capital costs of the SMI rehabilitation and improvement works (in kind or cash) and annually 100% of O&M&R costs. The average capital cost for the rehabilitation of the SMI schemes has been estimated at about 17,500 Dh/ha of equipped area (base cost). Participation in the capital costs corresponds to the estimated cost of labor and/or provision of local material that can be borne by the population without a financial contribution. Thus, participation in the investment costs should not cause a financial problem for the beneficiaries.'

This provision states that the population would not have to contribute financially to the capital costs but only provide labor and local material. However, it does not address the exact procedures of how this labor will be contributed nor the issues raised above such as the unwillingness of contractors to wait for beneficiaries to undertake the land preparation. Most importantly, it admits later on (Annex 11, p. 73), that 'although the principle of user financial contributions to investment costs is clearly set forth in Law No. 2/84 and its application decree, the rate of contribution was left to negotiation by the parties. In theory it is currently calculated on the basis of farm budget simulations for testing the contributory capacity of farmers. In practice, a flat rate of 10 percent has been adopted in the agreements between the administration and the users' associations. This flexibility of the legislation is positive to the extent that it allows for negotiation with users in light of their specific situation. It would, however, be desirable to set a minimum rate reflecting users' interest in the project. On the other hand, the legislation does not define any specific procedures for cost recovery from users. For the WUAs already constituted, participation agreements have been signed with the MARDWF [Ministry of Agriculture], but they have not been approved by the Ministry of Finance, as stipulated in Decree No. 2/84. The MARDWF does not in fact submit these agreements to the Ministry of Finance, and the latter has no procedure for collecting contributions from users' associations. This situation must be clarified before project start-up, given the importance of user contributions as proof of their commitment to the project.'

Even though the fee collection mechanism was not clarified in practice, and despite the above provision that the beneficiaries would not have to make cash contributions for the capital costs, the two WUA in the case study area have been collecting such contributions from its members according to their financial capacity (between 25 and 100DH each though not all members have paid yet). While one WUA has put 6,000Dh into a bank account, its committee members have raised doubts with the Ministry of Agriculture about their members' capacity to pay

⁸ 'Average net income per ha on the area under perennial irrigation would increase by 60% over a 10 year-period, or by an additional 6,800 MAD/ha (prior to payment of O&M charges).' It also states that 'an average farm holding is about 5 ha out of which less than 1 ha is irrigated (World Bank 2001: 17). This seems a gross overestimation compared with the data in the two PDPs for our case study area (two irrigated areas in a rural commune), where 66.4% and 90.9% of the total number of farm holdings are less than 0.5ha, and none bigger than 1ha (Royaume du Maroc [no date]: 16). Yet another number can be obtained from the Agriculture Census of 1996; the size of the SAU (useful agricultural surface) divided by the number of farming units should give us the average size of a farming unit. For our case study commune, this is 1.86ha, and if we divide the size of the SAU by the number of parcelles we obtain 0.19h as the average size of a plot in the same area. In other words, an average farming unit would have 10 plots (RGA 1996).

for 10% of the capital costs. While most farmers and commune civil servants are unclear about how the population will contribute to the costs (in labor or cash) despite the agreement having already been signed between the WUAs and the Ministry of Agriculture, farmers interviewed are reluctant to provide their labor 'for free' or believe that the project is sponsored by the government and hence the contractor will provide the labor. This is in contrast with previous experiences of participation in the commune; the population on their own or with minimal involvement by the local government has built many tracks and drinking water reservoirs.

The project appraisal document then goes on to calculate the affordability of the O&M costs. 'Average annual O&M costs following rehabilitation are estimated at about 300 MAD/ha of equipped area. This includes about 100 MAD/ha for operation (mainly salary of the "*aiguadier*") and about 200 MAD/ha for maintenance (unqualified and qualified labor, material such as cement and running costs of equipment). With an average increase in farm income of about 296 MAD/ha after 2 years, the payment of O&M costs should be affordable to farmers.' (ibid.: 17) Hence, it seems that the project designers themselves did not expect the farmers to substantially increase their incomes after paying for the operating and maintenance costs.

Furthermore, the document does not address the critiques of the water governance consensus reviewed above and in particular the 'functional model' of the WUA, i.e. the ways in which such institutions can reproduce hierarchies of power, and reinforce exclusion of the marginalized. It only notes that 'investment decisions by municipalities tend to favor investments with political impact; and the current budget process is highly centralized and not conducive to community driven development.' It argues that 'the proposed project would address these issues by: (a) establishing a participatory process for the beneficiaries to express their priorities and see that they are implemented; and (b) making available to the participating provinces additional resources from the Rural Development Fund (RDF) to be used flexibly to respond to the incremental needs of the beneficiaries in an integrated way.' However, it seems quite unlikely that the participatory process will be able to address the political nature of municipal investment decisions. On the contrary, it might even reinforce this tendency since the main 'participants' in the WUAs in our case study area are in fact local government councilors. In one WUA, four out of six committee members are councilors, and in the other, all are political party members. One WUA is presided by the brother of the commune president and is in fact a businessman rather than a full-time farmer; indeed, most committee members work as shopkeepers or businessmen. This plurality of offices by the same persons most likely means that there will not be much discussion or resistance to the council's decisions that affect the WUAs, and that the ordinary farmer members will perceive the committee to be disconnected from their daily realities.

Finally, there is also the issue concerning the geographical coverage of the WUAs and its implication for their representativeness. One WUA in our study area includes over 10 'associated villages' but is only allowed to have six committee members. Hence some farmers do not consider the WUA to be competent to know or address their needs, and do not feel represented in it. Yet others consider it only to be the WUA for the village where its premises are based. However, in the other WUA, an agreement was reached that one committee member would represent several villages so as to cover all villages associated with the irrigated area among them. This issue is consistent with the insight gained from the Lakhdar watershed management project reviewed above, in which even the village level was considered too 'macro' for successful participation.

To conclude, this paper has attempted to provide a critique of the issues around poverty and participation at the example of the irrigation sector and water user associations in Morocco. The question I would like to raise for discussion is how and to what extent can an irrigation project like the DRI-PMH be insulated against or take into account the dominant local political forces and elite capture to ensure a positive poverty alleviation impact.

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Legal and extra legal channels for the redress of historical injustice: Water rights in India and South Africa

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1. Introduction

Amongst the principal challenges confronting improved access to water for historically disadvantaged social groups is water scarcity resulting from entrenched inequitable patterns of water use. This challenge is compounded by the complex nature of property rights over water, essentially a 'common-pool' resource, the use of which tends to be governed by a mix of formal laws, customary rights and constantly evolving informal practices. This paper draws from case studies in India and South Africa to argue that the question of securing water rights is intrinsically linked with the establishment of effective common property regimes for the governance of water. Through two different but related scenarios, the paper demonstrates that legislation plays an important part in this process, but is by no means sufficient to secure water rights equitably. In the process, it explores the more complex relationships that exist between water rights, collective action and the law.

2. Water rights: Tensions of a 'common-pool' resource

A property right is defined as 'an enforceable authority to undertake particular actions in specific domains' (Ostrom 2000: 332), but there has long been the recognition that property rights are actually social relationships between people in relation to a resource. Property rights regimes are broadly classified according to the holder of these rights: public (the state), private (individuals or legal individuals like corporations) or common property (a clearly defined group of people with legal rights to exclude non-members from using the resource).

While water resources may be privately held, there are inherent problems of operating a perfectly private operating system for water. These problems are owed to water resources sharing two important attributes of what have been described as 'common pool resources'. These attributes are: one, *non-excludability*, i.e., it is costly and difficult to exclude individuals from using the good, either through physical barriers or legal instruments and two, *subtractability*, i.e., the benefits consumed by one individual subtract from the benefits available to the others (Ostrom 2000: 337). Indeed, despite these attributes, water resources everywhere are not necessarily governed by common-property regimes. Often times, in addition to being privately held, water and other natural resources like forests, may be governed by 'open access regimes', where no one has the legal right to exclude anyone from using that resource. Open access regimes include classic cases such as the atmosphere and the open seas, but frequently, open access regimes are also the consequence of 'ineffective exclusion of non-owners by the entity assigned formal rights of ownership' (Ostrom 2000: 336). There may also be external interventions by the state such as nationalisation of water and land resources in a number of developing countries in the 1960s, which wiped out *de facto* local users' common property regimes to *de jure* government property regimes, which then in effect became *de facto* open access regimes. These sorts of interventions have been to the detriment of local users².

This paper makes the case that the management of water, and the securing of water rights henceforth, is essentially a problem to do with the creation of a common property regime for what is essentially a common-pool resource. In most developing countries, water rights are generally

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² The harmful effects of nationalizing resources that had previously been governed by local user-groups have been well documented in India (Gadgil and Iyer 1989; Jodha 1990, 1996) and elsewhere.

based on one of three systems: *prior appropriation* rights or first-come, first-serve allocation; *riparian* rights or allocation based on proximity to flows; and *public allocation* that involves the publicly administered distribution of water. In scenarios as complex as this, a commonly recommended solution for the 'effective governance' of water is privatisation. The privatisation argument is put forward by proponents of 'formal markets' who believe that only the formal, market-based allocation of water based on 'well-defined, private, exclusive and transferable rights to water' can be efficient, besides serving a range of other purposes such as 'creating entitlements where none existed' and 'allowing environmentalists to purchase water rights' (Mohanty and Gupta, working paper). They are critical of the sorts of existing arrangements for water allocation in developing countries mentioned earlier, describing these as non-market and prone to creating 'distortions'. This market-centric approach has been criticised on a number of grounds, not the least of which is that the privatisation of water is far from simple. Ostrom (2000) argues that water being a mobile resource unit, privatisation leading to private ownership usually means the individual ownership of withdrawal rights, associated with the 'allocation of a particular quantity of water per unit of time or the allocation of a right to take water for a particular period of time or at a particular location', and implementing operational and efficient withdrawal rights is very difficult in practice (Ostrom 2000: 350).

The other response to problems surrounding water rights is to codify these in law, but this is not uncontested either. To begin with, traditionally, water along with other 'basic' elements such as space, air and energy has been perceived as a 'non-legal object, that is incapable of becoming property' (Singh 1992: 13)³. This eliminates water rights as being purely 'legal' rights, as they have not been 'granted' by the state or law, only 'recognised' by it. Traditionally moreover, water rights have often been group rights of communities or even whole villages over tanks, streams, river banks etc, and this has subsequently conflicted with the imparting of individual rights through modern statutes. The other major conceptual issue regarding water rights is whether they are positive- wherein the state or other people, on whom the corresponding duty lies, can be compelled to ensure that an individual is provided with water- or negative- where the state or other people merely need to keep away to ensure that the individual can enjoy unfettered access (Singh 1992).

Counter-arguments to legal codification have also been proposed by scholars using Amartya Sen's 'entitlements' approach. Within this approach, the law is an important mediating agency that influences the bundles of commodities that an individual can exchange for what he owns; thus, legal shifts may affect both access to and degradation of common property resources, consequently leading to entitlement failures (Sen 1999 cited in Parthasarthy 2002: 3)⁴. Moreover, what is commonly referred to as the 'law' or the 'legal system' generally is only 'that portion of the legal structure that is based on what we will come to recognize as the "market principle"' (Yasuda 2000 as cited in Parthasarthy 2002: 4). The disregard of non-market domains only provides support to dominant legal systems in suppressing traditional or customary rights (Parthasarthy 2002: 4). Citing seminal studies by Arun Agarwal (1999) and Jishnu Das (2000), the author shows that customary legal regimes have provided both property and usufruct rights as well as flexibility of operation, and also that state actions such as the redrawing of village commons or other kinds of legal reinforcement can impact these regimes adversely. A case is thus made for 'legal pluralism' within which traditional or customary rights can exist viably.

³ This has been observed in a variety of contexts. For example, the Roman Law did not ever classify running water as capable of becoming someone's property (Singh 1992). Singh also cites Halsbury's *Laws of England* which explicitly mentions that water in general cannot be the subject matter of property (1992: 13).

⁴ Common-pool resources are more typically referred to as common property resources, without necessarily alluding to the type of regime they are governed by.

In practice, water rights are mediated by a complex interplay between the formal legal structure and local governance arrangements that may or may not be the consequence of customary rights. Further, as this paper seeks to demonstrate, effective water rights that ensure improved access to water for historically disadvantaged social groups can only be secured when the bigger problem of effective common property regimes that govern water resources is addressed. It draws from case studies in India and South Africa that demonstrate this point, in different ways. In India, the legal framework for water property rights is a combination of customary, juristic, riparian, statutory and group rights. While ground water beneath privately owned lands constitutes private property of the landowner, this is not the case with respect to flowing or standing surface water, where the state continues to hold 'absolute' rights while recognising customary and riparian rights. The case study shows how this context sets the ground for various local interpretations of water rights that militate against the establishment of common property regimes. South Africa embodies the rather different situation where the post-apartheid state in its recent 1998 Water Act effectively sets out to extinguish property rights in water, and create a common resource that is to be managed by a three-tier common property regime, at the national, catchment and local water users' levels. The case study shows how well organised local resistance from existing water users hinders the fulfilment of such progressive legislation. Both cases powerfully illustrate the inadequacy of legislation alone to guarantee effective and equitable common property regimes, and the imperative need for historically situated extra-legal conditions to facilitate such regimes.

3. Water rights in India: Common property, collective action and the law

In India, the central government is responsible for regulation and development of inter-state rivers and river valleys (Union list Item 56), whereas state governments are responsible for water supplies, irrigation and canals, drainage and embankments, water storage and water power (as subject to the provisions of the Union list). However, under the *de facto* interpretation of these responsibilities, state governments have emerged as pre-eminent and water has come to be perceived as a state subject. As mentioned earlier, water rights of the people can be classified into five different types, and their correlation with rights held by the state is illustrated in the table below.

Table 1 Water rights of the people and the State in India

Water Source	Rights of the people	Rights of the State
Rivers & Streams	Customary, riparian and other rights recognised by the courts and under the Easement Act, 1882	Absolute rights of the state under Irrigation and other laws
Tanks, lakes (artificial water bodies)	Individual rights of landowners; customary usufruct rights of the people	No rights if tank is on private land. Rights vested in the panchayats or municipality if tank is on public land.
Tanks, lakes (natural water bodies)	Customary rights of the people	Absolute rights of the state
Private wells	Absolute rights of the landowners	No rights
Public wells	Customary rights of groups (castes or communities); but rights of all under the Constitution and the Civil Liberties Act	Rights of the state to regulate
Tube wells	Unlimited right to draw water from tube wells	Rights to regulate the use of public tube wells

Source: 'Water Rights in India' by Chhatrapati Singh (1992), p 25

The first and most important legislation that legitimised the customary rights of the people was the Indian Easements Act of 1882⁵. This Act provides two rules for recognition of easements: first, by long uninterrupted use for 20 years and second, by local customs. Section 2(6) of the Act also recognises customary rights in or over immovable property that any person, the public or even the government may possess, irrespective of other immovable property. Thus, a right may exist by custom in which some people are entitled to take water from another's land. Similarly, riparian rights, or rights of landowners to use the water of a stream or river, which flows past his land equally with other riparian owners, have been established through the recognition of customary law. However, the state continues to hold 'absolute' rights over surface water, producing a number of contentious situations. The state's rights have in the past been challenged by riparian users, who claimed that the state had violated their rights in its pursuit of irrigation projects⁶. These situations have led to arguments for better clarification of surface water rights (Mohanty and Gupta, working paper).

Laws subsequent to the Easements Act have slowly shifted the emphasis on people's water rights from customary to proprietary or usufruct rights (Singh 1992). The Transfer of Property Act 1882 states that easements cannot be transferred separate from the 'dominant heritage'; thus, rights to groundwater belong to the landowners, and can only be reassigned if the land itself is transferred. There are also no customary rights over groundwater, regardless of type. Further, since groundwater is attached to land ownership, which is governed by the tenancy laws of the state, there is no limit on how much groundwater a particular landowner may extract. This has serious equity implications, and there have been repeated recommendations for the separation of groundwater rights from land rights (Kerr et al 2005, Singh 1992).

Finally, group rights of village communities over publicly owned water resources such as tanks, ponds, streams and public wells arise from statutory provisions, especially the Panchayat Acts of various states⁷. Panchayats are by law, required to regulate the usufruct rights of all people in the village to these water bodies, but their performance has been varied and in most cases, apathetic. This situation acts as a constraining factor on the establishment of common-property regimes, further allowing wrongful claimants of customary and riparian rights and engendering inequitable situations of accessing common water bodies. This is the subject of the following story.

The story of Neelpura, Madhya Pradesh

The story of Neelpura⁸, a small tribal village in Dewas district in south-west Madhya Pradesh, a state in central India, is one of water rights being denied to the poorest people through the deliberate misinterpretation of law by a small but powerful minority. An equally integral part of the story is that this injustice was redressed, not through any change in formal legislation, but through the overturning of the prevailing inequitable arrangement through a new collective agreement, crafted through popular mobilisation.

The legal framework for water rights in Madhya Pradesh resembles other parts of the country; 'all lands belong to the state government, *including standing and flowing water*, mines, quarries, minerals and forests, reserved or not, and all rights in the subsoil of any land are the property of

⁵ An easement 'is a right which the owner or occupier of certain land possesses, as such, for the beneficial enjoyment of that land, to do and continue to do something, or to prevent and continue to prevent something being done, in or upon, in respect of certain other land not his own' (Indian Easements Act 1882).

⁶ Both the Madras High Court in 1936 and the Bombay High Court in 1976 have established that the state's rights do not amount to 'absolute' rights (Mohanty and Gupta, working paper, p 12).

⁷ Panchayats are three-tier elected local bodies at the district, block and village levels, and were granted constitutional recognition in 1993.

⁸ Name of the village and all individuals have been changed to preserve anonymity.

the state government'⁹. However, the state is somewhat unique in that it accepts formal responsibility for providing *nistar* or communal land to serve a variety of common ends (such as cremation grounds and parks) required for the 'business of living' (Ramanathan 2000-4). Further, the Code also recognises customary and easementary rights of individuals to land and water on occupied lands- that do not belong to, or are controlled or managed by the state government. Such rights are recorded in the *wajib-ul-arz*, a record of customs in each village. The state government is authorised to intervene in the *wajib-ul-arz* 'only when all persons interested in such entry so desire, or where a court intervenes to rule on an existing entry, or decrees the existence of a custom that has not yet been recorded'¹⁰.

Dewas is a dryland district, with low and undependable rainfall, but contains striking regional disparities between its plateau and valley portions as divided by the Narmada river which flows through the district. The 'ghaat-upar' (in Hindi, meaning the area above the valley) region comprising the fertile Malwa uplands is both economically and politically dominant within the district. Neelpura is located in Bagli *tehsil* (block) deep in the valley or *ghaat-neeche* and shares its larger history of economic marginalisation and resource degradation. Bagli and other parts of the *ghaat-neeche* have large tribal pockets, interspersed with a non-tribal majority. In Neelpura, like elsewhere in Bagli, most tribals have small plots of land (1-3 acres) that were given by the government at the turn of the century, but practise rainfed agriculture. They suffer wage related exploitation at the hands of their non-tribal neighbours and have also succumbed to a tortuous routine of annual migration to the Malwa uplands, where unlike *ghaat-neeche* villages, irrigated cultivation continues for the winter (*rabi*) crop as well as during the summer.

In 1992, a small group of left-minded friends set up an NGO in Bagli with the intention of engaging in grassroots work and advocacy in this politically and economically marginalized region. This NGO was called *Samaj Pragati Sahyog* (in Hindi, meaning 'Support for Social Progress'), henceforth referred to as SPS. The organisation started their activities in Neelpura, which was both small and poor, as also conveniently located near the main road. Water scarcity is the key problem afflicting the region, and SPS obtained funds from the central government to implement a number of well-digging and water conservation projects in the village. Under various schemes, it excavated, repaired and deepened the wells of virtually every farmer in the village. Neelpura has only one common water body, a *naala* or stream of water which is 1000 meters long and flows down through the heart of the village. Farmers have fields on either side of the *naala*, though lands upstream are far more fertile than those downstream. The lower reaches of the Neelpura watershed have an underlying stratum of limestone and by the time the *naala* flows downstream, most of its water disappears underground. SPS quickly discovered that the use of this *naala* had been improperly appropriated by a small group of upstream farmers, in particular Mahbub Khan, the largest landowner and moneylender in the village, who drew waters continuously through underground channels and daringly, through electric pump sets and diesel engines from the surface itself. With a few farmers siphoning off waters upstream, poorer farmers downstream had practically no access to running water or the opportunity to recharge their wells. Village livestock were the worst affected, since the *naala* ran dry after the rainy season.

Following our previous discussion, the appropriation of *naala* waters by upstream farmers was first of all, a violation of riparian water rights since riparian users downstream were being deprived of their share of water, and secondly, a violation of group village rights over what was a public resource. Moreover, despite the *naala* being the only common water body in the village

⁹ The Madhya Pradesh Land Revenue Code 1959, cited in Ramanathan (2000-4: 1), italics added.

¹⁰ The Madhya Pradesh Land Revenue Code, Section 242 (5)

and the presence of a clearly identified group of users¹¹, there were no effective rules governing its 'common' use. Thus, while the *naala* was theoretically being governed by an 'open-access' regime, in practice, withdrawal rights over its waters had been privately appropriated by a dominant and exploitative minority. Farmers felt disgruntled about this- indeed, they had a fine understanding of the intricate ecological relationships between the water of the *naala* and village groundwater- but had never collectively mobilised to challenge Mahbub and the handful of other upstream farmers owing to the context of unequal power relations. During its well-digging activities, SPS encountered apprehensions from a large number of farmers that increased groundwater through well-digging may adversely affect the flow of *naala* waters. However, they also appreciated that there was a reduced need to depend directly on the surface water of the *naala*, and soon recognised that their newly acquired wells would not be charged if *naala* waters did not flow continuously.

In 1995, SPS was invited by the Dewas district administration to implement a watershed development project in Neelpura watershed¹². The state government implements the Union Ministry of Rural Development's Watershed Development Programme, designed to regenerate rural livelihoods through soil and water conservation. Watershed project works included treatment of the *naala*'s catchment, but SPS realised that under the existing arrangement, a rich, minority would corner the likely benefits. It resolved not to go ahead with project activities until the arrangement had been overturned. It is clear that SPS was attempting to intervene in a highly contentious area that other project agencies may have disregarded, but one that had actually been specified within its role as a project implementing agency. The Ministry of Rural Development's policy framework emphasise 'common property resources' and their proper consideration within the project action plan. In the three years since its arrival in Neelpura, SPS had been working to mobilise popular opinion in the village to formulate a collective agreement to regulate the use of *naala* waters. This agreement was ultimately formulated in October 1995.

139 farmers from Neelpura and some adjacent villages, who constituted 99% of the co-riparians of the *naala* signed a written resolution, which in translation from Hindi reads as follows:

It is decided by consent (*sarvasammati*) that nobody would ever draw water from the *naala* using a *naarda*. Those farmers who have wells will also not draw water from the *naala* using motors. Those farmers who do not have wells have agreed to draw water from the *naala* on a limited basis according to rules. After the water in the *naala* stops flowing, nobody would draw water from it, irrespective of whether they have wells or not. This water would be kept for cattle only. *All villagers agree to this resolution (italics added).*

Mahbub Khan protested vehemently, but under the weight of collective opinion and the NGO's vigilant stand, had to block the underground channels with cement along with the other farmers. Those who had water in their wells or lands on which wells could be dug, had to remove motors from the *naala*. SPS even constructed additional wells wherever necessary, free of any contributions from the farmer. The *naala* agreement was a matter of tremendous pride for SPS, and it mediated this to the last detail. In the initial days after the agreement, enthused villagers set up a system of rotation to watch the *naala* against possible violators at night.

¹¹ Indeed, the *naala* possessed both the attributes of 'common-pool' resources identified by Ostrom, i.e., non-excludability and subtractability.

¹² The term 'watershed' above any point on a defined drainage channel is used to denote all the land and water areas that drain through that point, leading to the 'normalisation' of a 'micro-watershed' as a 'rational' unit of planning (Tideman 1998: 7).

Mahbub Khan moved the court against the agreement, claiming 'easementary rights' over the *naala*, under the Indian Easementary Act of 1882 recognised in the state Land Revenue Code of 1959. As previously stated, the principal clause of this Act is it allows a single user or group of users exclusive or predominant use over a village resource, on the basis of 'long use or prescription', on the grounds that this use has been peaceable, open and uninterrupted for at least 20 years, as an easement and over a resource that is not owned by anyone in particular. His response bears crucial implications for the relevance of law in guaranteeing water rights. To begin with, claiming easementary rights over *naala* waters was inappropriate because the resource in question was a *common* body, the use to which had been guaranteed through the recognition of *nistar* or communal rights by the state Land Revenue Code. In a context where Mahbub had never been challenged over his appropriation of *naala* waters, such misinterpretation of the law was deliberate and intended precisely to perpetuate an unjust and illegal arrangement. Given that the majority of the other users are poor and illiterate with little or no understanding of their rights, exploitation based on such legal misinterpretation could have been unchecked for long.

Acting on the strength of the collective opinion it had mobilised in Neelpura, SPS fought back claiming that none of the grounds put forward by Mahbub were valid. After extensive legal research, it offered convincing reasons- the *naala* was actually owned by the government, which in 1993 had issued an order prohibiting villagers to refrain from its use (apropos its 'absolute' rights over all 'flowing and standing water'), and Mahbub himself had claimed right of use for the last 17 years only. Mahbub was reprimanded for coming to court with 'unclean hands' and his appeal for 'easementary right' was struck down. This had the effect of upholding the *naala* agreement and effectively altered the local field of power. Mahbub Khan was dealt a clear blow, symbolic and material, and SPS established itself as pro-active agency of change.

The process of formulating this agreement and abiding by it introduced new political as well as economic behaviour by farmers in Neelpura. SPS had effectively facilitated the establishment of a common property regime with clearly stated rules for a clearly defined group of users of what was essentially a common pool resource. This episode had an extremely positive impact on the working culture of panchayat institutions in the area. In a context where panchayats rarely convene gram sabhas (village assemblies), the Bhimpura-Neelpura panchayat had passed a public resolution legitimising the *naala* agreement. SPS had thus also galvanised the locally elected panchayat into securing the group water rights of its constituent village community over the *naala*. In economic terms, the *naala* agreement proved to be central to the more equitable distribution of typical project benefits, allowing most farmers new opportunities for income generation (including increases in double and multi-cropping, improved cropping practices and the growth of easily marketable crops such as cotton and soybean). As a result of these changes, the poorest tribals from Neelpura were spared of their arduous annual ritual of migration to the Malwa uplands during the long, dry summer, and have since been able to work on their own fields, or as wage labourers in nearby lands, but also on project construction work in their village and remain hopeful of finding employment through the expanding activities of the NGO.

4. Legislating reform in South Africa: creating a common resource

As in so many other regards, the past decade in South Africa has witnessed measures taken by government to redress the gross discrimination in water rights. The passage of new legislation promised radical change in the process by which access to water is determined. Drawing on work undertaken in the sugar and fruit-growing 'lowveldt' area near Malelane, in Mpumalanga Province, this paper identifies obstacles to achieving that change and possible ways to overcome them.

Under the apartheid regime, water rights were defined by the 1956 Water Act, which recognised both 'private' water (wells, springs and streams on privately owned land), and 'public' water (water shared among different users). Rights to public water were primarily riparian rights, with the quantity of water to be withdrawn from a stream by any individual notionally determined by the length of their riparian boundary as a proportion of the total. In common with many other parts of South Africa, the land around Malelane was divided up in the early twentieth century into farms for European settlement, with each farm having the possibility of drawing water for irrigation from one of the rivers in the area, principally the Crocodile, or its tributaries the Lomati or Komati. Africans had no rights to land, and therefore no rights to water. Under the 1956 Water Act, the government reserved the right to designate a Water Control Area where competition for water was strong and regulation was needed. In rural areas, management of water in a Water Control Area was delegated to the local Irrigation Boards. Although Irrigation Boards are 'self-governing' farmers organisations, with officials elected by the membership, the designation of a Water Control Area greatly reinforced the powers of the a Board to regulate individual farmers' use of water, and, even more important, extended this regulation to all farmers using irrigation within the Board's area of jurisdiction. Outside Water Control Areas, Irrigation Boards only governed water use by those who voluntarily were members.

From the 1960s to the 1980s commercial agriculture developed rapidly in the lowveldt, focused primarily on sugar to supply a sugar mill at Malelane, and tropical and subtropical fruit (citrus, bananas, mangoes, and papaya) for the South African and export markets. As a result of intensifying water use for irrigation a Water Control Area was established. In the mid 1970s the South African Department of Water Affairs made formal allocations of permitted amounts of water that each riparian property could withdraw from the rivers covered by the Water Control Area. By the 1980s the apartheid policy sought a more formal separation of the black population by designating ethnically-defined 'homeland' areas as the areas in which black people would be legally allowed to live and to which black people would be moved from areas reserved for the white population. A homeland area called Nkomazi, one of a number of disparate areas to be administered by an African entity designated as KaNgwane, was established in 1982 in the lowveldt, at the margins of the commercial farming area, but including a number of farms with riparian water rights that the government had purchased for the resettlement of the black population. . At the establishment of the Kangwane administration in 1982, the Nkomazi region was allocated the water rights of 17 farms, totalling 7327 ha along the lower Komati which fell within the homeland boundary (Government Gazette No 8061, 5/3/82). Water rights were also proclaimed on farms totalling 7196 ha, also on the lower Komati but within 'South African' (white farming) territory. In the decade that followed, irrigation development on the Komati in Kangwane amounted to only 400 ha, but by 1995 a government study (JIBS reference) reported developed irrigation on the lower Komati as 14335 ha, which suggests that the Irrigation Board had permitted the South African commercial farmers to use the Kangwane water allocation.

The advent of democratic government in South Africa in 1994 brought constitutional change and the repeal of apartheid legislation, and was followed by a wave of new laws that sought to redress the past discrimination against Africans' rights to use natural resources. The purpose of the National Water Act of 1998 is stated (sect 2) as: "to ensure that the nation's water resources are protected, used, developed, conserved, managed, and controlled in ways that take into account...

- meeting basic human needs of present and future generations;
- promoting equitable access to water;
- redressing the results of past racial and gender discrimination;
- promoting the efficient, sustainable and beneficial use of water in the public interest
- facilitating economic and social development;
- providing for growing demand for water use;

- protecting aquatic and associated ecosystems and their biological diversity;
- reducing and preventing pollution and degradation of water resources;
- meeting international obligations;
- promoting dam safety;
- managing floods and droughts,

and for achieving this purpose, to establish suitable institutions and to ensure that they have appropriate community, racial and gender representation.”

Key aspects of the new legislation are as follows:

- Effective abolition of water rights tied to ownership of riparian land.
- Abolition of the distinction between ‘private’ and ‘public’ water, and the assertion of the status of “all water in the water cycle whether on land, underground, or in surface channels, falling on, flowing through or infiltrating between such systems” as “an indivisible national asset” over which the National Government will act as the custodian in the public interest (DWAF 1997).
- The guarantee of water to meet basic human needs and to maintain environmental sustainability, to be known as ‘the Reserve’.
- The allocation of water to meet other needs that are beneficial in the public interest.
- Allocations will not be permanent, but for a ‘reasonable period’, and may be traded between water users with Ministerial consent.
- The new legislation broadens the definition of water use to include any activities which result in reduction of stream flow (eg forest plantations), or deterioration of the water resource (eg waste, effluent, or cooling water disposal), or removing and disposing of underground water (eg mining).
- All water, wherever in the water cycle it occurs will be subject to a catchment management charge which will cover actual costs of catchment management activities.
- Some or all charges may be waived for disadvantaged groups to promote equitable access for productive purposes such as agriculture.
- Water management will be carried out in regional or catchment water management areas, “recognising that conflicting interests will intensify the need for national management and supervision, and that the policy of subsidiarity does not interfere with the need for a perspective on water use.
- Phased establishment of catchment management agencies, subject to national authority, to undertake water resource management in water management areas. (DWAF, 1997)
- In shared river basins, Government will be empowered to give priority over other uses to ensure that the legitimate requirements of neighbouring countries will be met.

The institutional framework for operating the new legislation has three main elements: a National Water Resources Strategy (NWRS), Catchment Management Agencies (CMAs), and Water Users Associations (WUAs).

The 1998 Water Act effectively sets out to extinguish private property rights in water and create a common resource that is common property managed at these three different levels: nation (NWRS), catchment (CMA) and local water resource (WUA). While this conceptualisation of the water resource allows for the principle of ‘self-governing’ institutions (Ostrom, 2000), the need for governance at *all* levels to implement a *national* policy of redistribution of water access to groups that were historically disadvantaged raises issues about the relationship between different levels of management, and the limits to the principal of self-government and subsidiarity.

In the Nkomazi, since 1994 black farmers have gained access to irrigation for the first time, and 9500ha has been developed in a series of schemes of 100 – 800 ha each under the Nkomazi

Irrigation Expansion Programme (NIEP) on the lower Komati and lower Lomati rivers, bordering the white commercial farming areas. Individual holdings are generally in the range of 5 to 15 ha. These developments have brought black farmers into competition for water with white farmers. However, despite the completion of a major new dam in the area in 1998, at Driekoppies, further expansion of irrigation is constrained by lack of water. There is a consensus that water use by the commercial sector exceeded allocation (an "overallocation" according to water resources Director W van de Westhuyzen, interviewed in 1999, "commercial farmers exceeded their allocation" according to Technology Support Services director, Roché Mataré), but it is not clear what the consequences are for current water availability for black farmers. Within the 1992 agreement between Swaziland and South Africa on water use in the Komati catchment, the then Kangwane administration was allocated water for 12000 ha (sugar cane). Under the NIEP, projects were distributed between the different tribal authorities in the Nkomazi region, up to a total of 9500ha, with a further 2500ha to be developed in the Mswati region of the upper Komati subcatchment. There is confusion as to whether this is additional to the allocations of around 7000ha made in 1982, and indeed whether any of these agreements will now be honoured.

In practice, making water available to black farmers will depend on white farmers' willingness to reduce the amount of water they take from the rivers. This is because a large part of the expertise and knowledge about local water use resides in the white farming sector and the Irrigation Boards. This is exemplified by the simple question of how much water is being used by the commercial farming sector. In 1999, this was illustrated by discrepancies in estimates of irrigation in the Crocodile river catchment. These ranged from 297.7 Mm³/a in a government study (JIBS 1995) to 307 Mm³/a estimated by a water engineering consultancy company (MBB 1988), to 424 Mm³/a annually scheduled by Irrigation Boards.

The reality of water management in South Africa is that local commercial interests, and particularly farming interests, achieved a large measure of decentralised governance over water use during the apartheid period, and the capacity for detailed local management of water does not exist within central state agency (the Department for Water Affairs and Forestry - DWAF). This means that the capacity of local (white) elites controlling resources such as water to resist national policies to redistribute access in favour of historically disadvantaged groups is high. The capacity of local black farmers to challenge this white domination of water resources is low, mainly due to ineffective and unfocused organisational and representative structures. These are in part a legacy of the old 'homeland' administrations, notably the Department of Agriculture, that have been incorporated into post-apartheid Provincial government to speak on behalf of black farmers. In the Nkomazi area there are a large number of black farmers' organisations with an interest in irrigation development. Their effective representation is undermined by a number of factors, including: weak institutional and technical support from the Department of Agriculture, and internal tensions due to challenges to the legitimacy of land allocations made by tribal authorities.

This last factor is evident particularly in Nkomazi where the perceived success of the NIEP sugarcane schemes has prompted competing claims over land with potential for irrigation. The complexity of overlapping claims to land which are the legacy of repeated removals and resettlement of communities in 'homeland areas under apartheid presents a particular hazard for water allocation. In particular, the allocation of an permit to use water may strengthen one set of competing land claims against another. It seems clear that the relatively large sums earned by black cane growers on the NIEP schemes, coupled with the large numbers of potential growers excluded by the 'first phase' of the NIEP, have generated many proposals for further irrigation schemes to spread the benefits more widely among the population of Nkomazi. A main focus for

representation of claims for a 'second phase' NIEP is the Central Steering Committee (CSC) for the NIEP, which brings together representatives of each of the separate irrigation schemes under the NIEP. The CSC has asked a couple of black consultants from firms based in the Provincial capital, Nelspruit, to represent the interests of aspirant black irrigators on DWAF's catchment management steering committee for the Nkomazi. One of these consultants has been involved in securing off-shore funding for a new irrigation scheme for black smallholders in the Nkomazi area.

The CSC leadership, while pressing for wider access to irrigated sugar, also makes clear its view that the advantages of a guaranteed market for sugar are offset by risks of dependency on a single crop, and are anxious to see diversification to alternative crops such as vegetables or fruit orchards and their processed products (eg fruit juice). It seems clear, however, that the local sugar mill intends to stipulate minimum areas for sugar contracts to ensure 'full-time sugar cane farmers', reducing scope for diversification. Moreover, although black farmers are represented on the local Irrigation Boards, they recognise a gulf in influence between themselves and the commercial sector, describing their participation in irrigation board meetings as "window dressing" for an organisation whose decisions reflect the interests of the largest water users.

More critically, for all the sophistication of the CSC leadership's analysis, black farmers remain inexperienced in the day to day operations of growing cane, and consequently heavily dependent upon managerial support, currently provided by commercial contractors and consultants, one of whose field staff expressed concern at the high level of dependency he felt from the irrigation groups with whom he worked. Perhaps the biggest weakness of black farmers and their representatives is the almost complete lack of an independent technical (i.e. hydrological or engineering) competence to interpret, let alone challenge, commercial farmers' information about water availability and use. Even the Nelspruit-based consultants who are working on black farmers' behalf are from non-engineering backgrounds, one being in marketing and the other in social development. The reality is that the technical competence needed for viability in the market economy exists only in the commercial sector. For black farmers it is presently only on offer from the sugar company.

With a relatively weak local constituency from which to advance redistributive change, the question arises as to what opportunities exist for the (central) state to foster a self-governing local organisation that will support change. One over-riding factor in favour of this happening is the political imperative, fuelled by white farmers' perception that if redistribution of access to land and water is not achieved by their own organisations they will confront violent expropriation as occurred in Zimbabwe (Cousins ref). There are signs that there is room for redistribution. It is widely acknowledged that irrigation on commercial farms is inefficient and up to a third of the water used could be saved if new equipment were to be installed, thus making water available for black farmers. There is also widespread acknowledgement that water tariffs should be lower for poorer farmers than for large-scale commercial water users, indicating an acceptance of a principle of cross-subsidy from white to black farmers. However, two factors that are commonly identified as requirements of effective self-governing organisations have yet to be put in place. One is the clear definition of the resource. The other is clear definition of the membership of the group with rights to use it.

Lack of clarity (see above) about the amount of water available for irrigation is a major obstacle to meaningful negotiation about (re) allocation. The DWAF has chosen the Nkomazi region as the first in which to pilot a process of registration of water use by existing water users and verification of that water use through GPS and satellite imaging in conjunction with inspection visits to farms. This process is costly and time-consuming but is regarded as the only means by

which to establish an authoritative estimate of water use, taking full account of less visible resources such as farm dams for water storage (often filled by pumping from the river), which can evade existing water use control mechanisms.

Definition of membership of the group with use rights has proved more difficult, in part because of ambiguities in the drafting of the Water Act. This regards Water Users associations (WUA), into which Irrigation Boards are expected to be transformed, as made of voluntary membership and does not stipulate that all water users must belong to a WUA. For existing Irrigation Boards, this raises the prospect of trying to manage a resource without the power to exclude other users. For those accustomed to that power, under the terms of the old Water Control Area, this is unworkable, and, indeed, the principles of common resource management state that to be the case.

The central authority thus faces the challenge of confronting local elite power in seeking to redistribute access to previously disadvantaged black farmers. In doing so it may need to combine a degree of central intervention, such as establishing an authoritative and transparent information base on water availability, with a willingness to strengthen the legal authority of local water management organisations – albeit elite-dominated – over regulation of water usage, by making membership of Water Users' Associations – and hence subordination to those local authorities' rules – compulsory for all water users.

5. Conclusion

Both the Indian and South African case studies powerfully illustrate a number of conceptual issues regarding water rights raised at the outset. First, property rights over water are determined by a complex mesh of different rights and practices, instead of a single overarching law that is straightforwardly implemented. In India, the legal framework concerning property rights over water comprises a combination of customary, juristic, riparian, statutory and group rights. While ground water beneath privately owned lands constitutes private property of the landowner, this is not the case with respect to flowing or standing surface water, where the state continues to hold 'absolute' rights while recognising customary and riparian rights. This sets the stage for various possible interpretations of water rights. Further, the apathetic condition of most panchayats in the country implies that group rights of publicly owned water resources are frequently not secured, and minority powerful interests wrongfully claim customary easement and riparian rights. The South African scenario is perhaps more progressive than India in that the post-apartheid central state in 1998 established an overarching legal framework that set out to null private property rights in water (notably riparian rights as also the distinction between private and public water) and created a common resource that is to be managed by a three-tier common property regime. The case study describes the various factors that work against the practical enforcement of this law.

Second, the law(s) securing water rights may have very different meanings in practice. The *naala* and other similar water bodies such as rivers and streams, which share properties of common-pool resources, are not necessarily governed by common property regimes. In fact, the iniquitous arrangement for water extraction prevalent in Neelpura is a widely observed problem in common-pool resources throughout India, whereby dominant elites militate against the establishment of or adherence to any commonly agreed rules of access and use. In theory then, such resources are governed by open access regimes; in practice, they are appropriated as private property by a single dominant individual or group, whose actions deprive other users of their share of the resource. In South Africa, where the law in fact created the institutional conditions to transform the existing private governance of water into common property governance, historically driven racial inequalities of prior access, knowledge, organisation and representation allows white

commercial farmers to retain an unfair control over the decentralised governance of water, which in turn defeats the progressive, redistributive logic of the new Act. In fact, an interesting fallout of the new, equitable water law is that it has intensified conflicts and contests over another resource-land-; since the allocation of a permit to use water potentially strengthens one set of competing land claims over the other. This works to the detriment of black farmers as land allocations made to them by tribal authorities frequently lack legitimacy.

Third, irrespective of formal laws- whether those in South Africa that explicitly facilitate common property regimes or in India that do not- actually existing governance regimes complement the organisational skills and knowledge of those involved. In Neelpura in India, deep-rooted ignorance of riparian and group rights allowed a dominant minority to appropriate a vital common-pool resource for their private gain, and no common property regimes could be established until SPS's dramatic intervention. Ironically enough, in this case, recourse to formal arbitration in a court of law took place only as a defence mechanism, when Mahbub Khan was challenged through collective action. It was then that Khan resorted to a deliberate misinterpretation of the law to assert his exclusive easement rights over the *naala*. The oppressed are barely aware of their rights and are not easily able to evoke law in their daily life. Similarly, in Nkomazi in South Africa, black farmers were unable to reap the true benefits of the progressive legislation as a large part of the expertise and knowledge about local water use continues to reside in the white farming sector and irrigation boards. Here again, formal changes in legislation were not enough to secure effective common property regimes, and in fact there is the pressing need for political mobilisation and awareness building in order to promote the organisational skills and knowledge of the historically disadvantaged black farmers.

To conclude, each of these issues reiterates that the guaranteeing of clear, secure water rights is inevitably linked with the larger issues concerning the effective establishment of common property governance of water, for which legislation is necessary but inadequate. The Neelpura case poignantly demonstrates how informal arrangements for the governance of water continued *despite* and *beneath* the law, and a potent combination of disempowerment, illiteracy and lack of mobilisation allowed such inequitable governance arrangements to continue. On a more positive note, the Neelpura case shows also that popular mobilisation by a pro-active agency, such as SPS, was integral to the facilitation of collective action and the consequent collective agreement. SPS acted as a comprehensive political entrepreneur: increasing local awareness of riparian water rights, mediating a signature campaign, allaying individual concerns of poor farmers, galvanising the formal recognition of the collective agreement in the local panchayat and ultimately fighting out the defendant in a court of a law (which laudably, upheld the rule of law). Each of these aspects was equally significant in redressing the unjust arrangement for the use of *naala* waters through an effective common property regime, where simply enacting legislation would not have been enough. This point could not have been truer in the South African case, where the central government needs to play the part of a pro-active agency and defeat locally vested interests, if it is to truly pursue its objective of broadening its social goals through the creation of common property regimes for water. Clearly then, water rights are contingent on complex and multi-layered relationships between the law(s), its interpretation, local power relationships and the possibility of collective mobilisation, and measures for redressing violations of such rights must take this complexity into account. Ultimately, the redress of historical injustice regarding water rights through effective common property regimes cannot occur in the absence of a larger political struggle, facilitated by a pro-active agency, be it a popular organisation or the state itself.

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How to finance multiple use water systems for the rural poor? Lessons learnt from the domestic water sector in the Olifants River Basin, South Africa

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Abstract:

Designing financing mechanisms that ensure an improved access to water for rural poor and in the same time the sustainability of water services has been identified as a cornerstone for fulfilling the goals of the water policy in South Africa. This paper focuses on characteristics of rural water supply in terms of level of services, costs and financing, a subject less studied than determinants of water demand. It presents the new water policy in South Africa and the resulting institutional setting for the domestic water sector. Based on a study area (the former homelands of the Olifants river basin) where data have been collected, it then points out the following results: firstly, it seems difficult to identify the main determinants of costs due to the extreme variability of situations, even in specific area like the former homelands. However, water costs per capita increase with the quantity of water delivered without economy of scale due to an improvement in water technology and in service quality. The research also shows that very few water-pricing policies are implemented, everyone, including poor people having a free access to water. The conclusion raises concerns about future sustainability of existing systems and presents some research questions that are being addressed by the MUS project.

Key-words: domestic water supply; rural areas; South Africa; costs; tariffs; subsidies

Résumé :

La conception de mécanismes de financement permettant à la fois d'améliorer l'accès à l'eau des populations rurales pauvres et d'assurer la durabilité des services d'eau est considérée comme une condition fondamentale pour l'accomplissement des objectifs de la politique de l'eau en Afrique du Sud. Ce papier se concentre sur les caractéristiques de l'offre en eau en zone rurale en termes de niveau de service, coûts et modes de financement, une question moins souvent abordée que les déterminants de la demande en eau. Il présente la nouvelle politique de l'eau en Afrique du Sud et les arrangements institutionnels qui en résultent pour le secteur domestique. Sur la base des données collectées dans la zone d'étude (les anciens homelands du bassin de l'Olifants river), les résultats suivants sont présentés: Il semble difficile d'identifier les principaux déterminants des coûts de l'eau, en raison de l'extrême variabilité des situations, même dans une région aussi spécifique que les anciens homelands. Cependant, les coûts de l'eau par tête augmentent avec la quantité d'eau délivrée sans économie d'échelle à cause d'une amélioration parallèle des technologies utilisées et de la qualité du service. La tarification de l'eau est très rarement appliquée dans la zone d'étude, l'accès à l'eau étant gratuit pour tous en particulier pour les plus pauvres. La conclusion soulève la question de la durabilité des systèmes existants et présente quelques unes des questions de recherche traitées par le projet MUS.

Mots-clés: eau domestique; zones rurales; Afrique du Sud; coûts ; tarification ; subventions

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1. Introduction

In rural and peri-urban areas of developing countries, everyone uses water for various 'domestic' purposes and many people use or could use water for 'productive' purposes to earn an income, such as gardening, field crops, livestock, brick making. Yet in most cases, water sources, uses and users are not well integrated, leaving much scope for improvements in water use efficiency, livelihood, and equitable water use. Examples of such improvements are: more accessible and cleaner water for households, expanded water services that allow productive uses, more reliable water supply through new institutions that enable effective interactions between end users and providers of water. Such improvements increase the ability of water users to pay for installation and maintenance of the systems, which in turn prepares the ground for accelerated up scaling and implementation of multiple-use systems. (Moriarty, Butterworth et al. 2004).

The domestic water sector in South Africa is characterised by important inequities in terms of access to water inherited from the apartheid era, despite the tremendous investments in water infrastructures made by the governments since 1994 and the significant institutional changes promoted by the 1998 National Water Act and the 1997 National Water Services Act (Republic of South Africa 1997; Republic of South Africa 1998). The provision of Free Basic Water and a more equal distribution of water for productive uses (irrigation, mining, industry) are seen as important instruments to redress inequities from the past and eradicate poverty (Republic of South Africa 1996). Among the main challenges facing the water sector is the provision of free access to basic water services for all the users and at the same time promoting and planning for providing higher levels of service, that can accommodate for productive uses of water and broader livelihoods options (DWA 2003).

Designing financing mechanisms that ensure an improved access to water for rural poor and in the same time the sustainability of water services has been identified as a cornerstone for fulfilling the goals of the water policy in South Africa. However, if several studies analyze the determinant of water demand and the willingness to pay of users (Goldblatt 1999; Banda, Farolfi et al. 2004; Hope and Garrod 2004), characteristics of rural water supply in terms of level of services, costs and financing have been less studied. The objectives of this research are (i) to assess the costs of the various water supply systems in South African rural areas; and (ii) to inventory the different financing mechanisms (directly via water tariffs and indirectly through subsidies) of these systems; and (iii) to analyse the potential of the various identified financing mechanisms to address the requirements of full multiple-use water services. As a first step, the study is restricted to the domestic water supply, and will then be extended to irrigation water supply.

This paper is based on the research undertaken by Marie Lefebvre in fulfilment of her Master degree (Lefebvre 2005). This research is part of a broader project on Multiple-Use Systems (MUS), led by the International Water Management Institute (IWMI), which seeks to design, test and promote models, guidelines and tools for the upgrading of existing systems to systems where sources, uses and users are effectively integrated (Penning de Vries, van Koppen et al. 2004).

The paper is organized in 7 sections: section 2 presents the new water policy in South Africa and the resulting institutional setting for the domestic water sector; section 3 gives a rapid overview of the study area, the former homelands of the Olifants river basin; section 4 sets the framework for analysing existing tariffs and subsidy systems; section 5 describes the method used for data collection; results are presented and discussed in section 6; conclusion and perspective for further research are drawn in section 7.

2. The new water policy in South Africa: institutional framework and challenges

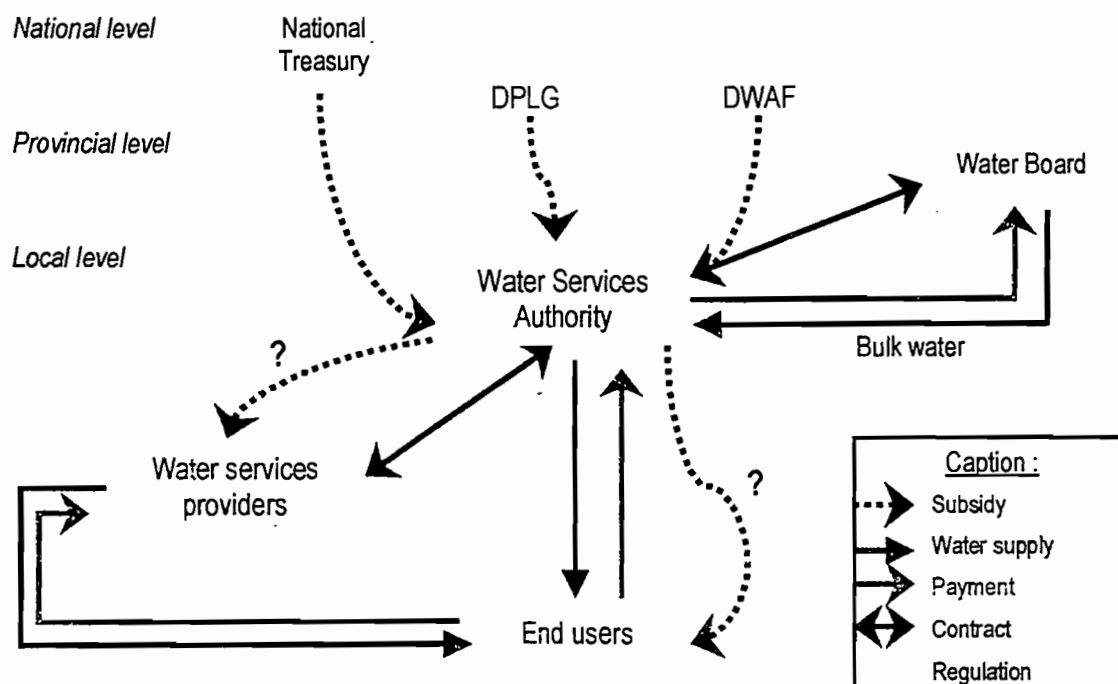
The National Water Act (NWA) (Republic of South Africa 1998) represents the key reference for water policy in the South African post-apartheid democratic context. It promotes integrated and decentralised water resource management in a new institutional environment.

Social development, economic growth, ecological integrity and equal access to water are key objectives of the new water resource management legislation (Hassan and Farolfi 2005). The NWA defines water resource as a public good belonging to all people. Recognising the current inequitable resource allocation (due to geographic characteristics but also to the discriminatory practices of the apartheid period), it insists on the need of an integrated management and strong institutional framework for water services provision in order to redress inequities from the past.

According to the Water Services Act (Republic of South Africa 1997), water & sanitation provision for domestic purpose is recognised as a duty for local governments with the financial and technical support of provincial and national governments. Furthermore, the provision of free basic water and sanitation services for all end-users is compulsory. The Act introduces the notion of basic services, which in terms of water supply means for a household composed by 8 persons an amount of water corresponding to 6 m³/month, available at less than 200m from the dwelling. According to World Health Organization (WHO) standards, this is the minimum amount of accessible water to promote a healthy living.

The current water services sector landscape is particularly complex in South Africa (Figure 1), mainly because of dynamic and sometimes-chaotic legislative implementations since the end of the apartheid. All levels of government are well represented in this sector: national, provincial and local (Thompson, Stimie et al. 2001). In view of the decentralisation principle, provincial and local governments are now new spheres of government in their own right and duties and not anymore emanations of the national government.

Figure 1: Institutional organisation of domestic water services in South Africa



At the national level (and at the provincial one through decentralised offices), the Department of Water Affairs and Forestry (DWAF), the Department of Provincial and Local Government (DPLG) and the National Treasury (NT) are the key actors. DWAF is the national department responsible for both water resources management and water services provision. During the period immediately following apartheid, the Department took in hand some water networks previously managed by homelands governments. These networks are being transferred to

relevant Water Services Authorities (WSAs, described later) according to their location. For the future, the Water Services Act provides for DWAF to be a sector leader in policy matters. DWAF will also keep a regulation responsibility beside both Water Services Authorities (WSAs) and external Water Services Providers (WSPs). DPLG has overall responsibility for the affairs of local governments. NT monitors and regulates the finances of all public bodies.

At the local level, Water Services Authorities (WSAs) and Water Services Providers (WSPs) represent the main institutions involved in rural domestic water provision. Water Boards (WBs), Water Services Committees (WSCs) and Ward Committees (WCs) complete the landscape. According to the Municipal Structures Act (117 of 1998) (Republic of South Africa 1998), a WSA is a municipality that holds the executive authority to provide water services and sanitation within its area of jurisdiction. In addition to ensuring access to water and sanitation services to all people living in their areas of jurisdiction and being responsible for ensuring that water services providers act within the policy framework, WSAs secure licenses from DWAF, or Catchments Management Agencies when already established, to abstract water and to discharge wastewater. The Strategic Framework for Water Services defines as Water Service Provider any person who has a contract with a WSA or another WSP to i) sell water to and/or to accept wastewater from that authority or provider (bulk water services providers) or ii) assume operational responsibility for providing water services to one or more consumers (end users) (retail water services providers) (DWAF 2003).

The new South African water legislation indicates, among others, two objectives sometimes contradictory, and in any case difficult to achieve at the same time: social equity in water provision (equal access to basic human needs reserve⁴ for all people in the country) and economic and financial efficiency in the management of the resource and in the provision of services. The latter goal is directly linked to the concept of cost-recovery, achievable through the adoption of economic instruments like water pricing (tariffs and charges); the former objective can be facilitated through the application of subsidies and aids to water users and providers.

In a context of severe backlogs from the previous regime and huge social inequalities, water pricing should not jeopardise the right to water and a non-harmful environment and should promote access to an adequate amount of clean potable water (Eberhard 1999). As a consequence, in rural areas pricing is often very low and in some cases, especially in former homelands, there is no billing yet. This practice cultivates a non-payment culture.

Water pricing implementation alone does not make a services pricing policy. Compensatory measures (subsidies mechanisms) are also an integral part of it, especially to ensure that everyone can access basic water services. The most important subsidies encountered in the SA domestic water services sector are the following: the *Municipal Infrastructure Grant* (MIG), a conditional grant dedicated to municipal infrastructure funding; the *Equitable Share* (ES), corresponding to the portion of nationally raised revenue that is allocated to local governments to enable them to provide basic services and perform the functions allocated to them⁵; and the DWAF's *Community Water Supply and Sanitation* (CWSS) Programme, which was initiated in 1994 to achieve the constitutional objective of ensuring that all South Africans have access to sufficient water and sanitation, focusing especially on rural areas.

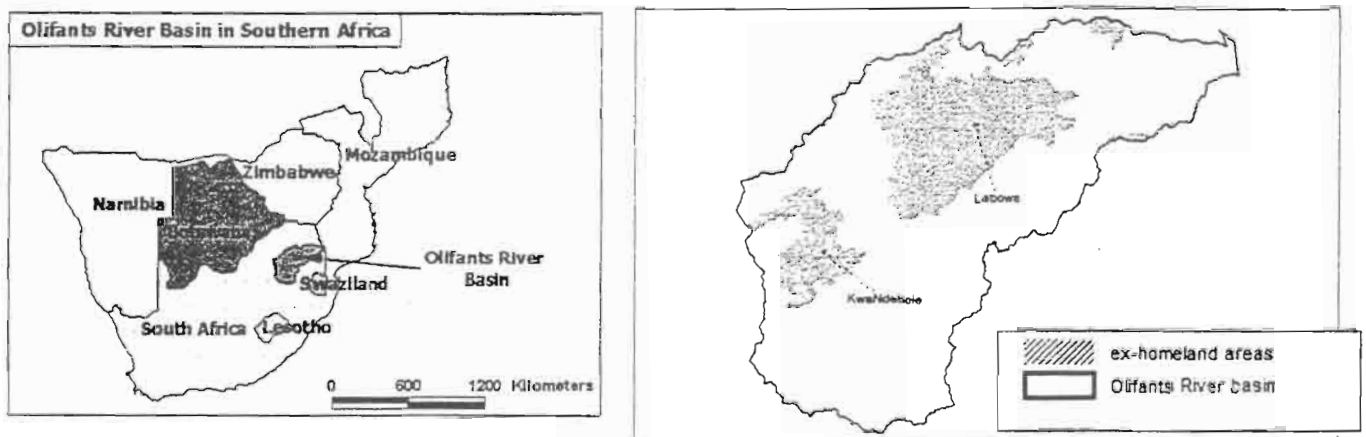
⁴ According to the NWA, "*The basic human needs reserve provides for the essential needs of individuals served by the water resource in question and includes water for drinking, for food preparation and for personal hygiene*". The amount of water necessary to cover the basic human needs is set aside. It constitutes, alongside the ecological reserve, the only right to water in South Africa, and has therefore priority over all other water use DWAF *Guide to the National Water Act*. Pretoria, Department of Water Affairs and Forestry.

⁵ The ES is not solely dedicated to water services provision and there is no obligation for municipalities to use it for this purpose.

3. The former homelands of the Olifants river basin: a very unequal access to water services

The research took place in the Olifants river basin, a benchmark basin for the International Water Management Institute, located in the North-East of South Africa and covering part of the Mpumalanga, Gauteng and Limpopo provinces. It focused specifically on the former homelands⁶ of Lebowa and Kwa-Ndebele, which constitute the poorest rural areas in the basin (Figure 2). They together represent 25% of the total surface of the basin but 57% of the population. Due to the isolation imposed by the apartheid government, these areas show socio-economic figures significantly different from the other part of the basin and suffer huge backlogs in basic services supply.

Figure 2- Location of the research area: the Olifants river basin and its former homelands



Source: Lefebvre (2005) and IWMI database

The Olifants river basin is characterised by a semi-arid climate, with two marked seasons. Increasing water demand for irrigation, mining, industry, power generation and urban and rural domestic use already represent a large proportion of the available water resources. Seasonal shortages already occur in some parts of the basin. The water resources are also affected by pollution from agricultural, mining and industrial activities located upstream of the basin. This creates a serious concern considering that some populations consume non-treated surface water, especially in poor rural areas.

The population distribution patterns show the legacy of the apartheid era: former homelands are densely populated (100 to 300 inhabitants/km²) mainly by black people (only 0.2% of whites against 5.8% in the whole basin), whereas in former "white-only areas"⁷ the density rarely exceeds 100 inhabitants/km². In former homelands, the population is also heavily touched by HIV (one person out of three is believed to be affected), which already affects its growth rate.

The main economic activities in the Olifants river basin are mining, industries, power generation and agriculture. In former homelands, rainfed agriculture, together with pensions and grants from government, is often the main source of income of households. According to

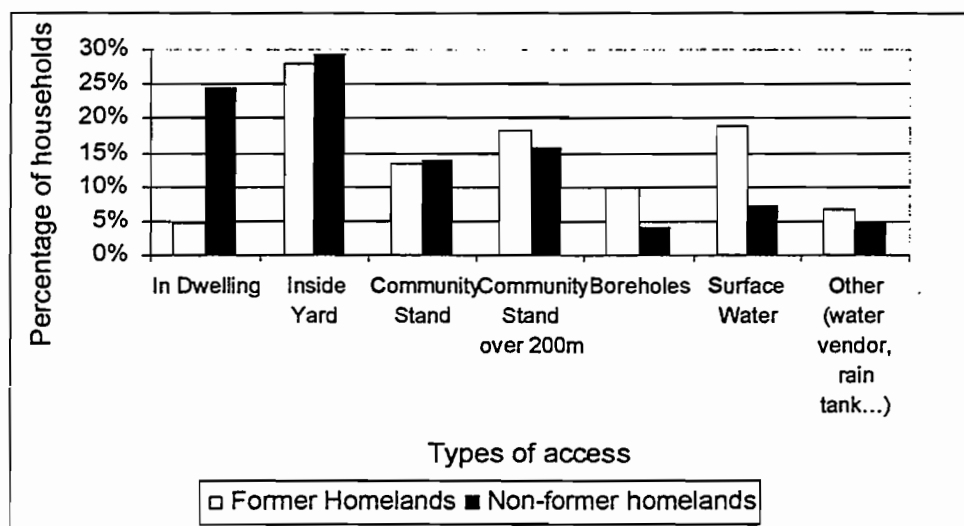
⁶ From the Natives Land Act of 1913 on, a number of homeland areas were delineated according to ethnic, geographical and economic criteria, and formed "reserves" for black people. Such spatial discrimination was developed and implemented further under the apartheid regime. Reserves were granted some form of autonomy from central government. Some of them ultimately were declared self-governing independent states (Bantustans), although not recognized internationally. Homelands and the so-called independent Bantustans have all been re-incorporated into the country in 1994.

⁷ The term "white only area" refers to areas where only white people were free to live and possess a home during apartheid.

the 2001 Census, more than 74% of the basin population declared having no income. In the areas of Lebowa and Kwa-Ndebele only, this figure grows up to 80%.

The study area suffers from huge backlog in terms of water supply and sanitation. In 2001, according to census, only 49% of households had access to piped water at less than 200m from dwelling, which is the standard adopted by the South African policy (against 72% for the whole country and 57% for the Olifants basin). Figure 3 compares the access to water in former and non-former homelands areas in the Olifants river basin⁸. Inequality of access to adequate sanitation is even worse: 22% of households have access to improved sanitation (pit latrine with ventilation or flush toilet) in the study area against 33% in the Olifants basin and 59% in the whole country.

Figure 3 - Distribution of population according to type of water access in former homelands and non-former homelands areas of the Olifants river basin



Source: Lefebvre (2005) from (Statistics South Africa) Census 2001

4. A framework for the analysis of water pricing and costs of rural water services

Before presenting the framework to analyse water pricing and costs of rural water services, it is important to define what we include under the terms employed.

Under water pricing policies, we mean the total amount of money paid by a consumer to have access to domestic water and to sanitation services if any, and the tariff structure. Water is priced according to a generic function: $B = aX + b$ (with B: total bill, a: the proportional part based on water consumption, X: water consumption level, and b: the fixed part). Three main types of water pricing can then be found: (i) if $a = 0$, the water bill does not change with water consumption level: it is a flat rate structure; (ii) if $b = 0$, the water bill is strictly proportional to water consumption: it is a volumetric rate structure; and (iii) if (a) and (b) are strictly positive, it is a two-part rate structure.

The proportional part (a) can either be constant whatever the level of water consumption or priced "per block". The block pricing can then increase with the consumption level (increasing block rate) or decrease (declining block rate). Complex pricing structures combining increasing and declining steps can also be found. Including in increasing block rate, one

⁸ "in dwelling" represents an access to water inside the house. "Inside yard" is an access (a tap) on the property but outside the house. Community stand represents a collective tap in the street, for the use of all households in the neighbourhood. "Borehole" indicates access to water via a borehole. And "Surface water" is access to a river, spring or dam. "Other" represents various accesses like rain tanks and water vendors.

finds the so-called "volumetric pricing with flat part": it combines a zero-charge for the first cubic meters included in the flat part, possibly with a fixed part, and a proportional rate on extra cubic meters.

The fixed part (b) can be priced on the basis of different but non exclusive criteria: (1) the liable person: the subscriber, the number of served flats, the number of inhabitants and/or the duration of stay; (2) the connection: the size of water pipe determines the level of the fixed part; (3) the level of consumption (e.g. a fixed rate for a fixed volume of water). Others indexes are also found, such as the size of the house, the number of taps, etc.

Through water price, water utility managers try to achieve different objectives, although the relative weight of each one may vary depending on the social, economic and environmental context and may sometimes be contradictory (OCDE 1987; Dalhuisen and Nijkamp 2002; Arbués, Garcia-Valinas et al. 2003). Following (Boland and Whittington 2000), the main objectives of water pricing are:

- *Cost recovery*⁹: it is the main purpose put on water price by water utility managers, because it will determine if water services are sustainable.
- *Economic efficiency*, to maximise welfare through equalisation between prices and marginal costs.
- *Equity*: Whittington *et al.* (2002) define it as a situation where similar customers are treated equally (*"users pays monthly bills that are proportionate to the costs they impose on the utility by their water use"*). This sense can be related to economic efficiency. On the other hand, advocates of water as a human right understand social equity as an equal access to water and to the benefits of using water. This is this sense that is used in the South African water policy (DWAf, Guide to the National Water Act).
- *Economic affordability*: water prices can be set to allow everybody to have an access to water. According to an international reference (World Health Organization 2000), to reach this target, the effort rate (i.e. the part of household budget spent on water) must be below 5%.
- *Resource conservation*, to promote a sustainable use of water. As this objective mostly concerns future, it is often forgotten in implementation of water pricing even if it is also often put forwards in legislations.

We can note that additional objectives can be considered, but they must be taken more as constraints: water price must be acceptable by water users; it must be transparent and simple to induce the desired users' behaviours; finally it must be easy to implement (in particular it must cost less than it allows to earn).

Economic affordability and more generally the guarantee of access to water for everyone, can be reached through a system of subsidies, which is incorporated in the design of water tariff structures. These subsidies can come from outside the water sector (from the government or an external institution, non-governmental organisations, international financing institutions) or from inside (poor water users are then subsidised by richer water consumers). In addition, subsidies can be paid directly to water users or indirectly to water utility managers (Whittington, Boland et al. 2002).

⁹ Cardone and Fonseca provide a simple definition of "cost recovery" as *"recovering all of the costs associated with a water system, programme or service to ensure long-term sustainability"* Cardone, R. and C. Fonseca (2003). *Financing and cost recovery. Thematic Overview Papers*. Delft, the Netherlands, International Water and Sanitation Centre (IRC): 117.. In the report *"Twelve Successful Cost Recovery Case Studies for Water Services in South Africa"*, DWAf seems to consider cost recovery as the rate effectively paid by users on the total amount of payment expected DWAf (1998). Twelve successful cost recovery case studies for water services in South Africa. Water services chief directorate. Pretoria, South Africa, Department of Water Affairs and Forestry: 24..

A good subsidy system must try to reach the four following objectives (Whittington, Boland et al. 2002):

- *Genuine need*: subsidy must be given only to poor users, which is not easy. Effort rate surveys and willingness to pay studies can be used to verify that it reaches the right users.
- *Accurate targeting*: beneficiaries must be precisely identified. This can be done through some types of subsidy schemes, like a subsidy given according to the level of water use, to specific areas which are recognised to be the poorest, to household characteristics (income level, presence of flush toilets, number of rooms...) or to the level of water quality service (the diameter of the connection, public or private tap, ...).

These two first objectives can be summarised with two standard indicators (Foster, Pattanayak et al. 2003): the error of inclusion, which arises when "rich" people benefit from the subsidy (which represents a leakage of funds) and the error of exclusion, which arises when poor people do not receive the subsidy.

- *Low administrative costs*: it is usually expensive to identify correctly beneficiaries.
- *No perverse incentives*: households who benefit from a subsidy should not be incited to waste water.

To synthesise, there are two main difficulties in a subsidy scheme: the risk of not reaching the targeted people and the risk of inciting subsidised households to consider water as non scarce. Then, aiming at reaching various and often contradictory objectives a water pricing policy is difficult to design, especially if water utilities want to recover costs, to allocate water in an efficient way and to guarantee an access to every one.

5. A three steps approach

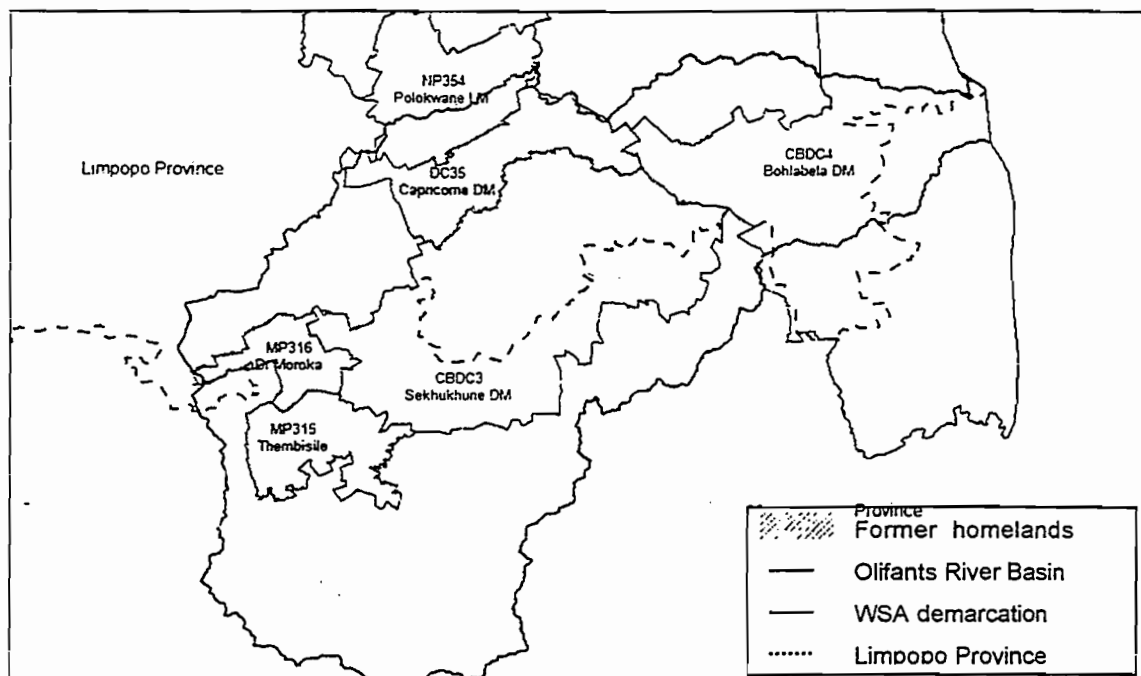
The research approach was threefold:

- The first step consisted in interviewing key-informants in the domestic water sector at national and provincial levels (DWAF, NGOs involved in water supply, consultants, and researchers) and studying the academic and grey literature related to domestic water supply in South Africa. The objectives of this first step were i) to get a better knowledge and understanding of the institutional setting of domestic water services, and ii) to identify the appropriate level for data collection on costs and water tariffs of water supply schemes in the study area.
- During the second step, we interviewed representatives of Water Services Authorities (Figure 4), and Water Services Providers, which operate in the study area, using a structured questionnaire. Questions included institutional arrangements at WSA level, sources of financing (subsidies, water tariffs, application of the Free Basic Water policy), network characteristics¹⁰, recent investments, difficulties experienced in water services management, and view on multiple uses of water. Water Services Development Plans and Integrated Development Plans were also used when available. Due to the limited number of WSAs in the area, data collected were analysed in a qualitative way, with regards to the objectives of water pricing and subsidy policy described above.
- The third step dealt with the analysis of data on water supply schemes provided by DWAF. Before handing over the management of domestic supply schemes to Water Services Authorities, DWAF has done an assessment of the existing infrastructure, the Functional Assessment (DWAF 2003). Available data on the 66 networks present in the study area encompass technical characteristics of the networks as well as

¹⁰ Since DWAF made the Functional Assessment available to us, this part of the questionnaire was not used.

financial information about costs and water revenues. A statistical analysis is presented in the next section.

Figure 4 - Water Services Authorities in the Olifants river basin



Source: Lefebvre (2005) from IWMI database

6. Results

6.1. Domestic water institutions in the former homelands of the Olifants river basin: from theory to reality

The present domestic water institutions in the study area shows differences and, somehow, simplification compared to the organisation planned by the legislation. No private Water Services Providers are contracted in the study area. Water is mainly provided by public entities at national (DWA), provincial (Water Boards) and local levels (Municipalities). Consulting firms, which were not explicitly identified in the national framework, compensate for lack of capacities at all levels. They actually play an important part in shaping provincial and local government decisions (Webster 1999), especially in the former homelands where municipal capacity is quite poor.

Water Services Authorities appear not to shoulder the full responsibilities inherent in their function. Indeed, local municipalities and water boards apply tariffs without referring to the WSA in charge in the considered area. The important backlog inherited from the apartheid and the fact that water laws and local governments were only recently created can explain this gap between theory and reality. However, it is important to notice that the present situation is likely to change in the near future. Indeed, DWA is transferring its schemes and responsibilities in term of water and sanitation services provision and should soon retire from the water services sector as services provider. Moreover, all WSAs are in the process of identifying their future water services providers. It is not clear whether local municipalities that presently perform water services provision function, will remain water services providers, particularly since some WSAs see these local municipalities' activities as an encroachment on their responsibilities. The situation is also complex for Water Boards. Three Water Boards play a part in the study area but it seems that their future development could differ. Indeed, Lepelle Northern Water, the most important water board in the area, will probably become part of a public-private partnership with WSAs while the others may disappear.

6.2. *Diversity of water supply networks and costs: what are the determinants?*

A short technical description of the schemes in the study area can be drawn. The average age of schemes in our sample ranges from 5 to 23 years. However, 55% of the schemes are between 9 and 12 years old, which approximately correspond to the end of the apartheid (1994). More than 45% of schemes (precisely 31) supply a population between 50000 and 100000 inhabitants. The average consumption is 36 L/person/day, which is above the standard of 25L/person/day¹¹. However, it can vary a lot: the maximum consumption is 124 L/person/day and the minimum 10 L/person/day (with a standard deviation of 30 L/person/day). The water is mainly extracted from groundwater (66% of schemes) and for the most part is supplied via hand-powered boreholes (54% of boreholes are hand-powered, 22% diesel-powered and 21% electrical). The storage capacity of these schemes varies from 0 to 0.843 m³/capita, with an average of 0.132 m³/capita. However, all the capacity is not used. The non-used storage capacity varies from 0 to 64% of the total storage capacity, with an average of 27%. This gap can be explained by the lack of maintenance, which led to degradation of infrastructures. Only 24% of networks have a water treatment work, and only 15% are equipped with a sewage treatment work.

A typology of these networks in four groups was built using the results of a Principal Component Analysis (PCA) based on technical characteristics¹² (costs variables were kept as illustrative¹³):

- The first group comprises two large schemes, with a large of population, a high storage capacity per capita, and a number of pumping stations and of sewage treatment infrastructures above the general mean.
- The second group (15 schemes) is characterised by a relative youth, an amount of water delivered per person above the mean, a higher proportion of diesel pumps, and a higher storage capacity per person, all reflecting a higher level of service. This group is also characterised by higher replacement, refurbishment and maintenance cost per capita and present value per capita.
- The age of schemes and the proportion of hand-powered boreholes, both above the general means, distinguish the third group (10 schemes), which also generates lower costs.
- The last and largest group (39 schemes) is characterised by a high proportion of hand-powered boreholes, a lower water delivery per capita, and their youth. They also have significantly lower costs. These networks, which use simple technologies, may have been built just at the end of the apartheid to rapidly supply water to people who were not previously served.

Costs per capita are highly variable across schemes (Table 1). Indeed, each type of cost presents a standard deviation of the same order as the mean value. Groups 3 and 4, which gather the most rudimentary networks have the lowest costs. Group 3 schemes, which are the oldest, seem also to be the cheapest, even when compared with group 4. The T-test confirms the significance of mean differences between group 2 and group 3 and between

¹¹ Due to the generalised absence of water meter, what we call water consumption most certainly corresponds to the volume of water, which is delivered in the whole network (i.e., including water losses, which may vary according to the state of the infrastructure and the level of maintenance) and not necessarily what users consume. Therefore, this is only a proxy for water service level.

¹² The technical characteristics used were: number of people served, average age of the scheme, storage capacity per capita, percentage of hand-powered boreholes, percentage of diesel powered boreholes, and the water delivery par person and per day.

¹³ All costs used in this analysis were estimated and calculated costs provided by DWAF.

group 2 and group 4 (except for refurbishment costs). However, only the present value and operating costs are significantly different between group 3 and group 4¹⁴.

Table 1 – Means and standard deviations of networks' costs per person (2003)

	Present Value (R/person)*	Replacement cost (R/person)	Refurbishment cost (R/person)	Maintenance cost (R/person)	Operating cost (R/person)
General mean	R 346	R 476	R 41	R 12	R 18
General standard deviation	R 320	R 380	R 45	R 8	R 19
Group 2 mean	R 648	R 836	R 64	R 19	R 34
Group 3 mean	R 150	R 255	R 47	R 7	R 7
Group 4 mean	R 268	R 379	R 31	R 10	R 14

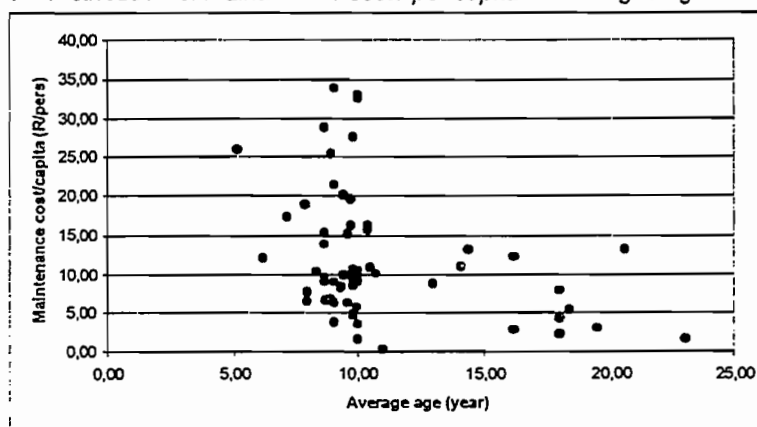
* In 2003, the average exchange rate between South African Rand and US Dollar was R 1 = USD 0.133

(Source: own calculation from DWAF Functional Assessment data)

The analysis of the effect on costs of technical characteristics, when considered individually, shows disappointing or unexpected results. For example, no economy of scale has been revealed, probably because of the high heterogeneity of the sample networks, and also because, schemes, which are presented by DWAF as stand-alone infrastructures are in reality composed of different networks.

Contrary to expectations costs of recently build networks seem to be higher than for older schemes (see Figure 5 for maintenance costs¹⁵). However, this apparent trend is not significant, as the sample comprises a large proportion of schemes aged 9 to 12 years, with a high variability of costs, probably due to different types of technologies.

Figure 5 – Distribution of maintenance costs per capita according to age of networks



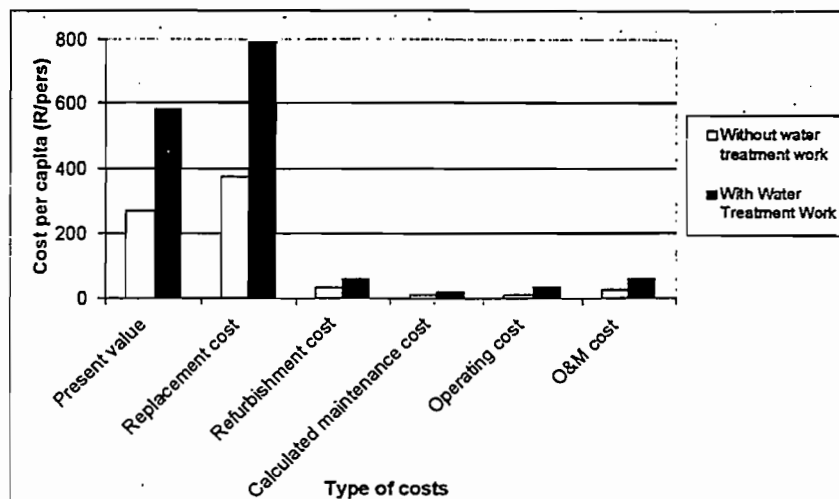
Source: Lefebvre, 2005 from DWAF Functional Assessment, 2003

On the opposite, as expected, the presence of water treatment has a significant effect on water supply costs (Figure 6) The difference of mean values between the two groups (with and without water treatment) is confirmed by a T-test, except for refurbishment costs, which are more related to the level of degradation of the infrastructure.

¹⁴ Group 1 schemes were not compared to other groups because of the low number of networks in this group.

¹⁵ Distribution of all other costs presents the same shape

Figure 6 - Distribution of mean costs according to water treatment



Source: Lefebvre 2005 from DWAF Functional Assessment, 2003

6.3. Do WSAs water pricing policies fulfill their objectives?

The analysis of water pricing policies requires getting financial data on water supply services, which is not easy in the newly built municipalities. Indeed, specific accounting systems for domestic water are rarely in place and relevant information are scattered in several municipal accounts. Some of the costs (e.g., personal costs) are even still born by DWAF.

Water pricing policies in our study area are quite heterogeneous (Table 2) and range from the most complicated to the simplest. Nonetheless, some WSAs are still drawing and submitting their water services pricing policy, which can explain the no tariff system in effect. It is also interesting to note that while the WSA is responsible for implementing tariffs in its area of jurisdiction, some local municipalities (when the WSA is a District Municipality¹⁶) apply their own tariffs in very localised areas (in general small former white towns). Similarly, Water Boards have implemented in rural area a specific pre-paid system for each village.

We can distinguish three pricing systems:

- The no tariff system is obviously the simplest and less expensive to implement, but it limits the source of funding for services, as all the costs have to be covered by national or local government subsidies. Moreover it raises the question of equity first because, due to the diversity of technologies used to provide water (see analysis of networks above), the level of services is likely to vary a lot within the WSA jurisdiction, and second, in a same WSA, some users may be charged or not for water depending on the services provider.
- A flat rate is used by two WSAs. The tariff seems rather high compared to the average level of income and experiences elsewhere. Indeed in cases of successful cost recovery systems in rural communities (DWAF 1998), flat rates ranged from R1.4 to R15/month/household. Moreover, this tariff does not take into account the level of services.
- Polokwane LM pricing system differentiates the tariffs according to the volume consumed. It also differentiates between locations, rural tariffs being lower than urban

¹⁶ There are two levels of local governments in South Africa, District Municipalities (DM) and Local Municipalities (LM), with theoretically different functions. According to circumstances the WSA may be either a DM or a LM.

tariffs, probably to reflect different levels of services. The lowest-income households receive a municipal grant of R100 per month to help them paying for basic services. This system requires obviously more information on the population served and is more costly to implement (targeting of subsidised households and metering of water consumption).

Table 2 - Diversity of water tariff structures applied in the WSAs of the study area

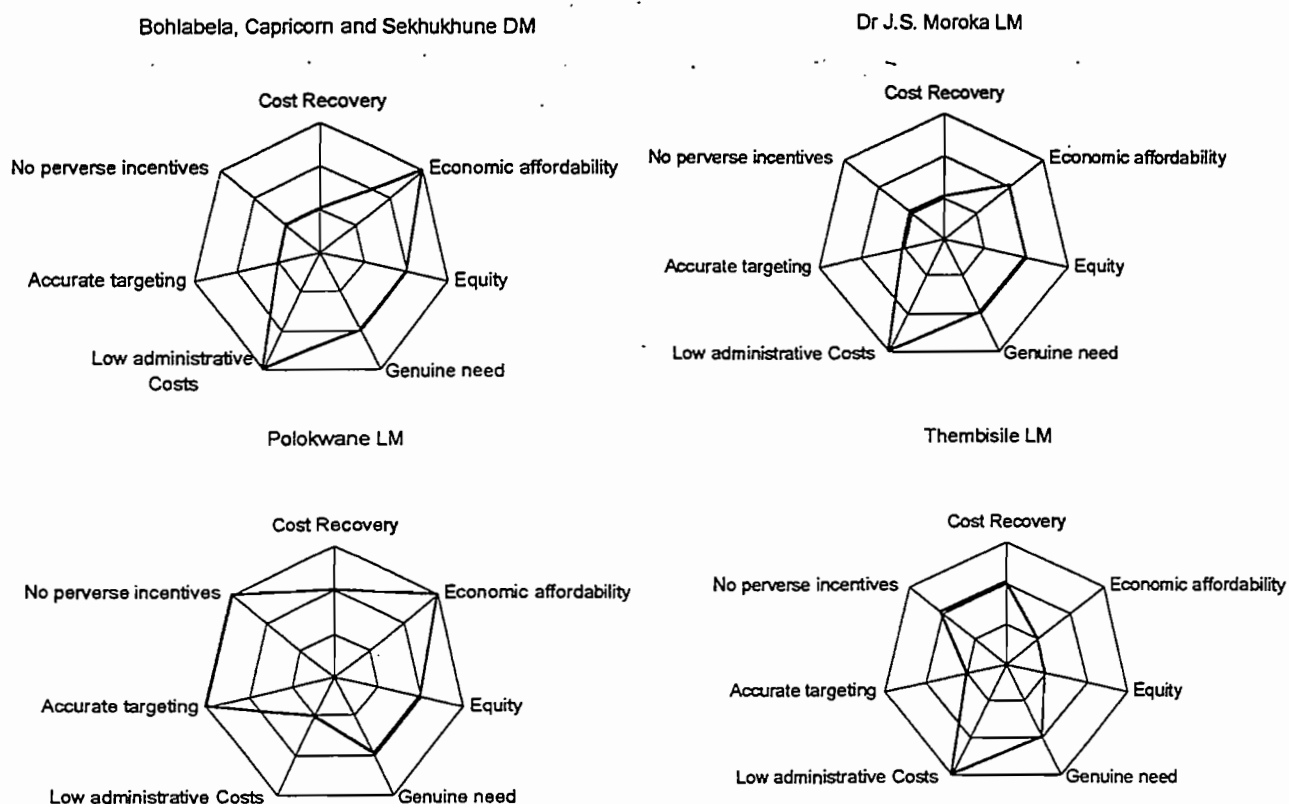
WSA	Current water tariff and direct subsidy
Capricorn DM	<i>No tariff</i>
Bohlabela DM	<i>No tariff (except in one former white town)</i>
Sekhukhune DM	<i>No tariff except a pre-paid tariff applied by Lepelle Northern Water and some Local Municipalities in former white areas</i>
Dr J.S. Moroka LM	<i>No tariff, except for 17% of the population (in town) who are charged a global amount of R 50/month/household for water, electricity and refuse removal</i>
Thembisile LM	<i>Flat rate: R25/month/household</i>
Polokwane LM	<i>Complex increasing block tariff and targeted individual subsidy:</i> - <u>First step</u> consumption < 5 m³/month: R 2.07/m³/month - <u>Second Step</u> consumption between 5 m³ and 100 m³: - in urban areas: R 4.5/m³/month - in semi-urban areas: R 3.8/m³/month - in rural areas: R 3.2/m³/month - <u>Third Step</u>: consumption over 100 m³: R 5.82/m³/month
	<i>R100 monthly grant to indigent households for all basic services</i>

As underlined previously, water-pricing policies cannot be analysed without considering the importance and type of subsidies. The Equitable Share and the Municipal Infrastructure Grant are the two main sources of national subsidies. Even if the total amount of each subsidy is available in municipal accounts, it remains difficult to know precisely the amount dedicated to water and the way it is used. The ES represents only a little part of total national subsidies (37% at most). In fact, as municipalities are free to choose how to use it, a very small part seems to go to water services provision. Furthermore, the amount received by each WSA varies a lot (from R3 to R42/inhabitant/year for ES; and from R32 to R149/inhabitant/year¹⁷). However, in WSAs where water is not priced, the rest of water services costs should be covered by the general municipal budget, which can be limited by the lack of revenue-raising economic activities. This situation entails a risk of low sustainability of existing schemes and limits the scope for new infrastructure development.

From informations gathered and using the objectives of water pricing and subsidy policies presented in section 4 above, it is possible to assess the water services policies encountered in the study area (Figure 7). Economic affordability was rated by comparing the average water bill and the distribution of income across households in the area (using Census data). Equity was appreciated qualitatively by comparing the level of water access and the water bill. Genuine need refers to the ability to pay appreciated through the level of income. For cost recovery we compared the revenue from water bill to the total costs of water services. The three last criteria are straightforward¹⁸. This analysis remains highly qualitative due to the reliability of data collected and results should be considered cautiously.

¹⁷ The amount of ES transferred to local governments by National Treasury depends on the proportion of indigent households in the area, while the amount of MIG is related to infrastructure projects. Therefore this variability reflects the diversity of socio-economic context and development strategy of the municipalities.

¹⁸ "Economic efficiency" and "resource conservation" have not been represented, due to lack of relevant data.

Figure 7 - Evaluation of water services pricing and subsidy policies in the surveyed WSAs

To summarise, three types of water pricing policies can be identified. The most common (used in Bohlabela, Sekhukhune and Capricorn DM and Dr JS Moroka LM) prioritises the simplicity of the policy and the objectives of affordability and low administrative costs probably to the detriment of economic efficiency and sustainability, which may create problems in the future. Thembisile LM policy tries to reach a higher level of cost-recovery but to the detriment of equity and affordability. Finally, Polokwane LM policy aims at reconciling various objectives, but is only possible because of the presence of high-income population, which allows cross-subsidies, and revenue-raising activities¹⁹.

7. Conclusion

The South African constitution imposes on governments to provide all inhabitants with a minimum level of water services. In rural and poor urban areas, the huge backlog in terms of water supply and sanitation inherited from the apartheid constitutes therefore a real challenge for the newly born local governments in charge of water services provision. The domestic water sector in South Africa is characterised by institutional uncertainties due to on-going transition between national and local governments. From what we have observed, the present situation may raise some concerns about the real participation of communities in the planning and decision-making process regarding water services, and furthermore in the day-to-day management of the networks, although it is explicitly considered in the Water Services Act. Considering the geographical extension of WSAs, an intermediate level between WSA and end-users may be needed, but the role of WUAs in this respect is still not very clear.

¹⁹ Polokwane is the capital of the Limpopo province and therefore has a population structure and level of economic development noticeably different from other municipalities in the study area.

Our study shows a technical heterogeneity of water supply schemes at local level, specifically in terms of level of service measured by volume of water delivered per person. Linked to technology diversity is the high variability of costs without clear scale effect and age dependency.

The most frequent pricing policy is a no-pricing policy, which raises concerns about cost recovery and financial sustainability of water services, although the average operation and maintenance costs remains affordable (R30/pers/year i.e. R15/household/month) for households earning more than R300 a month. Operation and maintenance costs for less than 25L/pers/day are even more affordable (R15/pers/year i.e. R7.5/household/month). Experiences of more sophisticated pricing-subsidy systems (e.g. Polokwane LM), which try to address several objectives, need to be monitored and assessed. At present they are not likely to expand due to their complexity and cost of implementation and the general lack of capacities at WSA level. Generally, the domestic water sector in poor rural areas is characterised by a high level of subsidisation, consistent with the free basic water policy. However the subsidisation sometimes goes beyond this basic level (no pricing for networks that provide more than the basic volume), which may lead to inequity of access and charging.

Besides the pricing policies, concerns about sustainability of networks after their handover to WSAs are nurtured by the lack of technical capacities, the lack of proper accounting system and financial management, and the poor capacity of WSAs to raise revenue to cover the costs of water services provision, which is not fully compensated by subsidies from national government²⁰. This entails a risk of initiating the vicious circle of poor cost recovery – poor maintenance – poor quality of service – poor willingness to pay.

From our study, higher volume delivered per person seems to be related to higher costs of provision. However available data are not sufficient to assess if a higher volume of water supply is inducing more productive uses of water in the study area. It can also correspond to a higher use of water for domestic purpose (e.g., increased hygiene).

The development issue formulated in the title of this paper "Is it possible to design water pricing and subsidy system to ensure equitable and efficient provision of water for multiple uses in rural poor areas of South Africa?" can be translated into several research questions: i) what is the willingness to pay of water users in rural areas? ii) what are the costs of water provision for different level of services? What are the methods to collect primary data on costs? iii) Can multiple use systems be implemented for which uses and categories of users, in which locations? Answering the first question requires an analysis of water demand at household level (such as (Banda, Farolfi et al. 2004)). The present paper provides only partial answers to the second question for the domestic sector and needs to be completed by an analysis of the irrigation sector. Finally, further research is required and planned within the MUS project to fully address the last one.

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²⁰ The ES is sufficient to cover operation and maintenance costs of delivering less than 25L/pers/day but covers only 60% of average operation and maintenance costs. Since there is most often no water pricing, 40% of costs must come from the general budget of the municipality.

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DEMOCRATIC DECENTRALISATION IN INDIA AND THE MANAGEMENT OF GROUNDWATER – AN INTERSTATE ANALYSIS: 1980-2000

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Abstract:

Many renewable resources are intergenerational common pools, exploited by one generation after another. The case of groundwater among other natural resources is particularly interesting because important aquifers are large in geographic scope and its users are many. The problem with groundwater has been basically regarded as the 'common pool problem' which begins with the simple idea of the efficient intertemporal allocation of resources which requires that any decision on the current rate of use takes into account the entailments for future supplies and future demands. The critical issue facing the groundwater aquifer today is that the rate of groundwater extraction exceeding long term recharge rate, resulting in rapidly declining groundwater levels in many areas. The groundwater stock may increase due to natural and artificial recharge, but recharge is usually small relation to the capacity of groundwater aquifer, and so often its variability is not a significant consideration in the allocation decision. Secondly few private agents have any incentive to invest in artificial recharge as the benefits from such investment cannot be appropriated by the investor. All private agents whose holdings lie above the aquifer benefit from artificial recharge while only one may invest in such a scheme.

This paper attempts to understand the implications of democratic decentralization specifically in the context of India in resolving the problem of over-extraction of ground water. Over-extraction can be prevented by two ways- one is to increase supply (by schemes like rainwater harvesting) and the other is to control demand. We ask whether Indian states that are decentralized with empowered local self-governments in the form of effective village councils can take meaningful steps in increasing supply and controlling demand as compared to a state that is centralized polity. Can the local self government internalize the problem of externalities (as it appears to constituent individuals acting in isolation) to arrive at a solution that is sustainable in the long run? Can public participation through the village assembly and other decision making structures ensure that problems like free-riding are curbed and optimal investment in recharge facilities are made? Case studies show that this may be so.

Here we try to understand the nature of optimal allocation of groundwater in dynamic programming framework as explicitly analyzed in Neher. P.A (*Natural Resource Economics – Conservation and Exploitation*). Also we try to understand the nature of stock variable (Groundwater) and control variable (either Extraction or Efforts to extract and augment) and accordingly the government's (assumed to be the sole owner) role in the sustainable development of groundwater resources. The objective function of the sole owner is to maximize net benefit with respect to Dynamic Constraint, given the conditions of Maximum Principle and Port-folio Balance. For the sustainable development of groundwater resources, monitoring groundwater extraction becomes foremost task of the government. However, actual extraction follows the individual profit maximization impulses of cultivators and it may be expected that actual results will diverge from the predictions of the theoretical one. We ask what happens when the form of government changes and its size becomes smaller. Does it move towards or diverge from the theoretically derived path of sustainable consumption?

In our experiment we try to explore the nature and causes of extraction. While we rely on case studies, we also use an empirical model to explain the causes of depletion for the policy suggestions as well as for forms of governance. The model is tested using interstate analysis of the Indian Economy from 1980s to 2000. Since the model constitutes pooled (Time Series & Cross Section) data across states over the years, Panel Regression Analysis has been performed and results indicate support for the thesis that decentralized Indian states are better at conserving groundwater than centralized states.

Key Words: Groundwater, Extraction, Depletion, Interstate Analysis.

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"If man is movement water is history, If man is a people water is the world, If man is alive water is life"

-Jose Manuel Serrat
El Hombre y el Agua

1 Introduction

Many Renewable Natural Resources are in general common property, exploited by many people at a time. The case of groundwater among other renewable natural resources is particularly interesting because aquifers are large in geographic scope. As a consequence, it creates two types of problem, namely, first, to establish property rights over its use and secondly, to determine the efficient rate of exploitation for the aquifer as a whole.

As far as the first problem is concerned, while an aquifer is shared by many 'land holders' where over land rights are legally quite well defined, the share of aquifer underlying each land holding cannot be ascertained. Because of its very nature, the withdrawal of water by any land-holder results in a loss of water for the adjoining land-holder.

The absence of property rights as discussed above makes it difficult to treat the optimal ground water exploitation as a sole-ownership problem discussed in most text books. In fact, given the rate of regeneration, the optimal rate of exploitation can be defined only for the entire aquifers, that is, taking all the individuals as one unit. While this problem is simple, the thorny issue that involves with this is how to allocate the optimal rate for each individual. Unequal land-holdings may create the problem even more acute.

Further, assuming equitable land-holding, it may be possible to allocate certain rate of withdrawal for each land-holder but then the main problem would then be how to implement such a policy. In a situation where community participation is existing, it may be simpler to monitor the use of such a resource. However, in the absence of such participation, it may be impossible to find a monitoring agency to exercise such a policy.

This paper is an attempt to analyze the major determinants of ground water exploitation in India. The critical issue facing the groundwater aquifers today is that the rate of water withdrawals exceeding the long-term recharge rate, resulting in rapidly declining groundwater levels in many areas³. As a renewable but exhaustible resource, ground water follows a typical path of accumulation and unless a well planned exploitation is followed, aquifers will be pushed to dangerous low levels⁴. The case of ground water, among other natural resources, is particularly interesting because important aquifers are large in geographic scope and its users are many. The unregulated extraction⁵ rate will be 'too high' if it results in the water table drawn down 'too low', causing extraction costs to be 'too high'. Over the years, due to indiscriminate extraction of ground water⁶ in most of the states in India, water tables have been depleted to a

³ Dhawan, B D (1975), 'Economics of Groundwater Utilization: Traditional versus Modern Techniques', EPW, Review of Agriculture (June 28).

⁴ Bhatia, Bela (1992): 'Lush Fields and Parched Throats: Political Economy of Groundwater in Gujarat' EPW, December 19-26.

⁵ The word extraction is synonymously used as harvesting, draft, withdrawal, exploitation or abstraction.

⁶ See section 3.1 for details.

dangerously low level in many places. Depletion of an aquifer has three chief economic effects⁷. First, an aquifer can become 'extinct' through overuse if its geology is such that water channels that feed the aquifer can collapse as water table goes down and in consequence the aquifers eventually become dry. Second, water in the ground is "money in the bank" for use in periods of drought when local rains fail and surface water courses dry up. Third, it is that extraction costs rise as the water table falls⁸. Even if the social benefit of the water exceeds extraction cost, the latter will be economically excessive under an uncontrolled regime. The purpose of the aquifer management is to control these costs and optimize water use over time. Depleting ground water levels pose threat of salinity and further it can be an environmental catastrophe as it disturbs the hydrological cycle⁹.

In this context it is pertinent to ask, does democratic decentralization affect ground water depletion? Is there any reason to expect that decentralized polities/administrations manage their common property resources better than centralized ones? Specifically in the case of Indian states are empowered Village Councils or Panchayat Raj Institutions (PRIs) in a position to solve the problem of property rights when it comes to ground water with its implications on water extraction, augmenting ground water supplies and thus affecting ground water depletion? Can PRIs internalize the externalities associated with ground water to arrive at more sustainable practices. This is the question that the paper intends to answer.

The paper argues that those states of India which have a long record of practicing democratic decentralization through institutions like the PRIs which are empowered financially and to which elections have been regularly been held are better equipped to foster sustainable development practices than centralized ones. For the purposes of our study the rate of ground water depletion is a measure of the unsustainability of development. Thus this paper intends to show that ground water depletion and the spread of PRIs is negatively linked.

We organize the paper in the following way: In Section 2, we discuss as to why the process of democratic decentralization affects ground water depletion. This is followed by a series of case studies where various studies are analysed at some length to marshal arguments that link decentralised administrations with lower rate of ground water depletion. In section 4 theoretical arguments followed by case studies that link democratic decentralization are analysed. In Section 5 we discuss the meaning of optimal rate of ground water harvesting in a sole-ownership model framework. In Section 6, we discuss the key factors determining ground water extraction which would lay grounds for our empirical studies. In Section 7, we set up the basic model of our regression analysis in the context of the Indian economy. In Section 8, we discuss our major empirical findings. In Section 9, we draw some broad conclusions and major policy suggestions for sustainable development of ground water resources.

⁷ Neher, P.A., (1990): *Natural Resource Economics – Conservation and Exploitation*, Chapter - 14.

⁸ Also called as *User Cost*.

⁹ Apart from a major and reliable source for water supply, groundwater also plays an important role in moderating and modulating the surface water regime and surface eco-systems.

2 Democratic Decentralization and Management of Ground Water Resources-Some Theoretical Arguments

What is the economic argument for asserting that decentralization is linked to reduced ground water depletion? A case for this linkage is based on grounds of economic efficiency and sustainability and may be made on the same grounds on which von Hayek¹⁰ defended the market economy vis-à-vis the planned economy. A centralized plan for sustainable development (in this case sustainable ground water management) is less likely to succeed than decentralized planning where the responsibility of executing this task is entrusted to the local self-governments, in the case of India to Panchayat Raj Institutions.

In so far as one of the role of the state is to provide public goods like infrastructure where externalities are involved (ground water management certainly qualifying), a theory may be advanced. It must be recognised that most economies are not homogenous entities. There is a wide variation among various regions and localities within regions. Consequently, economic infrastructure that has to be created is not always standardized or uniform. Planning for sustainable ground water management in a non-uniform environment, especially when local economic activity is especially affected by local factors requires the collection of relevant data - available locally - and then processing this data into information. Ideally, it should be this information that is the basis of planning for certain kinds of infrastructure. This is also true (indeed especially so) for agriculture and a host of agro-industries. To that extent infrastructure required to support that industry/economic activity in a sustainable manner will be peculiar to the locality as its nature and quantum will depend on local conditions. Thus that portion of infrastructure will be best planned, executed and managed by the members of the locality itself. The reasons are simple. The members of the locality or their representatives being first hand observers of local conditions should know the best way to create an appropriate supporting local infrastructure and should be able to do so in the most economical manner. Indeed, for projects relating to watershed management, local self-governing bodies can mobilise free labour (by suitable innovation as regards distribution of benefits) from its citizens, which in the context of South Asia usually means unutilised labour.

If, on the other hand, the central government is entrusted with the responsibility of providing all infrastructural requirements, then it has to collect information from all the localities, aggregate this information and process it to arrive at a plan to provide infrastructural support. This is obviously a monumental task and one that is not easily accomplished. Additionally, in the process of aggregating information, it is likely that some information of value will be lost. To that extent the plan created will be *faulty/sub-optimal*. Furthermore, given the magnitude of this exercise it is also likely that the *lag* between the perception of the problem and action will be larger. Fourthly the possibility is that the link between local public good requirement and a local solution will be broken. While local demands will be aggregated, the solution that is proposed will be a centralised one. Take the case of the construction of a multi-purpose irrigation dam to cater to the needs of a large number of people spread over a large area distributed into various localities. This solution, while at times the only and perhaps the best solution, may not always be so. For one, the capital costs of such projects are very high. Secondly,

¹⁰ von Hayek, F (ed), 'Collectivist Socialist Planning,' Routledge, Kegan and Paul, London, 1935

they can take a long time to complete. Thirdly, it has a tendency to submerge the most fertile areas and thus the most populated areas and displace a section of people 'for the greater common good.' However in the absence of effective decentralization, the solution like the one above will be the only solution. Before discussing the effect of the redistribution of powers, a look at the public goods requirements of the Indian economy integrating with the global economy is useful.

What are the public goods that the Indian economy requires now that it has decided to integrate with the world economy? Obviously the public goods that must now be provided must supplement the strengths of the Indian economy. Given the fact that India is a labour surplus economy, this means that public goods provided must be those that amplify the strengths of those sectors of the economy that are labour-intensive. This covers agriculture and labour-intensive manufactures like apparel/garment manufacture. In the future it could also include assembly of electronic goods, that is the labour intensive component of manufacture of electronic goods. The latter sector generally is comprised of small firms¹¹ that have a tendency to agglomerate/localize in a particular region. For an economy the size of India, these regions will possibly spread all over the country, with different regions supporting different clusters of industries.

However, whether agriculture or industry, both these sectors have a set of common public good requirements. *But the prime requirement for agriculture is water.* Apart from civic requirements, water is needed for irrigation and has industrial uses and water supply must be predictable and regular. Now provision of water is, by and large, in the domain of the state and the central governments and logically so as the usual mode of meeting requirements on a mass scale is met by the construction of large dams which is beyond the capacity of local civic authorities, be it urban or rural. However, such projects are highly capital-intensive projects and not without their share of controversies, not the least because of doubts over their long run cost-effectiveness. The alternative is to go in for decentralised solutions but one that depends on local participation, like roof top/rainwater harvesting. Given their nature they are best administered by the local civic authorities like the PRIs. If these schemes are successful, then not only are significant savings effected, the conflict between agriculture and industry over electricity can also be lessened. This is because if the experience of the *Tarun Bharat Sangh* (see below) is anything to go by, the rise in the water table reduces power consumed in pumping water to the fields. It must be pointed out that the implementation of a successful water management scheme has other significant fallouts- one of them being lower power requirements from agriculture which can only mean more and cheaper power for industry as SEBs with a lower financial burden will be able to invest more in power generation as well as maintenance of existing infrastructure. This will lead to a lowering of costs as well as a removal of an infrastructural bottleneck. Additionally moneys saved by the state due the substitution of the capital-intensive water supply project can be spent on transport and ports to lower transportation costs and add to competitiveness.

¹¹ Small as is being defined here may not tally with the government of India's definition of what comprises the small sector.

3 Democratic Decentralization and Sustainable Development: Actual Performance

Does Democratic Decentralization actually lead to practices that are sustainable? The literature on this subject is not very encouraging although it must be qualified that there is not much literature that explicitly looks at democratic decentralization and ground water extraction. There is literature that looks at the effect of democratic decentralization on the nature of public investment. An example of this is Rosensweig and Foster¹² who report (based on a study of 250 villages in India) that the replacement of local/traditional methods of village administration with democratization has the effect of changing the nature of expenditure from irrigation projects (preferred by the rich peasants who had hitherto been *de facto* rulers through the village headman) in favour of road building (favoured by the poor as it increases employment). Expenditure on education also receives a boost. They also report that fiscal decentralization not only boosts local governments' incomes but also lowers the cost of public investments. But the consequence for overall economic growth seem to be limited.

Much closer to the theme of this paper is the work by Ratna Reddy *et al*¹³ analyzing the impact of participatory watershed development in certain districts of Andhra Pradesh who conclude that participation is a necessary condition but by no means a sufficient condition for overall improvement in livelihood. For that other complementary programmes like horticulture and dairy development programmes. They also conclude that the benefits from such programmes are not spread equally; the rich benefit more than what the poor do.

4 Some Case Studies

a) Tarun Bharat Sangh

The successes of the Tarun Bharat Sangh (TBS)¹⁴ in Rajasthan in watershed development projects have opened the eyes of policy makers to the possibility of rainwater harvesting as a tool for ensuring the supply of water even in areas with scanty rainfall. It is best exemplified by the experience of Alwar district that had been declared a 'dark zone' (no ground water) in the 1980s by the authorities and activities like agriculture had almost ceased to exist. It is here that the Magsaysay Award winner, Rajendra Singh, the founder of the TBS with the help of the villagers of Kaonta Bhaontala constructed the first check dam in 1985. In 1986, they constructed a *johad* (a traditional crescent shaped pond) at the source of the River Arvari which had become a seasonal rivulet. Other villages too followed suit constructing *johads* in the other catchment areas of the Arvari. When the number of ponds touched 375, the Arvari that had almost ceased to exist, revived and from 1994 became a perennially flowing river.

¹² Foster, A.D. and M.R. Rosensweig, 'Democratization, Decentralization and the Distribution of Local Public Goods in a Poor Rural Economy' 2001, <http://econ.bu.edu/dilipm/ec722/papers/25fosterrosenzweig.pdf>

¹³ Ratna Reddy, V, M. Gopinath Reddy, S. Galab, John Soussan and Oliver Springate-Baginski, 'Participatory Watershed Development in India: Can it sustain rural livelihoods?', *Development and Change*, Vol 35 no 2, 2004

¹⁴ 'The Arvari, Coming Back to Life', Down to Earth, March 15, 1999

What TBS has accomplished is a vindication of the Nurkse-Vakil-Brahmanand¹⁵ thesis, that in a labour abundant economy like India, labour combined with very little capital can bring about a remarkable economic transformation. The economic impact can be gauged for the effect of the investment made by the villagers of Neembi. On an investment of Rs 50,000/- to build two checkdams, Neembi produces vegetables and milk worth Rs 3 crores. This is not the kind of capital-output ratio that can be easily ignored especially by states who are financially constrained.

However ignored it was till 2000 when large areas in India were struck by drought. It was suddenly discovered that the villages under the TBS's area of operations did not suffer from want of water, even though Rajasthan was suffering from drought for three consecutive years. Indeed in some areas the ground water lay only three feet from the surface.

TBS's success must be studied carefully if it is to be scaled up significantly. For the implementation of such exercises, the amount of labour required, the know-how required as well as the information of local geographical and hydro geological conditions is crucial.

Briefly summed the following seem to be the characteristics of the projects undertaken by the TBS. By and large information about the latter is extremely localized. *This would preclude the possibility of a statewide exercise/effort to undertake rainwater harvesting schemes centrally planned and implemented from a state capital.* Indeed, local participation and planning (and in this case even finances) were locally procured.

However not all state governments heeded this lesson. Indeed the government of Rajasthan attempted on number of occasions to demolish the structures that the TBS had set up failing each time in the face of determined opposition of the villagers who have benefited from this scheme. The grounds ran from legal (the state claimed that the TBS had no right to construct the check-dams) to technical (the structure of the check-dam was deemed to be unsafe.) However a group of eminent persons which engineers disputed the state government's claim. In this din, the enormous beneficial effects of the TBS's activities relative to the modest investments made were ignored till drought struck India in 2000.

b) The Power of the Panchayats- A Case of Two States

In the aftermath of the drought of 2000 Prime Ministerial pronouncements that rainwater harvesting should be looked into were heard and two states decided to undertake this on a wide scale. They were Andhra Pradesh and Gujarat

The state government of Gujarat launched the *Sardar Patel Participatory Water Conservation Programme* (SPPWCP) choosing to act through the PRIs. The state government invited proposals from the panchayats and faced an overwhelming response. Initially, the state government had budgeted for approximately 2500 check dams at the cost of Rs 100 crores. However the response and innovation of the PRIs in the state ensured that while the number of sanctioned dams quadrupled to 10,500 the budget only doubled to Rs 200 crores. Impressingly enough, the state government did not bear the entire cost but asked the villagers to bear 40 per cent of the cost. Planning and execution

¹⁵ Nurkse, R, 'Problems of Capital Formation in Underdeveloped Countries,' Oxford University Press, New York 1967. See also Vakil, CN & PR Brahmanand, 'Planning for an expanding economy' Vora & Co. Delhi, 1956

of the project was done by the PRIs themselves. The results of the SPPWCP have been described as 'good.' While there have been cases of corruption, these have been limited. The best results have taken place in those villages where civil society was involved.

The case of Andhra Pradesh is another matter altogether.

The *Neeru Meeru* Scheme in Andhra Pradesh, unlike the one in Gujarat, did not rely on local participation. Here the state relied on contractors and bureaucrats and the results have been poor. Being centralised, they have fallen prey to certain members of the ruling party who utilised the scheme to set a system of patronage. This is easy, as those managing and executing the scheme do not live amongst those who are its beneficiaries. It is also clear that States who have a long nurtured PRIs are also states where participatory schemes will be successful.

But that is not all. The planning for such projects which require as we have previously argued specialised and local knowledge acquired by local people over a long period of time cannot be transferred to external agents like contractors in a small period of time. Additionally what must have undoubtedly to Gujarat's success must have been the fact that 40% of the investment required had to be raised locally as per the state government's guidelines. Thus the villagers had added incentive to see that their investment was productive. The villagers in Andhra Pradesh having invested nothing themselves had less incentive. Here Garelo's¹⁶ point about fiscal coherence becomes particularly relevant. A local government which does not have to fully or partially finance a scheme that it has to implement is likely to be less concerned about the productivity of such investment than one where it is asked to share the cost. Similarly its inputs regarding information are likely to be more relevant when the project in question is thoroughly local one. Taken further we can argue that the greater is the responsibility of the local government in financing its own activities the concerned it is likely to be regarding the productivity of the project.

Indeed, as in the case set out below a village may even take it upon itself to finance the entire project itself.

c) Financing One's Own Plan: The Case of Gandhigram¹⁷

Gandhigram in Kutch, in the face of state government inaction, decided to mobilise the resources it requires to build a check dam in the year 1999. It organised a one-and-a-half million rupee loan from an NRI, a half-million rupee loan (at 16 per cent) from the *Kutch Gramin Bank* and voluntary labour from the residents would contribute an additional seven hundred thousand rupees. The loans are to be paid back in 5 years. Each resident agreed not to irrigate more than 5 acres of land and will share in the maintenance costs. As this dam will help them to grow an additional crop, the profits from this enhanced income is expected to pay for the dam. Again the ability of the local government to encourage/enforce cooperative behaviour enables it to execute this project. State governments, who are far more remote from the villagers than the PRI representatives, will find it impossible to elicit cooperation of this magnitude and

¹⁶ Garelo, Pierre, 'An index of fiscal decentralization for OECD countries' presented at the conference The Role of Government in Asian Economies, Hong Kong, 16-18 September 2004

¹⁷ 'Bank Loans to Harvest Water, A Community in Kutch mobilises Resources to meet its Water Needs' Jalvani, vol3, no2, 2000.

certainly not from all villages of the state. Thus, the link between decentralising power and increasing effectiveness of expenditures on infrastructural expenditures cannot be ignored. As the capital-output ratio declines with decentralised the foundations of an efficient economy as well as a sustainable development model are laid.

It is not being argued that bringing in the PRIs will necessarily enhance the state's irrigation assets. It is quite likely that PRIs being new institutions in this state will not be as dynamic as the Gujarati PRIs have been or be a Gandhigram which has planned, implemented and financed a irrigation scheme from start to finish. But to put a bar on their (PRIs) freedoms is a sub-optimal action because it precludes the possibility of a TBS like organization from taking root in the state and making rainwater harvesting a way of life. Even if such an organization arose, *such an entity as TBS in Rajasthan would be in the unenviable position of trying to enhance the productive capacity of the state in violation of state laws!* The possibility of one enterprising panchayat leading the way and the others following is also discounted. In states like West Bengal observers have noted the success of enterprising panchayats and have asked their local panchayat officials why that success cannot be emulated¹⁸.

Thus it is clear that the link between democratic decentralization and sustainable ground water extraction cannot be dismissed out of hand. *This is because not only do empowered PRIs invest in schemes that augment supply but they are also in a position to control demand given the information that they have and the powers of persuasion that they possess that is denied to a more centralized authority.*

However, democratic decentralization is not the only variable that affects ground water extraction. The rest of the paper discusses the other factors and models that affect water extraction.

Optimal Rate of Ground water Harvesting¹⁹: A Sole Owner Model

In order to understand the meaning of efficient inter-temporal extraction of ground water let us consider a model of aquifer exploitation by treating it as a sole ownership case. Sole owner is presumed to 'internalize' relevant 'externalities'. (In the previous section Gandhigram village may be said to have taken rudimentary steps in this direction.) He knows that action taken today will have consequences for tomorrow and hence he adjusts the rate of extraction.

Following the above, let the objective of a management authority be to maximize the present value of net social benefit. The net benefit is defined as (gross) benefits (B) minus costs (C). Benefits increase with extraction/ harvesting (h), but at a decreasing rate. That is,

$$B = B(h); \quad B'(h) > 0; \quad B''(h) < 0 \quad (1)$$

These benefits are illustrated in the upper panel of Figure 1 by the curve labeled "B".

Harvesting has a cost, which is a function of the rate of harvest, h , and the stock of ground water, x . The resource stock x is called 'state variable' in a dynamic setting.

18 Ghatak, M and M. Ghatak, 'Grassroots Democracy: A Study of the Panchayat System in West Bengal' Prepared for the Conference on Experiments in Empowered Deliberative Democracy, Wisconsin-Madison, January, 2000.

¹⁹ Neher, P.A, (1990).

With x momentarily fixed, extraction h and effort, E are uniquely related by the production function,

$$h = F(x)E \quad (2)$$

with positive but diminishing marginal values of $F(x)$, that is,

$$F'(x) > 0, \quad F''(x) < 0. \quad (3)$$

Note, however, that the marginal and average products of E are the same and equal to $F(x)$.

The cost of extraction depends on the rate of extraction (h) and the stock of water (x):

$$C = C(h, x) \quad (4)$$

This cost function is also represented in the upper panel of Figure 1. It is the solid line labeled "C" and it is drawn for some constant x . It shows marginal cost rising

$$C_h > 0$$

and at an increasing rate

}

$$(5)$$

$$C_{hh} > 0$$

That is marginal cost increases with output in the usual way. Also, extraction cost decreases as x increases, that is,

$$C_x < 0$$

and given h ,

}

$$(6)$$

$$C_{xx} > 0$$

These cost reduction relationships can be seen in the lower panel of Figure 1 where cost is calculated for some given h . Cost declines with x but at a decreasing rate (the curve becomes less steep).

To simplify, let

$$C = wE \quad (7)$$

where w is returns to efforts and then from (2)

$$E = \frac{h}{F(x)} \quad (8)$$

$$\begin{matrix} B(h) \\ C(h,x) \end{matrix}$$

$$C=c(x)h$$

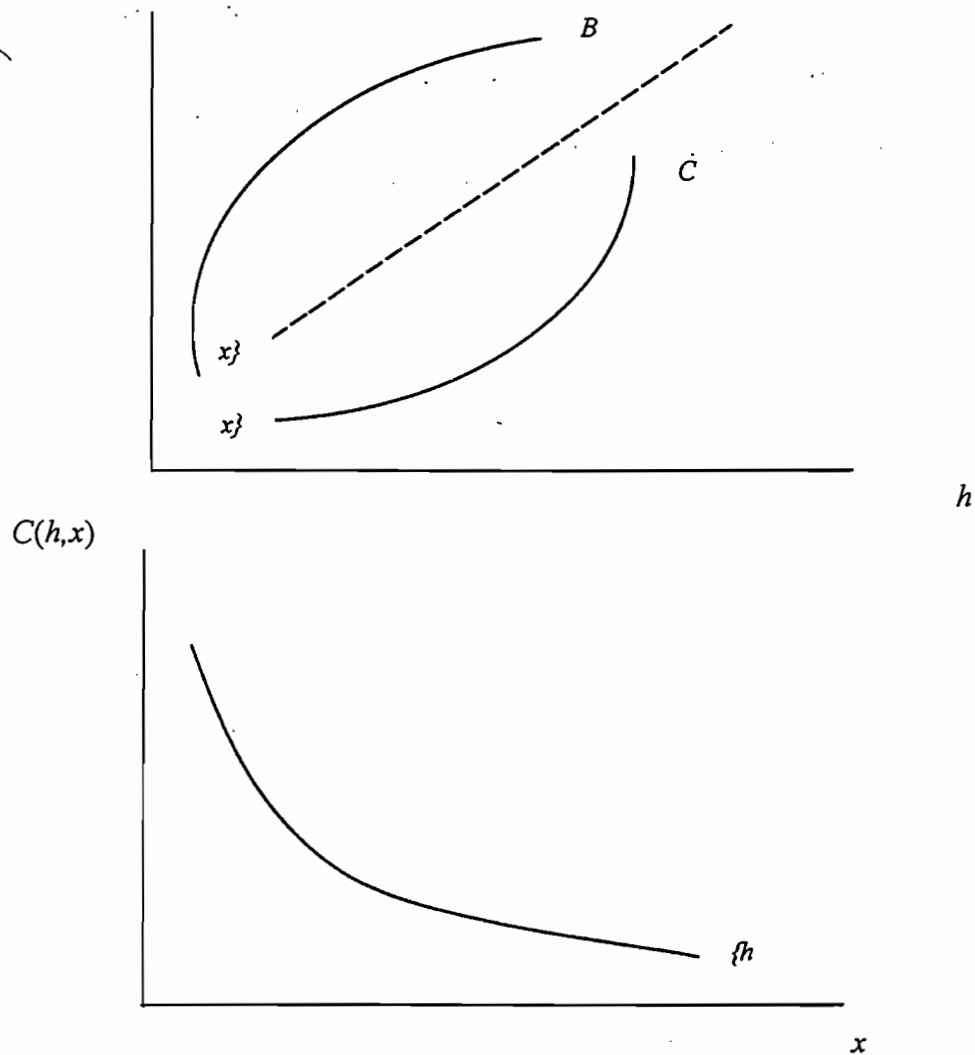


Figure 1 Social Cost and benefit functions

Then

$$C(h, x) = \frac{w}{F(x)} h$$

implying average cost to be $\frac{C(h, x)}{h} = \frac{w}{F(x)}$

Clearly,

$$C_h = \frac{C}{h} = \frac{w}{F(x)}$$

So marginal and average costs are equal, that is

$$c(x) = \frac{w}{F(x)}$$

So that

}

(9)

$$C = c(x)h$$

This is shown by the straight dashed line labeled "C" in Figure 1.

Now, it is straightforward to set up the water authority's planning problem,

$$\text{MAX } V = \int_0^T (B(h) - c(x)h) e^{-rt} dt. \quad (10)$$

This is subject to the dynamic constraint that the stock, x , grows at a constant natural rate G but is depleted by extraction (h). So, V is maximized

$$\text{S.T. } \dot{x} = G - h \quad (11)$$

To start with the dynamic constraint²⁰, the natural growth (recharge) rate is modeled as exogenously determined and constant at G . It is not stock dependant. Of course, as an aquifer becomes "nearly full," it develops "leaks" to the surface through springs and by augmenting streams and rivers. Where G is the exogenous recharge rate²¹ and h is the flow rate of extraction. The aquifer loses volume, and the water table falls if

h exceeds G , reducing x ($dx/dt = \dot{x} < 0$).

Using the Hamiltonian, the problem is written

$$\text{MAX}_{\{h, x\}} [H + x \dot{\lambda}], \quad H = [B(h) - c(x)h] e^{-rt} - \lambda \dot{x}$$

$$\text{S.T. } \dot{x} = G - h \quad (12)$$

The first order conditions are necessary conditions for the optimal solution. They are found in the usual way.

$$H_h = 0 \quad (13)$$

and

$$H_x + \dot{\lambda} = 0 \quad \text{or} \quad \dot{\lambda} = -H_x \quad (14)$$

Also note that

$$H_{\lambda} = \dot{x} \quad (15)$$

This last equation ensures that the dynamic constraint is always in force. Taken together, these three steps reveal conditions that necessarily characterize an optimal program. These conditions are known as Maximum Principle [MP: $q = B'(h) - c(x)$]²², the

Portfolio Balance $\dot{q} + h c'(x) = 0$ ²³ condition, and the Dynamic [DC: $\dot{x} = G - h$]²⁴ respectively.

As per Figure 2, let x be the stock of ground water, $G(x)$ be the rate of recharge and h be harvesting (extraction). We assume an increasing rate of extraction. Note that for a given level of harvesting, there is one sustainable stock of ground water wherein

²⁰ This defines the motion of x over time as the difference between natural growth and the extraction rate. It can be thought of as "nature's own budget constraint".

²¹ Usually measured in Million Hectare Meter or Million Cubic Meter per unit of time i.e., one year in India

²² This ensures that x is properly chosen, no matter what the level of b , so that the net value of the marginal product of x equals the price for it (or marginal cost equals price).

²³ There is PB if the natural asset b is competitive with other assets in the economy that earn a representative rate of return (r).

²⁴ See foot note 15.

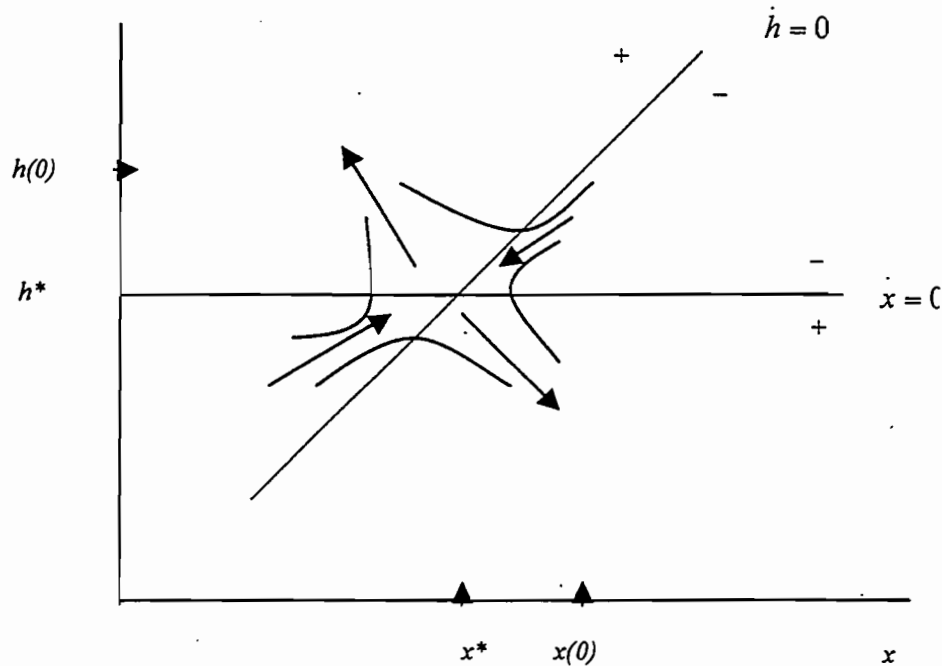


Figure 2 The synthesized solution in (x, h) for the aquifer

natural growth exactly replaces the harvest. It is labeled as x^* . For stock greater than x^* , h exceeds $G(x)$ so x is falling ($\dot{x} < 0$). But if x lies below x^* , then $G(x)$ exceeds h , so x is raising and surplus water can be withdrawn till the point x^* . Hence x^* represents a stable sustainable stock for all h at h^* .

From this we draw,

- 1 Natural stocks be maintained at their maximum natural levels are implying that harvesting should be totally proscribed.
- 2 If h exceeds $G(x^{Max})$, the stock will decline until it is extinguished.

These are some of the considerations to understand the potential fragility of the ground water stocks themselves.

3 Limitations of the Sole Ownership Model as practical policy tool:

Monitoring and allocation of ground water directly would have been possible if there were identical users and none is excluded. In reality neither government nor sole owner owns the ground water. Ground water is a common property concern with individual benefits and collective costs. Fragmented land – too many extractors and ‘ill-defined property rights’²⁵ complicate the meaning of sustainability of ground water

²⁵ Land based water allocation policy has been adopted in many states of India (Northwest India). The basic concept of this policy is that water right accrues from land ownership. It is recognized that every farmer has the right to receive water proportional to his land holding irrespective of the size of land holding. This

resources. Hence indirect measures of controlling over exploitation are of immediate concern. X^* in Figure 2 is the target point given point in time. The indirect macro economic forces like taxes, permits, subsidies, crop pattern, provision for more surface water irrigation, and afforestation are to be modulated in order to achieve the goal.

But as we have seen that in a decentralized polity, especially in one where empowered PRIs operate, some of these externalities can be taken care of.

3.1 Determinants of Ground Water Extraction: A Regression Analysis

In spite of the practical problem associated with direct observation over the ground water exploitation, it is not inconceivable to control exploitation by indirect measures. If we know the causes of exploitation we can explain how to control extraction accordingly with the policy variables concerned. Policies like ban of rice production in water scarce area, and encouraging alternative policies like dry farming, poultry farming, cattle farming etc., can be suggested. For this purpose, we set up a regression model in the next section.

A number of factors, though finite, are responsible for ground water extraction. They are generally classified broadly into four.

- 1 Growth factors – Population and GDP
- 2 Production Structure – Share of Agriculture and Forestry
- 3 Property Rights – Pricing System
- 4 Govt. Policies – Taxes and Subsidies

To this we add a fifth, the existence of experienced PRIs in the state (as defined by us as having been in existence for the last twenty-five years with regular elections.) It is our intention to see whether the presence of this institution affects ground water depletion.

It is very important to notice that ground water is never priced. Hence indiscriminate ground water exploitation at zero cost due to lack of proper function of pricing system is expected. Movement of ground water towards steeper aquifers has posed severe threat to the property rights assignment as the whole process remains unnoticed. Due to the absence of property rights or ill-defined property rights, the economic value of the harvested resource is not accrued to the aquifers. Further, ground water extraction by pumping is indirectly encouraged through subsidies for fuel and electricity. Pricing electricity at a flat rate or even supplying it free instead of on a 'volumetric approach' has led to the over exploitation of scarce ground water resources. Rural and urban water charges are much lower than the cost of provision and suffer from poor operation and maintenance. The result in all sectors has been higher consumption and inefficient cost recovery. Other forms of agricultural subsidies also have led to clearing of forests causing free rainfall runoffs²⁶ directly to the sea and precluding precipitation, percolation, seepage into ground water aquifers. *The purpose of this study is to see whether PRIs have been able to compensate to any degree for government policies that promote ground water depletion or whether it has been able to internalize or eliminate the problems of free-riding.*

practice has led the indiscriminate withdrawals of ground water, as it is available on free of cost (Dhillon et al, 1988).

²⁶ In Gujarat, Bhatia, 1992.

4 The Empirical Model: Cross – State Panel Study

Considering interstate primary and secondary data for the Indian economy, our interest is to see how interstate differences (which includes PRIs) in extraction are responsible for depletion of ground water. For this exercise, the use of multiple regression analysis under single equation regression models is of immense interest. Panel data analysis will be performed as the regression study is on across states over the years.

Methodology is very much similar to the one used in '*Estimating water use in the US: A new paradigm for the national water use information program, Committee on USGS Water Resources Research, National Research Council, 2002*'. A substantial body of work on model structure and estimation methods was performed by the United States Geological Survey (USGS) as stated in Helsel and Hirsch, 1992. Here public water supply including both ground water and surface water is modeled as a function of a set of explanatory variables. The regression estimated by Helsel and Hirsch is given below.

$$PS_{it} = a_0 + b_1 AP_{it} + b_2 GP_{it} + b_3 R_{it} + b_4 T_{it} + b_5 LG_{it} + b_6 LS_{it} + a_i S_i + b_i T_i D_i + \epsilon_{it}$$

PS_{it}	= per capita withdrawal (gallons per day) in state i during year t
AP_{it}	= average price in constant 1995 dollars
GP_{it}	= gross state product per capita in constant 1995 dollars
R_{it}	= total summer season precipitation in inches
T_{it}	= average summer temperature, degrees Fahrenheit
LG_{it}	= indicator for state groundwater law system (equals 1 if prior appropriation, 0 otherwise)
LS_{it}	= indicator for state surface water law system (equals 1 if prior appropriation, 0 otherwise)
a_i	= intercept adjustor for individual states
S_i	= indicator for individual states (equals 1 if the state is included in the model, 0 otherwise)
b_i	= trend coefficient describing changes in withdrawals in gpcd per year for individual states
D_i	= indicator for state-specific trend (equals 1 gpd if the state is included in the model, 0 gpd otherwise)

Findings of the model are as follow;

Dependent/Explanatory Variable	Regression Coefficient	t-Ratio	F-value	Probability
Intercept (gpcd)	115.881	3.28	0.0012	
Average price of water (\$/1,000 gal., real 1995 dollars)	-7.779	-2.63	0.0091	
Gross State Product per capita (\$1,000, real 1995 dollars)	1.676	3.22	0.0015	
Precipitation in summer months (May to Sept., in inches)	-2.119	-4.02	0.0001	
Average temperature during summer (Fahrenheit degrees)	0.983	2.15	0.0326	

Indicator of states with prior appropriation groundwater rights system	29	136	3.05	0.0027
Indicator of states with prior appropriation surface water rights system	17	218	1.81	0.0716
NOTES: Mean water use = 183.7 gpcd; $n = 192$; $R^2 = 0.52$; mean APE = 12.9%; root MSE = 31.6 gpcd.				

The size and signs of the estimated regression coefficients fall within the ranges of expected values. For the purpose of the study of local condition of Indian states, inclusion and exclusion of appropriate variables are accordingly done. Depending on the purpose for which the estimates are used, the dependent variable (i.e., extraction) can be presented in different ways. For example, in studies of surface and groundwater resources, the data are usually available as yearly withdrawals at a point such as a river intake or a well. Because the water withdrawn is typically used (or applied) over a larger land area, an equivalent hydrologic definition of water use would be the use of water over a defined geographical area (e.g., an urban area, a county, or a state). Total water use within a larger geographical area such as a country or state can be presented as a sum of water use by several groups of users within a number of sub areas.

Generally, water use at any level of aggregation can be modeled as a function of one or more explanatory variables.

$$E_{it} = \alpha_i + \sum_j \beta_j X_{it} + \epsilon_{it} \quad (1)$$

where E_{it} represents extraction within geographical area i during year t , X is a set of j explanatory variables, which are expected to explain variation in extraction, and ϵ_{it} is a random error term. The coefficients α_i and β_j can be estimated by fitting a multiple regression model to the historical data.

4.1 Model Estimation:

An estimate of groundwater withdrawals for any state and year can be made using the model (1). The variables are chosen in a way that the government can bring in policy implications accordingly with the results. As yet, extraction as a function of variables like rainfall, temperature, precipitation, evaporation, permeability, geologic structures and etc, are considered to be exogenous and hence are not included in the model.

Helsel and Hirsch's model considers total water supply including both ground water and surface water. Fortunately, there exists an efficient property right system for both the sources of water supply and the federal system is the sole supplier of water. Hence it is modeled as a function of mainly average price and SDP. But in case of India, due to the absence of efficient property rights (even ill-defined) system, the concept of sole owner is jolted. Ground water is zero priced. Hence we are interested to check in the true conditions (local) which would explain ground water extraction in India. Following, we model our dependent variable as

$$Extraction_{it} = \alpha_i + \beta_1 Agriculture_{it} + \beta_2 Canal Irrigation_{it} + \beta_3 Subsidies_{it} + \beta_4 Forest Cover_{it} + \beta_5 Population Density_{it} + \epsilon_{it} \quad (2)$$

Where,

Extraction _{it}	Ground Water Withdrawal (mhm) in state i during t
Agriculture _{it}	Share of Agricultural product in State Domestic Product in state i during t at 1993-94 prices
Canal IR _{it}	Area Irrigated by Canal Irrigation in State i during t
Subsidies _{it}	State Agricultural Subsidies in i state during t
Forest _{it}	Actual Forest Area in Square Km in State i during t
Pop Density _{it}	Population Density in State i during t

4.2 Sources of Information and Data:

For the purpose of modeling, we explore the structure of the past Central Ground water Board (CGWB) state-level aggregated groundwater use data, based on corresponding (and routinely collected) demographic, economic, and climatic data. The purpose of this inquiry is to determine if multiple regression models have the potential to explain the temporal and geographic variability across India of the aggregated groundwater use estimates produced by the CGWB. According to the availability of data on all the required variables 14 states²⁷ have been chosen for the years from 1988 – 2000 with 4 years internal gap²⁸.

Variables	Components	1988-89	1992-93	1996-97	2000-01
Extraction	Gross Draft in MCM (Irrigation+Domestic+Industrial)	1988-89	1992-93	1996-97	2000-01
Source: Ground Water Statistics, CGWB, Ministry of Water Resources, Faridabad					
Agriculture	Agri/SDP in 1993-94 Prices	1988-89	1992-93	1996-97	2000-01
Source: Statistical Abstract of India					
Canal Irrigation	Area Irrigated in Hectares	1988-89	1992-93	1996-97	2000-01
Source: Statistical Abstract of India					
Subsidies	Fertilizer+ Power+ Irrigation	1988-89	1992-93	1995-96	Extrapolated
Source: Acharya, S. S, (2000), 'Subsidies in Indian Agriculture and their Beneficiaries', Agricultural Situation in India, Volume LVII, August, Number 5, pp 251-260 (Library, Directorate of Economics & Statistics, Ministry of Agriculture)					
Forest Cover	Area in Sq.Km	1989	1993	1997	1999
Source: State of Forest Report 2001, Forest Survey of India, Ministry of Environment and Forest.					
Population Density	Pop per Sq.Km	1998	1992	1996	2000
Source: Statistical Abstract of India					

²⁷ Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal (See Appendix 1 for details).

²⁸ Cross state analysis for the years 1988, 1992, 1996 and 2000.

5 Regression Estimates – A Choice: Analysis of Results

5.1 What is expected from Regression?

Ground water extraction is mainly due to agriculture. Gross area irrigated by tube wells, dug wells and other wells over the years has increased in most of the states. Irrigation accounts for nearly 90% of total extraction. The water level in several parts of the country has been falling rapidly due to the indiscriminate increase in wells drilled for irrigation of both food and commercial crops. Advent of “Green Revolution” had also led to the depletion of ground water. To put it straight, green revolution is rather due to ground water. With the use of HYV seeds and fertilizer all the more water is required for the maturity of crops. Green revolution was characterized by land-saving but water-using technologies whereas dryland areas needed water-saving enterprise and practices which optimize output per unit of scarce water. In the absence of such technologies, the farmers in the dryland areas go in for water-intensive crops like rice when water resources are conserved giving rise to conflicts on water and scarcity of drinking water. The rapid increase in the agro-chemical use in the past 5 decades has contributed significantly to the pollution of ground water²⁹. This has resulted in the contamination of ground water. Hence water resources have been rendered unsafe for human consumption as well as for other activities such as irrigation and industrial needs. This illustrates that degraded water quality can in effect contribute to water scarcity as it limits its availability for both human use and the eco-systems, Further it exacerbates the extraction which is an instant cause of increased demand out of scarcity. By nature, canal water is near substitute to ground water. More the area irrigated by canal water, lesser the ground water extraction. Subsidies which have been under consideration are specifically agricultural subsidies. They constitute a sum of fertilizer subsidy and electricity subsidy. They are basically input subsidies. For instance, provision of free electricity or even charging at a flat rate has been a state policy in most of the states. More the subsidy more is the extraction. Before expecting the sign of the forest coefficient, we would want to distinguish between national and plantation forests. Generally, forests help recharging the ground water aquifers. In the absence of plant cover, the run-off rate is accelerated. ‘In Gujarat, denudation has played an important role in accelerating run-off and reducing ground water recharge. Just as denudation is a cause of increasing water scarcity, the disruption of the hydrological cycle itself contributes to the disappearance of forests. The latter problem should be a cause of deep concern in its own right’ (Bela Bhatia, 1992). An increased forest cover would support higher recharge resulting in an increase in the water tables. Increased water table is associated with low cost of extraction. Hence forest cover and extraction are expected to move together. Further, in an effort to keep the environmental balance, most of the state governments have resorted to protect the forest areas and plantation of forest (afforestation), maintenance of zoo, etc, are all of immediate concern which would require lots of watering leading to extraction. Population density has strong impact on increased water demand over the years. Population has been rapidly increasing over the years which has increased the demand for water making the per capita availability of water per year to decline rapidly, and projected per capita

²⁹ Usage of agro-chemicals rose from less than 1 million tones in 1948 to a maximum of 75 million tones in 1990 (CSE, 1999).

availability for 2025 alarms the 'WATER STRESS' as it falls below 1700 cu m³⁰ per year.

5.2 Fixed Effects Vs Random Effects:

Method	Fixed Effect			Random Effect		
Variables	Coefficients	t	P> t	Coefficients	z	P> z
Constant	-24024.95	-3.59	0.001	173.5732	0.03	0.973
Agriculture	4958.95	1.29	0.205	5438.728	1.04	0.296
Canal IR	-0.1135907	-0.13	0.899	2.272487	1.98	0.047
Subsidies	1.31742	4.36	0.000	1.286212	3.14	0.002
Forest Cover	1.035361	5.19	0.000	0.1248539	1.86	0.063
Pop Density	14.41316	2.92	0.006	16.4506	2.74	0.006
Number of Observations = 56						
Number of Groups = 14						
	R-Sq:	Within	0.6917	R-Sq:	Within	0.4908
		Between	0.026		Between	0.3605
		Overall	0.0271		Overall	0.3599
	F(5,37)	16.61		Wald Chi-Sq	38.39	
	P>F	0.0000		P > Chi-Sq	0.000	
	Corr(Ui, Xb)	-0.937		Corr(Ui, X)	0	
				RE Ui	Gaussian	
	Sigma u	33964.737		Sigma u	5638.1689	
	sigma e	1143.3073		sigma e	1143.3073	
	rho	0.99886818		rho	0.96050436	

5.3 Hausman Specification Test:

Coefficients			
Extraction	Fixed Effects	Random Effects	Difference
Agriculture	4958.95	5438.728	-479.778
Canal IR	-0.1135907	2.272487	-2.386078
Subsidies	1.31742	1.286212	0.0312079
Forest Cover	1.035361	0.1248539	0.9105068
Pop Density	14.41316	16.4506	-2.037433

Test: Ho: difference in coefficients not systematic

$$\chi^2(5) = (b-B)'[S^{-1}](b-B), S = (S_{fe} - S_{re})$$

$$= 23.51$$

$$\text{Prob}>\chi^2 = 0.0003$$

8.4 Breusch and Pagan Lagrangian Multiplier Test for Random Effects:

$$\text{extrn}[\text{state}, t] = Xb + u[\text{state}] + e[\text{state}, t]$$

³⁰ Seckler et al. 1998, Sustainability Development Index.

Estimated results:		
	Variance	sd = sqrt(Var)
Extraction	1.38e+08	11732.49
e	1307152	1143.307
u	3.18e+07	5638.169

Test: $\text{Var}(u) = 0$

$\text{chi2}(1) = 35.62$

$\text{Prob} > \text{chi2} = 0.0000$

- Based on Hausman specification test, we obtain the test statistic of 23.51, which far exceeds the 95 % critical value for Chi – Squared with 5 degrees of freedom, 1.145476.
- Based on least squares residuals, we obtain Lagrange Multiplier test statistic of 35.62, which far exceeds the 95 % critical value for Chi – Squared with 1 degree of freedom, 0.00393.

At this point, from both the tests, we conclude that the classical regression model with a single constant term is inappropriate for these data. The result of the tests in both the cases is to reject the null hypothesis in favour of random effects model.

8.5 Analysis of Results: Fixed Effects Model

The size and signs of the estimated regression coefficients fall within the range of expected values. These coefficients can be interpreted to mean that across India (14 states), from 1988-2000, the mean withdrawal was 16511.52 Million Cubic Meters (MCM) from the data. This average withdrawal would -

- Increase by 4958.95 MCM if the share of agriculture in SDP were increased by Rs. 1 Lac/SDP.
- Decrease by 0.1135907 MCM if the area irrigated by canal water were increased by 1000 hectares.
- Increase by 1.31742 MCM if subsidies were increased by Rs. 1 Crore.
- Increase by 1.035361 MCM if forest Cover were increased by 1 Square Kilometer.
- Increase by 14.41316 MCM if population density were increased by 1 per Square Kilometer.

8.6 Least Squares Dummy variable (LSDV) Model:

The predictions from the model in Table 2 can be improved by supplementing them with information that is contained in model residuals (i.e., differences between actual and predicted values). This can be done by introducing binary variables, which designate individual states. In a model with binary state indicator variables, the average value of residuals for each state is added to the predicted value for that state thus reducing the prediction error. Similarly, if the state residuals contain an increasing or decreasing time trend, such a state-specific trend can also be added to the prediction. However, the addition of separate intercepts and time trends for some states does increase the number of model parameters. If the resulting model is over-specified, the coefficients of the continuous variables, which form the structural component of the model, may be biased. Such bias is small when the inclusion of a state-specific intercept (or trend) does not

result in an appreciable change in the value of the estimated coefficients of the structural variables.

Consider the model,

$$E_{it} = i\alpha_i + \sum_j \beta_j X_{it} + \epsilon_{it} \quad (3)$$

usually referred to as 'Least Squares Dummy variable' (LSDV) Model.

The Summary of the estimation is as follow;

Model	R	R Square	Adjusted R Square	Std. Error	Durbin-Watson
1	.997	.994	.991	1143.3071	2.052

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	7522456396.415	18	417914244.245	319.714	.000
	Residual	48364592.175	37	1307151.140		
	Total	7570820988.590	55			

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	477.6821	54263.3086	16511.5198	11694.9534	56
Residual	-2065.0293	2455.6211	9.257E-13	937.7400	56
Std. Predicted Value	-1.371	3.228	.000	1.000	56
Std. Residual	-1.806	2.148	.000	.820	56

Coefficients

	Variables	Unstandardized Coefficients		Std Coeff	t	Sig.
Model		B	Std. Error	Beta		
1	CONSTANT	-34061.066	9295.889		-3.664	.001
	AGRI	4958.950	3847.493	.046	1.289	.205
	CANAL	-.114	.887	-.007	-.128	.899
	SUBSIDY	1.317	.302	.125	4.362	.000
	FOREST	1.035	.199	2.896	5.192	.000
	DENSITY	14.413	4.942	.254	2.916	.006
	Andhra Pradesh	-4288.573	1294.430	-.095	-3.313	.002
	Bihar	10770.608	4405.993	.239	2.445	.019
	Gujarat	28310.588	6591.894	.627	4.295	.000
	Haryana	33976.698	9219.341	.753	3.685	.001
	Karnataka	2052.048	2773.766	.045	.740	.464
	Kerala	14073.658	7615.105	.312	1.848	.073
	Madhya Pradesh	-91277.236	17493.665	-2.022	-5.218	.000
	Orissa	-14137.902	974.682	-.313	-14.505	.000
	Punjab	46561.944	9050.816	1.031	5.145	.000
	Rajasthan	25619.055	6554.869	.567	3.908	.000
	Tamil Nadu	30159.598	5919.898	.668	5.095	.000
	Uttar Pradesh	37312.801	4104.962	.826	9.090	.000
	West Bengal	21372.389	8220.829	.473	2.600	.013

Interpretation of LSDV model is not so important. It is customary to introduce $n - 1$ dummies for n characters. It is left to the researcher to choose the state to be dropped to avoid 'dummy variable trap'. Here in our 14 states model, Maharashtra has been dropped. State specific intercept terms change as one changes the state to be dropped. In relation to Maharashtra all the states intercept coefficients are statistically significant except for Karnataka. Andhra Pradesh, Madhya Pradesh and Orissa have shown negative extraction.

8.7 Least Squares Dummy variable (LSDV) Model: Some Evidence to the Effectiveness of the PRIs

But what of the impact of PRIs when it comes to water extraction in the various Indian states. This section attempts to show that the predictions from the model in Table 2 can be improved by supplementing them with information that is contained in model residuals (i.e., differences between actual and predicted values). This can be done by introducing binary variables, which designate individual states. In a model with binary state indicator variables, the average value of residuals for each state is added to the predicted value for that state thus reducing the prediction error. Similarly, if the state residuals contain an increasing or decreasing time trend, such a state-specific trend can also be added to the prediction. However, the addition of separate intercepts and time trends for some states does increase the number of model parameters. If the resulting model is over-specified, the coefficients of the continuous variables, which form the structural component of the model, may be biased. Such bias is small when the inclusion of a state-specific intercept (or trend) does not result in an appreciable change in the value of the estimated coefficients of the structural variables.

Thus consider the model,

$$E_{it} = i\alpha_i + \sum_j \beta_j X_{it} + PRI + \epsilon_{it} \quad (3)$$

usually referred to as 'Least Squares Dummy variable' (LSDV) Model. Here we have introduced one more dummy for democratic decentralization which takes the value of 1 if the state has a sustained tradition of PRIs operating in it and 0 if the state has not had this experience³¹. We have observed that Gujarat, Kerala, Maharashtra and West Bengal – these four states to have continued PRIs and hence we have assigned them 2 and 1 for the rest of the states. We expect the sign of the PRI coefficient to be negative. *A negative extraction would mean a lower extraction or controlled extraction or lower misuse and/or a higher recharge.*

The Summary of the estimation is as follow;

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.997	0.994	0.991	1,143.30711	2.052

ANOVA

³¹ Gujarat, Maharashtra, West Bengal and Kerala have long had a tradition of holding regular elections to the PRIs even before the passage of the 73rd Constitutional Amendment that required all Indian States (except the state of Jammu and Kashmir) to do so. But many states have been tardy in the implementation of this amendment.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7,522,456,396.415	18	417,914,244.245	319.714	0.000
	Residual	48,364,592.175	37	1,307,151.140		
	Total	7,570,820,988.590	55			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19,192.148	12,838.710		1.495	0.143
	agri	4,958.950	3,847.493	0.046	1.289	0.205
	canalir	-0.114	0.887	-0.007	-0.128	0.899
	subsidy	1.317	0.302	0.125	4.362	0.000
	forest	1.035	0.199	2.896	5.192	0.000
	density	14.413	4.942	0.254	2.916	0.006
	pri	-15,940.412	5,617.027	-0.619	-2.838	0.007
	ap	-41,601.374	3,460.791	-0.921	-12.021	0.000
	bihar	-26,542.193	2,406.284	-0.588	-11.030	0.000
	gujrat	3,469.100	1,696.323	0.154	2.045	0.048
	haryana	-3,336.103	6,590.459	-0.074	-0.506	0.616
	karnataka	-35,260.753	2,705.182	-0.781	-13.035	0.000
	kerala	-3,649.365	592.505	-0.162	-6.159	0.000
	mp	-128,590.037	20,407.737	-2.848	-6.301	0.000
	mh	-10,686.194	4,110.414	-0.473	-2.600	0.013
	orissa	-51,450.703	4,206.365	-1.140	-12.232	0.000
	punjb	9,249.143	6,398.141	0.205	1.446	0.157
	rajasthan	-11,693.746	4,580.098	-0.259	-2.553	0.015
	tn	-7,153.203	3,926.679	-0.158	-1.822	0.077

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	477.6821	54,263.3086	16,511.5198	11,694.95338	56
Residual	-2,065.02930	2,455.62109	0.00000	937.73995	56
Std. Predicted Value	-1.371	3.228	0.000	1.000	56
Std. Residual	-1.806	2.148	0.000	0.820	56

As expected the sign of the PRI coefficient is negative and the value of t is 2.838 which is statistically significant at 1% confidence interval. This coefficient can be interpreted to mean that across India (14 states), from 1988-2000, the mean withdrawal was 16511.52 Million Cubic Meters (MCM) from the data. This average withdrawal would decrease by 15940.412 MCM if the state practices the continued PRIs. Bias is small or even zero in this case as the LSDV model has not resulted in an appreciable change in the value of the estimated coefficients of the structural variables. State

dummies presented are usually compared with the state dummies dropped. In our model, Uttar Pradesh and West Bengal are dropped and in comparison to these two states, Gujarat and Punjab have shown higher extraction and rest of the states drawing lower water.

9 Conclusions and Policy Suggestions

9.1 Conclusion:

An important ground water allocation issue is how to evaluate current versus future use of ground water. Unfortunately, states rarely consider future ground water uses in establishing ground water allocation policies dealing with ground water depletion. The states that do have explicit policies to limit ground water depletion typically simply prohibit additional ground water uses and do little to regulate current ground water uses to extend aquifer life. There is unfortunately too little attention given to regulating existing ground water uses to lengthen aquifer life, let alone any explicit quantitative evaluation of the trade-off between current and future ground water use. Consequently, ground water valuation has historically played almost no role in state ground water allocation policies. Ground water policies in most states could be strengthened by acknowledging ground water's future value.

To understand the problem better we have posed the ground water problem in sole ownership framework. We have tried to explain the nature of state variable, stock of water and control variable, harvesting. Using Hamiltonian, we have solved for the sole owner's objective function with respect to a dynamic constraint. We have discussed the motion of the function where we have proposed an optimal rate of harvesting given the stock of water. Further we have posed the problem under two regimes – controlled and uncontrolled, wherein we prove that uncontrolled regime is costlier than controlled regime and the benefit of the latter for sustainable harvesting of ground water resources. We have also proposed alternatives such as taxes and permits to control indiscriminate harvesting.

Here democratic decentralization especially in the form of empowered PRIs can alleviate a problem caused by unwise government policies and the state of the undefined nature of property rights when it comes to common property resources like ground water. These institutions have the potential of internalizing externalities and thus arriving at a more optimal solution regarding ground water usage. Indeed even investments to augment water supply/stock may be undertaken as the free-rider problem is also simultaneously tackled.

In the absence of empowered PRIs, certain facts come painfully to light, viz that no one owns ground water due to ill – defined property rights, too many extractors (heterogeneous users), controlling harvesting is practically not possible. In spite of the practical problem associated with direct observation over the ground water exploitation, it is not inconceivable to control exploitation by indirect measures. We, from a broad literature survey, have found a set of factors determining the ground water extraction such as SDP, population, urbanization, forest cover, subsidies and most importantly for this study PRIs etc. Juxtaposing all these factors, we have formed five policy variables and one institutional variable (i.e. the PRI). We have set up a regression model which would explain the variation in extraction by a set of policy variables as well as the institutional variable. In our experiment we have found out the determinants of ground

water extraction and have proposed some of the indirect methods to control over exploitation of ground water. An empirical model has been used for this purpose. The model is tested using interstate analysis of the Indian Economy for the period of 1980 – 2000. Since the model constitutes pooled (Time Series & Cross Section) data across states over the years, Panel Regression Analysis has been performed. From this exercise we found that forest, subsidies and population density appearing as key factors in explaining the ground water extraction. On the basis of these findings we thus suggest in this paper certain indirect policy measures for sustainability of ground water. But we have also demonstrated that states with empowered PRIs also do well from the point of view of sustainability.

9.2 Policy Suggestions:

From this exercise we found that forest, subsidies and population density as well democratic decentralization appearing as key factors in explaining the ground water extraction. With respect to forest, if nothing other than protecting forests, afforestation are to be suggested. Stringent direct and indirect measures of population control programs should be implemented keeping well in mind that the per capita availability of water and alarming 'WATER STRESS'.

Proper crop management policy is required. Water intensive crop should be encouraged to cultivate in water abundant states and districts within states. Production planning should be on the basis of 'Comparative Advantage'.

Dealing with subsidies requires special attention, as it also invokes the global market in terms of AOA under WTO. Government's recent procurement price policy, indiscriminant subsidies and other likely mechanisms have resulted in higher extraction of ground water in states like Punjab, Haryana, Rajasthan, Andhra Pradesh and Gujarat where the water problem is acute.

Government should discriminate between states encouraging those states with subsidies to grow water intensive crops where water is abundant and discourage where water is scarce. Encouraging dry farming in water scarce states via subsidies would do the most required job. Understanding the necessity of water, agricultural production, rural base, etc, in a developing country like India, we would argue that we are not against subsidies scheme. Prioritizing and supporting the production of state specific crops according to availability of water (comparative advantage), and yet resulting inter and intra-regional trade would help states gain and hence consequent achievement of self-sufficiency, and sustainable development of ground water resources.

But the main contention of this study, that democratic decentralisation leads to more sustainable policies and thus Indian states must implement the 73rd Constitutional Amendment in its true spirit is also borne out. Empowered Panchayats promote participatory decision making and implementation. Such bodies have the kind of relevant information as well as the social resources to reduce the free-rider problem so endemic in common property resources. Thus the central government should encourage those states which empower their panchayats with financial resources and powers with matching grants tied to micro-irrigation projects.

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Workshop: Water poverty and social crisis
Perspectives for research and action

Agadir – Morocco
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Public-Private-Partnership in Water Governance

1. Introduction

On March 2006 the 4th World Water Forum will take place in Mexico-City. Under the topic „Local Actions for a global challenge“ governments, NGOs and multinational corporations will discuss the future of global water management. This paper aims to point out the meaning of water in global governance since international and national conflicts have arisen in both social and economical aspects about the privatization of water. Historically, water has been like air a public good under the level of governmental jurisdiction and has been excluded from the economic sphere. However, IMF and World Bank developed studies which have helped to promote the privatization of water and the liberalization of the water market in order to improve water supply and provide fresh water for all people, because corruption and public mismanagement excluded a number of especially poor people from the access to fresh and purified water. World's leading food and beverage companies like Nestlé took the chance to establish a worldwide water business which includes not only the manufacturing production of fresh and embottled water but also the implementation of water management training programmes for local communities.

Nevertheless, privatization of water springs, fresh water lakes, and urban supply, technology and distribution monopoly have given companies a strategic position with the usage of the public good water and escalated the exclusion of active and effective participation of the majority of the population. The UN Global Compact, initiated by UN-General Secretary Kofi Annan in 1999, was the first approach to establish a new public-private-partnership in which multinational corporations should demonstrate their ethical responsibility for sustainable development. However, critics say that many companies use this tool only for image purposes less for a real improvement of private-public global water governance. This analysis wants to define and evaluate the recent developments in water business and its private governance of the public good water. Furthermore, it depicts and discusses the risks and potentials in both developed and developing countries by considering the increasing weakness of state's legislation. Finally, it reflects the ensuing questions over property rights, human rights and sovereignty in the context of good governance and eventually it recommends new approaches in public-private-partnership for sustainable, just, legal, participative and effective global water governance in order to reduce poverty on the large scale.

2. PPP in the context of Water Stress

Public-Private-Partnership (PPP) for water management is not really a new term, but nowadays very frequently used as a magic word for political solutions: to provide fresh water for all people in the world. PPP describes mostly a joint venture based on a

contract between a multi-national water corporation or a private sector service provider and a "local government in which the former contracts to design, build and operate water-treatment and supplies for a pre-determined period. This will force governments to provide a congenial regulatory environment for the growth of the investing company and eventually prepare to hand over the water utility to the private sector" (Sharma, 2002). PPP started in the 17th century with privately sponsored ship-building endeavors and is nowadays mainly used for road-construction. In theory, in the framework of PPP the public authority retains the regulatory control, the set of environmental protection and quality standards, and keeps the ownership. The management can be delegated to the private operator which may attract foreign investment. PPP is principally based on concessions for a period of 20 to 30 years, in which the concessionaire has to deliver services to the customers. A very popular model of PPP is the building, operating and transferring (BOT) of new water facilities for drinking water or sewage treatment by a contracted company, where the public authority pays for this service like in the case of Johor Bahru in Malaysia. Lease Agreements, operation and maintenance and management support contracts are also PPP patterns. Many OECD countries have applied different models. France, for example, has the water supply in public ownership, but the management is a mix of PPP, and the municipal authorities act as economic regulators. In spite of the discussion about the increasing private sector participation in the water sector, only five percent of the world's population is provided with drinking water through private operators (Borkey, 2003).

PPP has benefits, but also disadvantages. Benefits are better quality, increased competition, innovation, efficiency, risk transfer; mostly a cheaper price for customer and taxpayer, and finally the project is monitored by the government. The main disadvantage is the privatization of a public good which may lead theoretically to a monopolized private good. Other arguments against PPP are according to Donald Tate the risks involved in relying on private firms, the labor and employment concerns and the diversion of revenues into profits:

"It is well known that private sector operations rely for their viability on making a profit. Often the criteria for profitability is (sic!) over 10% of operating revenue. Accordingly, these profits must be derived from the revenues paid through user fees. The private sector claims that efficiencies introduced through private operations will more than offset this need to make a profit and might even result in lower user charges. This claim remains unproven in aggregate, although there are many anecdotal claims that the efficiencies of privatisation are so great that they need for profitability is more than offset. There is also evidence from some areas, for example in Great, that private water companies may diversify into other areas with water servicing becoming relatively less important. For example, in, where large sections of watersheds have been turned over to private water companies, the water companies are actively pursuing profitable land sales, an activity not anticipated when the very substantial privatisation services occurred."¹

Vandana Shiva, Founder of the "Research Foundation for Science Technology and Ecology" and author of the successful book "Water Wars", developed three negative consequences from PPP as the result of the transformation of a democratic to a corporate (private) state:

"The first is it inevitably leads to the privatization of the state. [...] Executives, individual bureaucrats in power, usually with a kickback or a bribe, sign off something that does not belong to the state. Water. It is not the property of the state. Water belongs to the people and the earth. It is a community resource, common property. Common property cannot become state property. But private-public partnerships assume water to be a state property, to then be privatized to a private corporation. But the very action privatizes the state and stops it from being a public entity. That to me is the single most crucial damage that it does.

¹ http://www.greatlakesdirectory.org/032603__great_lakes.htm

Second, it takes what is a community resource and transfers it into a monopoly right. A distortion. First, a monopoly of the state and then a monopoly of the corporation that takes over. And the third damage it does, it leaves no accountability system either within a public-oriented state regulation or commons-oriented community regulation to regulate use."²

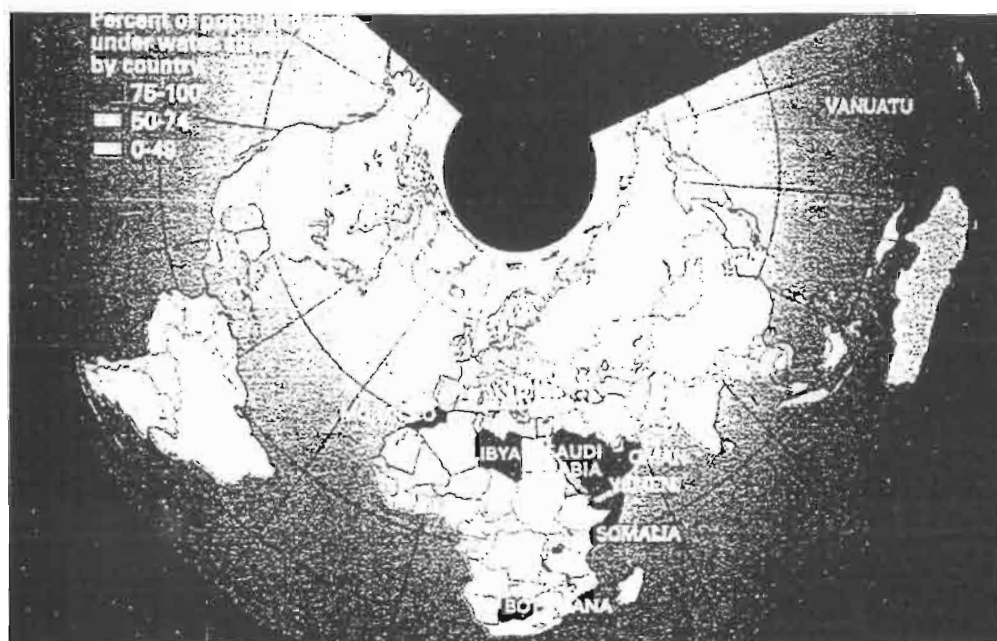
At first sight, facts may undermine the thesis of the necessity of PPP. On our planet, more than 1.1 billion people don't have access to fresh and purified water. 63 percent from them live in Asia, 28 percent in Africa. Moreover, 2.4 billion people don't have access to sanitation facilities, 80 percent in Asia, and 13 percent in Africa (WHO 2000). Consequently, the lack of water means a lack of hygiene and health and is a clear indicator for poverty and sub-development. In order to realize the Millennium Goals of the UN, to reduce the number of people living without access to fresh water by 50 percent due 2015, and eventually to 100 percent due 2025, the World Bank estimates that investment in the water sector must be risen from 60 to 80 Billion USD to 180 USD annually in order to provide freshwater access for more than 100 million people each year until 2015. The final declaration of the Third World Water Forum 2003 in Kyoto contained the good will of states and international organizations to double the technological and financial resources.

Most governments believe that they could only achieve with PPP this goal. But what does PPP actually mean for the performance of a political system? If the state doesn't have sufficient recourses to fulfill the need of its citizens, it has normally the option to raise taxes. There can be no doubt that people wish to live with access to fresh water and sanitation facilities. In democratic societies people may vote for those political parties or leaders who may promise this. But even in authoritarian regimes the ruling party needs legitimacy unless military oppression works perfectly.

Researchers of the University of New Hampshire have developed the relations between population density and water availability (National Geographic, 9/2002, 15), and stated that almost two billion people suffer serious water stress. Highly water-stressed population is defined if people use more than 40 percent of available renewable water. A look on the maps (see for water stress in regions: National Geographic, 9/2002, 15) shows evidently that water stress occurs especially in non-democratic and less free countries like in North Africa, Middle East, Central and South Asia like Pakistan parts of West India and huge parts of the North China Plain. Though regions in the United States (Great Plains), Mexico City, Australia and some European counties like in Spain and Belgium are affected by water stress, western and wealthy nations can compensate more easily the high demand of fresh water of growing population by recycling wastewater, tapping deep aquifers, importing food or even desalinating seawater. But future will be more stressful: by 2025 four billion people – 50 percent of the planet's population – could have an insufficient supply of fresh water. And most water is used for irrigated agriculture, almost around 70 percent of all water use.

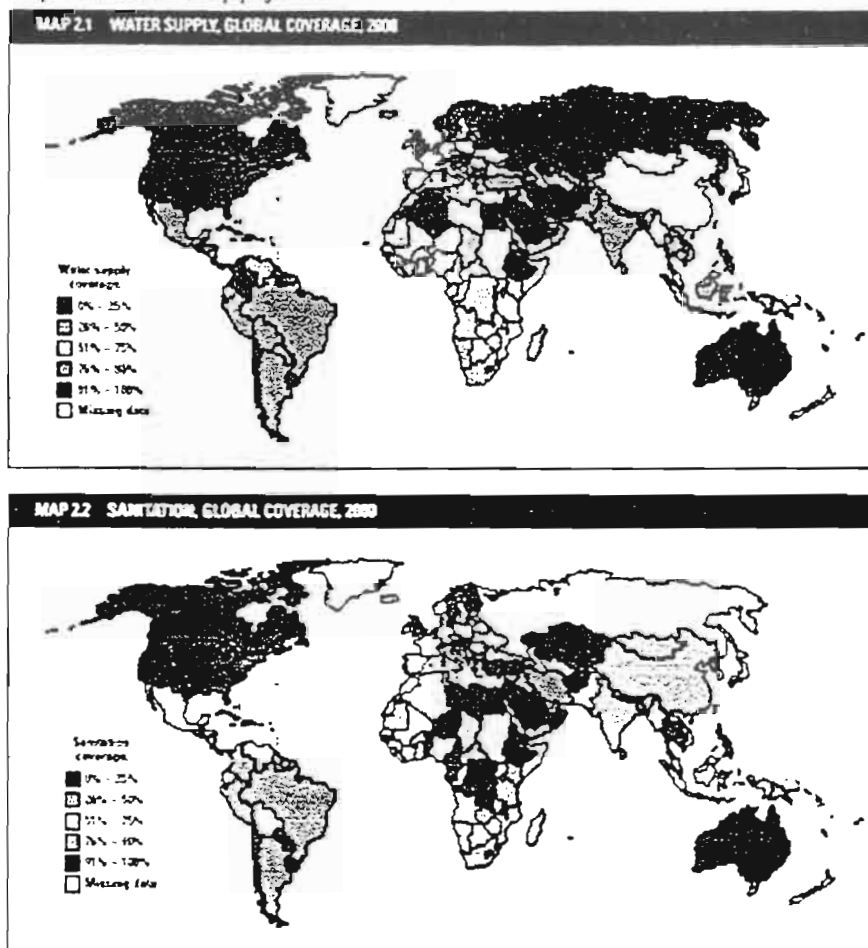
² Nic Paget-Clarke (2003): Resurrection of commons, community rights, and direct and basic democracy. Interview with Vandana Shiva, Motion Magazine, 6 March, <http://www.inmotionmagazine.com/global/vshiva3.html#Anchor-Water-35882>.

Map 1: Water Stress



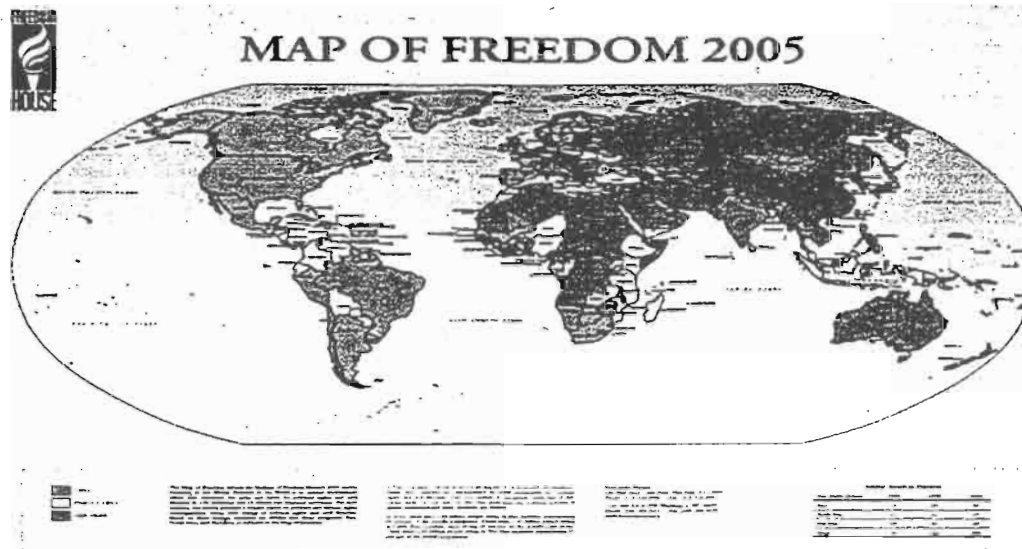
Source: National Geographic, 9/2002, 15.

Map 2: Water Supply and Sanitation



Source:
http://www.who.int/docstore/water_sanitation_health/Globassessment/Global2.3.htm#Maps%202.1%20and%202.2

Map 3: Freedom House Index



Source: <http://www.freedomhouse.org/research/freeworld/2005/map2005.pdf>

More than 40 percent of the world's population lives on the 214 major river basins shared by two or more countries (Barlow, Clarke, 2002: 69). Border struggles for water can break out in the case of water scarcity and eventually famines which threaten more than two-third of African population, although the continent has the most number of international river basins. The mix of drought and political tension characterizes states along the Nile River. Ten countries share Nile water: Egypt, Sudan, Eritrea, Ethiopia, Uganda, Rwanda, Burundi, Democratic Republic of Congo, Kenya and Tanzania.

In 2001, German government and World Bank organized an international panel in Bonn, where representatives of the ten African Nile-states learnt how transnational cooperation in the case of the Rhine works. Water has been defined as a catalyst for international cooperation and peace. The objective of the German government was the prevention of future conflicts about access and usage of water, because water scarcity has already become an enormous challenge for African and Asian political actors. Nation states consider water as a military and political tool, and water has even become a military objective for terrorists. Controlling springs may lead towards national and international economical, political and social tension which could escalate into military conflicts. The table shows clearly the current and future situation of water scarcity in the world.

Table 1: Water Scarcity in the 20th Century

Category 1 (absolute water scarcity)	Category 2 (economic water scarcity)	Category 3	Category 4
Afghanistan	Angola	Albania	Argentina
Egypt	Benin	Algeria	Austria
Iran	Botswana	Australia	Bangladesh
Iraq	Burkina Faso	Belize	Belgium
Israel	Burundi	Bolivia	Bulgaria
Jordan	Cameroon	Brazil	Canada
Kuwait	Chad	Cambodia	(China)*
Libya	Congo	Central African Republic	Costa Rica
Oman	Cote d'Ivoire	Chile	Cuba
Pakistan	Ethiopia	Colombia	Denmark
Saudi Arabia	Gabon	El Salvador	Dominican Republic
Singapore	Ghana	Gambia	Ecuador
		Guatemala	Finland

South Africa	Guinea-Bissau	Guinea	France
Syria	Haiti	Honduras	Germany
Tunisia	Lesotho	Indonesia	Greece
United Arab Emirates	Liberia	Kenya	Guyana
Yemen	Mozambique	Lebanon	Hungary
(China)*	Niger	Madagascar	(India)*
(India)*	Nigeria	Malaysia	Italy
	Paraguay	Mali	Jamaica
	Somalia	Mauritania	Japan
	Sudan	Morocco	Mexico
	Uganda	Myanmar	Netherlands
	Zaire	Namibia	North Korea
		Nepal	Norway
		New Zealand	Panama
		Nicaragua	Philippines
		Peru	Poland
		Senegal	Portugal
		Tanzania	Romania
		Turkey	South Korea
		Venezuela	Spain
		Zambia	Sri Lanka
		Zimbabwe	Surinam
			Sweden
			Switzerland
			Thailand
			UK
			Uruguay
			USA
			Vietnam

Definitions:

Category 1: These countries face "absolute water scarcity." They will not be able to meet water needs in the year 2025.

Category 2: These countries face "economic water scarcity." They must more than double their efforts to extract water to meet 2025 water needs, but they will not have the financial resources available to develop these water supplies.

Category 3: These countries have to increase water development between 25 and 100 percent to meet 2025 needs, but have more financial resources to do so.

Category 4: These countries will have to increase water development modestly overall on average, by only five percent to keep up with 2025 demands.

*These countries have severe regional water scarcity. A portion of their populations (381 million people in China in 1990 and 280 million people in India in 1990) are in Category 1. The rest of their populations are in Category 4.

Source: <http://www.futureharvest.org/news/03171999.shtml>

Many books about water wars have been published yet. A great number of them discuss the Jordan Basin and the "Arab-Israeli hydropolitics" (Wolf/Medzini, 2004) like for example Bulloch/Darwish (1993), Kliot (1994), Starr (1995), Murakami (1995), Wolf (1995), and Allan (1996). Because water conflicts may occur possibly in Islamic countries, a look on how water is defined in this region may help to understand water as a political challenge for these regions. Shiva develops in her book the thesis that especially the control over the dams may imply wars between nations and assumes a Jihad for the future (Shiva, 2003: 83). And also Klaus Töpfer, Director of the UN-Environment Programme, thinks that the danger of wars for water is more realistic than wars for ideological reason.³

³ Klaus Töpfers Stimme hat Gewicht, Interview with Peter Sartorius, <http://www.archive.hoechst.com/deutsch/publikationen/future/298/art4.html>

The Shari'a, which refers to Islamic law in general, had the original meaning of "law of water". "Shari'a identified water as God's gift, which no one may deny to another" (Ward, 2002:187). Water rights and its concepts of ownerships have become by the end of the Twentieth and the beginning of the Twenty-First Century a challenge for both international relations and law in spite of the regulations of irrigation ditches and wells according to Islamic law. Though codifications for water-sharing across borders have been established by the Helsinki Rules, which were developed by the International Law Association in 1966⁴, the 32 articles issued by the International Law Commission of the UN in 1991, the Agenda 21, and among others "The Dublin Principles" in 1992, which opened a debate for water as reflected in a comparative assessment of institutional and legal arrangements for integrated water resources management⁵, "international water law still lacks fact-finding machinery and means of enforcement" (Ward, 2002: 188). And, moreover, international water law doesn't recognize the right of priority or absolute sovereignty.

At least a political-scientific approach for international relations and conflict resolution permits the "Transboundary Freshwater Dispute Database Project"⁶ which is a compilation of the international freshwater agreements of the UN Environment Program and the Oregon State University. It also "provides a framework for quantitative, global-scale explorations of the relationship between freshwater resources and international cooperation [...]. Projects were designed to test common theories linking freshwater resources to cooperation and conflict, in particular within the context of geography and environmental security" (Yoffe et. al., 2004).

In 2004, the International Law Association set the "Berlin Rules"⁷ for a water resources law which integrated the experience from decades of the Helsinki Rules and the confirmation and codification of its association and expresses finally the progressive development of relevant international law regarding water matters. In this context its Chapter IV about the Rights of Persons opens a clear guideline about the (Human) "Right of Access to Water" (Article 17):

- "1. Every individual has a right of access to sufficient, safe, acceptable, physically accessible, and affordable water to meet that individual's vital human needs.
2. States shall ensure the implementation of the right of access to water on a non-discriminatory basis.
3. States shall progressively realize the right of access to water by:
 - a. Refraining from interfering directly or indirectly with the enjoyment of the right;
 - b. Preventing third parties from interfering with the enjoyment of the right;
 - c. Taking measures to facilitate individuals access to water, such as defining and enforcing appropriate legal rights of access to and use of water; and
 - d. Providing water or the means for obtaining water when individuals are unable, through reasons beyond their control, to access water through their own efforts.
4. States shall monitor and review periodically, through a participatory and transparent process, the realization of the right of access to water."⁸

There can be no doubt, that this article sets clearly the right of access to water which is codified in national constitutions of already more than 60 states.

3. Water Stress in Mexico

That Mexico will host the World Water Forum next year opens probably a new debate in a country whose capital, Mexico-City, already faces water-stress or a "water-crisis" (Serrano, 2005:29). Water conflicts, however, can even break out in one political

⁴ http://www.internationalwaterlaw.org/IntlDocs/Helsinki_Rules.htm

⁵ <http://www.thewaterpage.com/SolanesDublin.html>

⁶ http://www.transboundarywaters.orst.edu/projects/spatial_database/

⁷ <http://www.ila-hq.org/pdf/Water%20Resources/Final%20Report%202004.pdf>

⁸ Ibidem, 23.

jurisdiction, for example in the Mexican valley of the 20 million people metropolis Mexico-City which is divided between the Federal District and the State of Mexico. One scenario depicts that people would take over installations spontaneously in the case of a possible nature catastrophe (earthquake or flood), especially if both local governments wouldn't have developed a future plan for managing both water supply and sewage (Alcaraz, 2005). The famous Mexican intellectual Carlos Monsiváis quoted the Mexican water expert Iván Restrepo Fernández.⁹ He says that a rich family consumes 600 liter and a poor one only 20, but the poor one who has no access and receives water from the water-vendor pays 10 times more than the rich one. According to the statistics of the National Water Commission and the Environment Ministry rich families living in residencies pay only 1.50 Pesos (=0.13 USD) per cubic meter, though the real costs would be eight Pesos (=0.72 USD) or so.¹⁰ And draught affects especially the poor neighborhoods, around 1.5 million people, which have been gradually developing into law-free zones. There is, for example, the case of the *Mazahuas* Community in Villa Allende in the State of Mexico, where armed people defended their aquifers against the depriving of the municipality's authorities (González, 2005).

More than twenty, sometimes fifty percent of water is lost through lacks in the tubes. But privatization cannot be a solution though the Mexican bottled water and soft-drink industry is the most prosperous one. The market for bottled water is worth 32 billion Pesos (=2.9 billions USD). Mexico is the world champion in the consumption of soft beverages like Coca Cola. The former director of the Coca Cola Company, Vicente Fox, has become since 2000 the president. "Fox officials just continue to say that it [the water problem, TC] will only be solved by privatizing the entire water distribution system, selling it off to national and international capital" (Piñeyro, 2005: 27). Around 20 percent is already privatized.¹¹

But since 2000 any attempt for cooperation (not only in water management) in Mexico-City has failed, because of mutual blockade for political purposes. The capital is ruled by the left party PRD (Partido Revolucionario Democrático), the state which surrounds the capital by the PRI (Partido Revolucionario Institucional) that ruled the country in an authoritarian way for more then 70 years until 2000, and finally the conservative PAN (Partido Acción Nacional), which rules the country and some municipalities in the State of Mexico. In spite of the fact that in Mexico twelve million people don't have access to drinking water and more than twenty percent don't count with sewers, PPP won't be currently a real option because of Article 27 of the Mexican Constitution which doesn't actually permit any foreign investment in public goods.

"La Propiedad de las tierras y aguas comprendidas dentro de los límites del territorio nacional corresponde originariamente a la nación, la cual ha tenido y tiene el derecho de transmitir el dominio de ellas a los particulares, constituyendo la propiedad privada. [...] I. Solo los mexicanos por nacimiento o por naturalización y las sociedades mexicanas tienen derecho para adquirir el dominio de las tierras, aguas y sus accesiones o para obtener concesiones de explotación de minas o aguas [...]."¹²

Furthermore, privatization of the public utilities is not point of the political debate, because all political parties (even the PAN because of the presidential election's campaign for July 2006) and the trade unions would reject harshly any initiatives. The reduction of subsidies and adjustment of tariffs, however, are apparently logical consequences of this political dilemma.

⁹ Monsiváis, Carlos (2005): Agua, no huyas de la sed, *El Universal Dominical*, 31 July, 7.

¹⁰ *El Universal*, 27 March 2005, A1, A7.

¹¹ The state's initiative „Promagua" (Program for Modernizing Water Operations" has established a national data base for corporations in order to help them identifying investment possibilities. See: Roberto González Amador (2005): Privatizado, 20% del servicio de agua, *La Jornada*, 25 June, 43.

¹² <http://info4.juridicas.unam.mx/ijure/fed/9/28.htm?s=>

4. The Water Lords and PPP

An example from the Philippines stresses the insecurity of private water supply. Since 1997 the water sector in Manila has been privatized under the pressure of the World Bank with loans from the Asian Development Bank. One third of the 11 million inhabitants of the capital lives illegally on private or public land and had, therefore, no water access. So, people obtained water from the vending system operated by the private sector for which they paid normally more than from the public one: around 1.70 Euro per cubic meter. Until 2002 more than 120,000 accesses would be realized with an average price of 0.25 Euro per cubic meter. Moreover, the inhabitants of the slums have become now responsible for monitoring the water supply which supports the loss of water for the companies through leaks (Blume, 2003). But on the other hand, privatization increases the dependence on certain companies such as the French Suez/Ondeo (Public Citizen, 2005) which operated in a consortium with a Philippines oligarchy family under the name "Maynilad Water Services" in Manila. The company tried to increase the fees though they promised to keep the prices constant for the next ten years. Furthermore, the concessionaires fought successfully for postponing their set targets with the result that more than one-fifth of the citizens haven't been connected yet. Finally, Suez canceled in 2003 surprisingly its 25 years concession contract with the argument of the Asian financial crisis and demanded the return of its 303 million USD investment plus around 500 million USD loans. It brought the contract dispute to arbitration through the International Chamber of Commerce. Then the public water operator Metropolitan Waterworks and Sewerage System (MWSS) had to take over the system after the failure of Suez/Ondeo with the result of raising costs for both local government and consumers. Nevertheless, the Court decided the claims as being absurd and charged Maynilad to pay 150 million USD for outstanding concession's fees, because it withdrew unilaterally.¹³

Renegotiations and finally cancellations are a huge problem of PPP. Since 1990 more than 50 percent of all concessions were renegotiated in Latin America (Hall, 2004: 8). Suez, for example, left Buenos Aires in 2002 as well.

The case of Suez/Ondeo reflects the question of who does finally control multi-national cooperation's or the so-called "Lords of Water" (Burrow; Clarke, 2002: 106) like Nestlé, Véolia (the former Vivendi), Saur, RWE-Thames Water, Bechtel, E.ON or even Coca Cola and Pepsi? Normally, shareholders which are in the majority international (hedge) funds or financial companies control the politics of their stock companies, but mostly in the only way that they work profitable. In spite of approaches of corporate governance, the so-called shareholder democracy has become a false conclusion¹⁴, especially after financial scandals and frauds of both CEOs and Boards of Directors in the course of the end of the New Economy Boom. The prestigious author Jeremy Rifkin, however, points out the increasing influence of the consumer. He describes very optimistically in his book "The Age of Access" the transformation of capitalist structures from the traditional ownership to the access to goods and services as the new decisive power of consumers.

Certainly, decisions can only be taken, if the consumer has the knowledge to use information and if fair competition works. In many cases of PPP the market is still manipulated, restricted and unfair for consumers. Oligopolies or even monopolies determinate prices, the state loses its function as both regulator and stimulator for the public service.

Nevertheless, PPP is quite popular and potentially feasible under certain conditions. In Ghana, for example, the Netherlands Water Partnership in collaboration with NGOs, governments, the neighborhoods, and the private sector demanded a so-called "Tri-Partite Partnership" (Berkoh et. al., 2004), which is actually more a Public-Community-

¹³ http://www.citizen.org/cmep/Water/cmep_Water/reports/philippines

¹⁴ <http://www.nzz.ch/2005/03/24/bm/articleCOSG4.html>

Partnership, in which NGOs, however, indicated that one requirement for a successful realization would be organizational and capacity development for the private and public sector and that these NGOs would realize the need for strong monitoring capacities of the public sector, and a transparent regulatory framework.

Because of the lack of regulatory and transparent frameworks, PPP very often failed and because of citizens' protests, concessions were cancelled like in Cochabamba (Bolivia), Atlanta or Grenoble.

5. The GATS challenges water governance

Only water permits the condition of existence. In the frame of the General Agreement on Trade in Services (GATS), both the WTO (World Trade Organization) and the European Union promote the privatization of all national services like telecommunication, culture, mass media, banks and insurances, mail-services, garbage collection and even water and sewage services, too. Those services are usually the core of governmental jurisdiction in developed countries. The GATS applies in principle to all service sectors, but with two exceptions. "Article I (3) of the GATS excludes "services supplied in the exercise of governmental authority". These are services that are supplied neither on a commercial basis nor in competition with other suppliers. Cases in point are social security schemes and any other public service, such as health or education, that is provided at non-market conditions."¹⁵ The preference clause demands in the case of public competitions that all WTO-member states must accept equal conditions for any national and international applicants.

The Study "Euromarket" sponsored by the European Union in which different universities participated, among others the École Polytechnique Fédérale de Lausanne, drafted in 2003 models on water liberalization scenarios and has come to a more skeptical conclusion towards the liberalization, not privatization (!), of the water market:

"The emergence of new stakeholders (public opinion and water industries) has contradictory effects on liberalisation issues, with two diverging lobbying groups; The discussions on the nature of the good are still unsolved and their impact on liberalisation issues is still uncertain [...]. The competition rules but also the resource management [...], and the setting up and the monitoring of environmental standards require the designation of competent regulatory authorities. In most countries, territorial authorities with administrative boundaries drive water management. [...] A crucial question is to know whether these regulation authorities falls within the competence of the European Union or whether these aspects remain in the context of national or local actions. Is the European Union the best level to enforce different rules of regulation or does the WSS sector come under the exclusive competence of Member States? The answers to these questions depend on different problems stressed above. On the one hand, there are important interactions and cross-border externalities that require coordination and justify the establishment of centralized rules at the European level. On the other hand, the need to have a better information and to bring a rapid answer or action to any problem argues in favour of strong decentralisation and local decision-making. The solution is not black or white, and certainly some aspects will be managed at the Community level to achieve the objectives of the internal market, whilst other ones will be dealt with at national or local levels in accordance with subsidiarity principle."¹⁶

This assumption supports the argument that because of the critical public, liberalization processes are difficult to implement. Moreover, it implies that PPP is finally only one political option, if informed and enlightened citizens are willing to choose it in a democratic and participative environment. Whether the WTO will have the political legitimating to enforce the scenario of Burlow/Clarke (2002: 168) considering the enormous and increasing influence of anti-globalization- and anti-neoliberal-

¹⁵ http://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm

¹⁶ http://www2.epfl.ch/webdav/site/mir/shared/import/migration/D1_Final_Draft_1.pdf, 154, 157.

movements on domestic political decisions in both OECD- and developing countries, is today more than doubtful. Both authors write: "In this projected scenario, the WTO's existing national treatment rules on nondiscrimination would be applied to government subsidies. In other words, foreign-based, private service providers like Vivendi, Suez, and other water mega-corporations would have the legal right to claim access to public funds for such things as government grants and loans" (Burrow, Clarke, 2002: 169).

Of course, the question must be asked whether the WTO should liberalize in general the world market for agricultural products of less developed countries that have until today reduced access and participation to Western markets which are protected by tariffs, terms, taxes and subsidies in a new form of neo-mercantilism. Open markets, fair commerce regulations, legal structures would be the best politics for developing countries (Lambsdorff, Melnik, 2004). Very often the discussion doesn't reflect the real necessities of developing and marginalized countries that at first liberal reforms would push economic growth, democratic consciousness, participation, transparency and civil and social responsibility. And later, these citizens may be able to decide by themselves which form of political, economic and social system would be appropriate for them. The water issue, however, would obviously be kept in the most cases in public hand as citizens' responsibility has shown in above mentioned cases. Furthermore, this debate reflect the necessity that an active civil society is needed and involved in processes of the WTO in order to be sure that interests and political will is respected and integrated in the global decision process which should finally encourage the decentralization and localization of economic policies.

6. Democratization of Water Governance and PPP

The liberal thinker Adam Smith defined in his famous book "The Wealth of Nations" (1776) the government and economy in a system of natural liberty which had formed eventually the duties of a modern state. In welfare states of the Twentieth centuries especially during the East-West-conflict, the political will has exaggerated the welfare state. In times of globalization the state needs to reduce its duties, because of the necessity to consolidate its budget. But very often governments reduce those duties which are according to Smith necessary for the prosperity of society.

"Every man, as long as he does not violate the laws of justice, is left perfectly free to pursue his own interest his own way, and to bring both his industry and capital into competition with those of any other man, or order of men. The sovereign [government] is completely discharged from a duty, in the attempting to perform which he [they or it] must always be exposed to innumerable delusions, and for the proper performance of which no human wisdom or knowledge could ever be sufficient: the duty of superintending the industry of private people, and of directing it toward the employments most suitable to the interest of the society. According to the system of natural liberty, the sovereign [government] has only three duties to attend to, three duties of great importance, indeed, but plain and intelligible to common understandings: first, the duty of protecting the society from the violence and invasion of other independent societies; secondly, the duty of protecting, as far as possible, every member of the society from the injustice or oppression of every other member of it, or the duty of establishing an exact administration of justice; and thirdly, the duty of erecting and maintaining certain public works and certain public institutions, which it can never be for the interest of any individual, or small number of individuals, to erect and maintain, because the profit could never repay the expense to any individual or small number of individuals, though it may frequently do much more than repay it to a great society."¹⁷

Especially the last phrases emphasize the unconditional responsibility of the state to maintain certain public works without regarding any profits. So, PPP does imply a new dependence on companies' interests and, moreover, it reduces both the legitimacy and

¹⁷ <http://www.proconservative.net/ProConQuotesG2.shtml>

the capability of the state respectively its government to manage public services and accomplish the people's will.

Arguments that through privatization companies would reduce investments and maintenance in infrastructure which could affect the quality of water and the chance of infections and diseases can be considered surely as an argument against privatization, but on the other hand, if privatization or liberalization allows competition, citizens may choose those companies that offer the best price-service-quality relations. However, the local government needs no expenses for marketing of its product, meanwhile companies do, which finally the consumer pays with his fees.

In the theories of international relations, liberal theorists believe that the scarcity of one good enforces cooperation in order to prevent international conflicts. The dependence on water has established international treaties such like the Indus one between India and Pakistan in spite of Kashmir-conflict or nuclear rearmament. On the national level, however, water dependence has stirred up conflicts and injustice. There can be no doubt, that water is a resource of rich and powerful classes, especially in less developed countries. Poor people dependent on illegal water supply or dubious companies and have to pay in average more for water than middle- or upper-class population. Vandana Shiva describes the privatization of water as a new form of terrorism. Though her opinion in this point is exaggerated, the privatization in less developed countries, however, was principally realized because of the fact that public administration and control didn't exist. Indeed, terrorism may be find new roots, if marginalized people are excluded from basic rights like here the access to water.

Back to Adam Smith: In his famous book *The Wealth of Nations* he writes that the government must invest in the infrastructure in order to guarantee the function of the market.

And because of the fact, that water is considered as a public good, necessarily for food production (we remember that 70 percent of the water usage serves for irrigation of the agriculture sector) and industrial production (20 percent) that guarantees the survival of self-existence of human beings and their economic performance and finally their political participation as citizens. A democratic Public-Private-Partnership, therefore, makes sense if it is controlled and legitimized by the publicity. There can be no doubt that a voluntary investment in the water business is for companies only attractive if they would gain benefits. Initiatives like UN Global Compact or Corporate Governance may be support these trends: the transformation from profit-orientated capitalism toward socially and ecologically responsible entrepreneurship.

Nevertheless, national water supply shall not exclude competition; a monopoly would provoke inefficiency, corruption, and finally high prices for the consumer. Furthermore, no subsidies should be given, because otherwise the behavior to save water wouldn't be encouraged.

Finally, states and governments should use international forums like the World-Water-Forum to develop an international water regime with good governance principles. But even the previous World Water Forums have been seen by many NGOs critically as a tool of international water corporations:

"Soutenues par de puissants groupes industriels privés, ces institutions organisent des forums et produisent des rapports qui font la promotion d'une vision radicalement orientée vers la privatisation des services de gestion de l'eau, sinon de l'eau elle-même, ainsi que de la mise en oeuvre des grands travaux hydrauliques. Elles présentent évidemment ces solutions comme les seules possibles." (Rekacewicz, 2005: 48).

The forthcoming forum in Mexico will focus on "Local Actions for a Global Challenge". This motto opens indeed a new debate, that fresh and original ideas have very often their roots in local activities. Local actors might make a virtue of necessity from resources scarcity, lack of public and private support.

Finally, full democratic and public participation in the governance of water resources (Bruch et. al., 2005) must be a condition sine qua non in order to overcome less transparent structures in the water market management.

7. Conclusion

There can be no doubt that water service must be permanently social, just, and priced with good quality. Democratic water governance must be the key to overcome both local and international water stress in order to prevent potentially violent environmental conflicts. Tension, violence and finally wars may occur in center-periphery transboundaries where certain conflict regulatory mechanism doesn't work because of weak state performances, where additionally environment (water) might be instrumentalities as a military strategic target. Constructive conflict resolution processes should have preventive approaches on the long-term run by involving NGOs and the UN as mediators. Giordano, Giordano and Wolf (2005) stressed that „international resource conflict is most likely to occur where there exist both resource scarcity and insufficient institutional capacity to deal with that scarcity“ (61). According to them, a conflict would be most likely in those areas where resources sovereignty, in our context the public good water, is ill-defined or non-existent as well as an existing regime is destroyed by political transformation and/or rapid changes by environmental resources scarcity. The authors suggested the promotion of an effective international resource management regime developing positive-sum solutions and mitigation strategies in the conflict. In the realm of high-level politics, however, international resource conflict management or prevention would be a new challenge. Consequently, traditional concepts of PPP in developing countries which are affected by water stress are definitely contradictory according to this approach.

Moreover, one point of the debate has become clear: Local governments shouldn't sell water concessions and services in order to improve its budget, because it is short-sighted. On the long-term-run the state may loose control, income and influence of a public good that actually has to serve to its citizens. The liberalization of the water market doesn't lead consequently to lower prices and better quality. Examples from the energy market have shown that citizens pay nowadays in average more than before the liberalization.

Public-Private-Partnership in Water Governance cannot be necessarily a solution only because of water scarcity. PPP may be efficient and successful in states, where democratic participation and good governance does work. The argument, that PPP would be the key for a freshwater revolution in many slums of Africa and Asia, cannot be proved positively as long as high quality standards of governance are not accomplished.

But finally, civil society is responsible for opening the debate about the public good water. Both NGOs and parliamentary groups with support of scientists and mass media have to create a new consciousness about the selling-out of public resources. Finally, if in democratic structures people mean that PPP would be an option for them, and then the state should be responsible for setting strong rules and monitoring these processes. The state representing its society shouldn't give up its final control and power, and it needs to set the legal framework to cancel PPP in the case that it doesn't serve for society. For less developed countries, PPP can be an option, but it must be monitored under an international democratically organized and legitimized water regime that controls companies' activities in a form of a new UN Global Compact. The idea of a cooperative world fund (Petrella, 2005) under the shield of the UN may be the first step towards this kind of an international water regime that guarantees a sustainable, participative and fair development.

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Accès à l'eau potable et développement

Le rôle des libertés dans la conversion de l'accès à l'eau en développement

Présentation du projet de recherche financé par le ministère français de la Recherche

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1. Contexte

L'amélioration de l'accès à l'eau potable et à l'assainissement figure explicitement parmi les objectifs de développement du Millénaire. D'ici 2015, l'ambition est de diminuer de moitié le nombre de personnes n'ayant pas un accès adéquat à l'eau potable et à l'assainissement. Cet objectif mobilise depuis 25 ans les institutions financières internationales (IFI) et on estime à 300 milliards d'USD les investissements consentis sous forme de subventions ou de prêts pour y parvenir. Les résultats restent toutefois médiocres: si le taux de desserte a réussi à se maintenir malgré une croissance démographique soutenue, l'accès de ce service de base ne s'est pas amélioré pour les populations qui en étaient traditionnellement exclues.

Au cours d'une première période (1980-1990), les efforts se sont traduits par une augmentation des investissements, sans réforme institutionnelle. Dans un second temps (1990-2000), les mêmes institutions ont conditionné leur aide à des réformes institutionnelles majeures. Les autorités politiques (locales ou nationales) des pays en développement (PED) ont dû faire évoluer l'organisation de leurs services d'eau potable sur la voie de l'efficacité, synonyme à l'époque d'une privatisation (de la gestion ou des infrastructures) et coupler l'ouverture du marché à la création d'instance de régulation chargée de contrôler les opérateurs privés. Les réformes promues s'inspiraient des modèles britannique et français. Elles empruntaient au premier l'exercice d'une régulation par une agence supposée indépendante et un mode de régulation spécifique (*price cap* ou prix non négociable pour une durée définie) et au second, un large appel aux opérateurs privés dont le partenariat était formalisé à travers un contrat de concession de longue durée. Les IFI espéraient d'une gestion privée des services l'apport de capitaux et une efficacité accrue dont les gains seraient reportés sur une amélioration de la desserte en eau. Les terrains privilégiés étaient les grandes mégaloilles des PED dont les quartiers périphériques se développent de façon anarchique sans offrir à leurs résidents d'accès aux services essentiels.

Depuis quelques années, la formule promue par la Banque mondiale a suscité de nombreuses critiques, par ceux qui en ont été les maîtres d'œuvre, et plus largement par les économistes qui relèvent de l'école néo-institutionnelle. Ces critiques ont principalement porté sur la démarche empruntée (importation d'un modèle de gestion et de régulation inadapté), sur le mode de régulation retenu (incompatibilité d'une régulation par prix plafond dans un environnement risqué et incertain), sur le cadre institutionnel (agences de régulation incapables de réguler et à l'indépendance toute relative) et, enfin, sur le manque d'adhésion des populations directement concernées au modèle proposé.

2. Dimensions économique et humaine de la durabilité des services d'eau

2. Dimensions économique et humaine de la durabilité des services d'eau

Une analyse des actions entreprises pour atteindre les objectifs du Millénaire aboutit à la conclusion qu'elles ont échoué parce qu'elles ont fait prévaloir la durabilité économique des services d'eau potable et d'assainissement sur leur durabilité socio-politique.

Un service d'eau est économiquement durable s'il dispose de revenus suffisants pour reconstituer son patrimoine, donc pour garantir sa transmission en bon état aux générations suivantes. Les différents modèles prescrits par la Banque Mondiale ont tous contraints les PED candidats à l'obtention de financements internationaux à tarifier le service d'eau à son coût. Le recouvrement des investissements consentis pour améliorer la desserte en eau potable pesait exclusivement sur les abonnés. Dans les quartiers pauvres des grandes villes des PED, les travaux d'extension de réseaux, à forte intensité capitalistique, étaient logés à la même enseigne. Les nouveaux raccordés devaient payer leur branchement et acquitter des factures permettant un recouvrement intégral des coûts d'investissement et d'exploitation consécutifs à leur desserte.

L'objectif de durabilité économique des services d'eau s'est heurté à l'incapacité des ménages visés à honorer leurs factures. Si une tarification intégrale garantit la durabilité économique du service d'eau, elle peut contrevenir à sa durabilité socio-politique. On a ainsi redécouvert que la voie montrée aux PED n'avait été empruntée par aucun des pays qui sont aujourd'hui totalement équipés de réseaux de distribution d'eau potable. En effet aucun pays développé n'a pu généraliser l'accès à l'eau potable en réclamant aux abonnés le paiement intégral du service. Une telle démarche aurait été contraire à l'objectif poursuivi, l'amélioration rapide de l'hygiène publique dans un premier temps et, subséquentement, le développement économique du pays.

La Banque mondiale estime que la facture d'eau potable ne doit pas dépasser 5% des revenus d'un ménage dans les PED, sauf à susciter des réactions très vives. Dans les pays riches, elle n'a jamais dépassé 1%. Elle se serait sans aucun doute établie à un niveau bien supérieur, si l'eau avait été tarifée à son coût dès la mise en service des réseaux, comme les contrats de concession le prévoyaient. Il est intéressant de rappeler qu'en France, l'application à la lettre des contrats, à laquelle le Conseil d'Etat veilla scrupuleusement, a justement soulevé parmi les abonnés (réels et potentiels) des contestations auxquelles les réactions actuelles des abonnés des PED font écho. A l'époque, ces protestations aboutirent à l'abandon, par les communes, de la concession comme cadre contractuel privilégié au profit de l'affermage ou de la régie intéressée, contrats qui leur laissaient la liberté de subventionner intégralement les investissements.

Par ailleurs, les acteurs dits de terrain (ONG) insistent sur la nécessaire complémentarité, au moins durant une phase de transition, entre différentes formes d'approvisionnement en eau sur un même territoire (points d'eau traditionnels, eau du réseau) selon l'usage (eau pour la toilette ou la lessive / eau pour la boisson), pour améliorer l'accès à l'eau potable des populations vivant dans les quartiers péri-urbains des mégalo-poles des PED. Le Programme de Solidarité Eau (pS-Eau) souligne par exemple l'impact sanitaire positif de modes d'approvisionnement plus modestes mais qui emportent l'adhésion des populations auxquelles ils sont destinés et ouvrent sur une évolution durable des pratiques d'hygiène. Plus généralement, le pS-Eau insiste sur le caractère impératif de l'adéquation entre le type d'accès à l'eau proposé et le niveau de développement atteint par les populations concernées. Dans un travail de recherche conduit au laboratoire GEA, Lise Breuil démontre que les situations de blocage auxquelles ont abouti la plupart des gros contrats de concession intervenus dans les années 1990 (en Afrique du Sud, en Amérique du Sud et en Asie) proviennent du décalage entre la qualité de service proposé (desserte à domicile) et les ressources financières que les nouveaux abonnés pouvaient y consacrer, compte tenu de leur niveau de développement économique.

Si le niveau de développement des populations est insuffisant, l'accès à un service sophistiqué n'est pas durable. Les habitants ne peuvent pas se l'offrir et ceux qu'on a parfois incités (branchements sociaux) à se connecter au réseau finissent par être déconnectés, faute de pouvoir honorer leur facture. Il importe de veiller à étalonner l'amélioration de l'accès à l'eau au niveau de développement des populations. Les populations qui disposent aujourd'hui d'un accès sophistiqué (eau au robinet) ne sont pas passées d'un accès primaire (puits ou rivière) à cet accès sophistiqué sans transition. En ville, une distribution d'eau "en ligne" a d'abord permis l'approvisionnement en eau de quelques fontaines, puis les canalisations en réseau ont pu multiplier la desserte à des bornes-fontaines, ouvrant la possibilité de connexions individuelles, à la population riche d'abord, puis à l'ensemble des citadins. L'amélioration de l'accès à l'eau potable a duré plusieurs décennies en Occident. Dans les campagnes françaises, ce processus s'est achevé à la fin des années 1980, soit un siècle après l'établissement des premiers lavoirs publics.

A chaque étape du processus d'amélioration de l'accès à l'eau potable, le niveau de développement des populations s'est accru. L'amélioration de l'accès à l'eau n'a d'ailleurs pas pesé sur le développement économique des populations. En effet, l'eau "publique" a toujours été gratuite et l'eau "privée" (ou à domicile) s'est développée grâce à la subvention massive des investissements que son traitement et sa distribution supposaient. La question du transfert vers les usagers du financement intégral des services d'eau (coûts d'exploitation et d'investissement) ne s'est posée qu'au moment du renouvellement du patrimoine, et alors que la ressource en eau acquérait le statut d'un bien dont la préservation était d'autant mieux garantie qu'il était valorisé sur le plan économique. Le niveau de développement des populations avait alors suffisamment cru et le revenu des ménages s'établissait à un niveau suffisant, pour qu'une facturation du service d'eau potable au coût complet ne pèse pas plus de 1% dans leur budget.

3. Evaluer l'impact de l'accès à l'eau sur le développement grâce au concept de *capability*

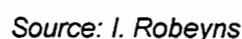
Aucune étude ne permet à ce jour d'estimer l'horizon temporel auquel se situent les effets d'une amélioration de l'accès à l'eau potable en terme de développement économique (ou d'augmentation de revenu). Faut-il compter 20 ans ou une génération avant que la disposition d'eau potable à domicile ait suffisamment imprégné les pratiques pour que le temps auparavant consacré à l'accès au service se trouve libéré et soit finalement converti en activités susceptibles d'augmenter le pouvoir d'achat ? Quel sursis faut-il accorder au développement humain avant d'intégrer les exigences de la durabilité économique des services d'eau, c'est-à-dire le recouvrement des coûts à travers la facturation aux usagers ?

Notre projet se propose d'évaluer l'impact d'une amélioration de l'accès à l'eau sur le développement. Une fois cet impact connu, il devient possible de programmer des investissements d'amélioration en tenant compte du temps nécessaire à la conversion de cet accès amélioré en supplément de revenu. Il s'agit donc de rééquilibrer les différentes dimensions de la durabilité des services d'eau en assujettissant l'objectif de durabilité économique au temps nécessaire au développement humain.

Différentes variables expliquent le processus de conversion de l'accès à l'eau en développement économique. Notre projet se propose d'évaluer la contribution de la variable « liberté » dans ce processus, sur la base des concepts proposés par A. Sen. A. Sen propose un cadre d'analyse pour l'évaluation des libertés individuelles et des compromis sociaux. Sa réflexion est centrée sur le concept de *capability*, concept dual qui signifie à la fois liberté de réaliser et capacité à user de cette liberté.

Un exemple permet d'illustrer ce concept. Un vélo (bien) permet de se déplacer plus rapidement (fonctionnalité). Il remplira cette fonctionnalité si une personne en use ou, plus

Autrement dit, il ne suffit pas de connaître les biens qu'une personne détient pour connaître le spectre des fonctionnalités qu'elle peut effectivement réaliser. Il faut aussi connaître les conditions personnelles, sociales et environnementales dans lesquelles elle évolue et qui déterminent son degré de liberté.



4. Méthodologie et terrain

Dans un premier temps, notre démarche consiste, à partir des différents modes d'accès à l'eau (d'un accès basique comme la borne-fontaine ou le revendeur d'eau au mode le plus sophistiqué, le robinet), à identifier les vecteurs de fonctionnalités ou l'ensemble des *capabilities* qui en sont issus. Ainsi, le temps "gagné" par une femme qui n'a plus à « consommer » 2 heures journalières pour approvisionner sa famille en eau peut être converti en travail, plus grand soin apporté à ses enfants, éducation, etc.

Notre projet doit procéder par entretiens en groupes et individuels pour répondre au double objectif qui consiste, d'une part, à évaluer l'impact d'une amélioration de l'accès à l'eau potable sur le niveau de développement économique et, d'autre part, à préciser l'influence du

degré de liberté des individus dans la conversion plus ou moins grande de l'accès à l'eau en développement économique.

Nous avons retenu comme terrain de recherche une ville appartenant à la rive sud de la Méditerranée : Tétouan. Tétouan est une ville importante à l'échelle de la Région du Rif marocain. Avec 550 000 habitants, elle arrive en seconde position après la Capitale régionale, Tanger. Le contexte urbain est caractérisé par une forte pression de l'exode rural, à l'origine de la prolifération de l'habitat dit « non réglementaire » dans les quartiers périphériques ; ce qui pose d'importants problèmes en matière d'équipement, et notamment de desserte en eau potable. On estime en effet qu'environ 35 % de la population n'est pas branchée au réseau eau. En 1998, la gestion des services de l'eau (ainsi que celle des services de l'assainissement et de l'électricité) de Tétouan et Tanger a été conjointement attribuée à Amendis, filiale de Véolia, groupe déjà présent à Rabat. La société ainsi créée, Amendis, doit faire face au défi que constitue l'extension de l'accès aux services de l'eau dans les quartiers périphériques, et met en place pour cela des formules innovantes, comme les opérations de branchements sociaux.

Nous retiendrons trois quartiers sur Tétouan, le premier (quartier 1) offrant un accès basique à l'eau potable (borne-fontaine), le second offrant une connexion au réseau public sans que toute la population du quartier soit connectée (quartier 2) et le dernier présentant un taux de connexion de 100% (quartier 3).

Le choix qui traduit une *capability* en réalisation est opéré selon une logique qui échappe en partie à l'observation. Son étude nécessite des enquêtes de terrain relativement approfondies, basées sur des protocoles qui ne peuvent définir *a priori* une liste de fonctionnalités potentielles soumise à un panel d'habitants. La démarche consiste donc à initier un dialogue à partir des réalisations observées, pour permettre aux acteurs directement concernés d'énoncer eux-mêmes la nature de leur réalisation et, surtout, le vecteur des fonctionnalités à partir duquel s'est opéré leur choix. En ce sens, nous suivons les prescriptions d'A. Sen et des praticiens des concepts qu'il a développés, et qui refusent de fournir *a priori* une liste de fonctionnalités. Ils insistent au contraire sur l'importance du processus de sélection des fonctionnalités pertinentes qui doit être opéré avec et par les personnes qui sont directement affectées dans leur *capability*.

La méthodologie obéit donc aux étapes suivantes:

Etape 0 – Etat des lieux approfondi

- Détailler les caractéristiques sociales et le type d'habitat et d'urbanisation des quartiers considérés.
- Réaliser un historique de ces quartiers pour mettre en évidence la dynamique de leur développement.

Etape 1 – Observation et premier contact

- Observer les fonctionnalités réalisées en liaison avec les trois types d'accès à l'eau potable (accès basique, connexion techniquement possible, accès sophistiqué généralisé) à travers une description générale de l'activité des résidents (journée typique des habitants, par genre et par âge, existence ou non d'activité professionnelle, située dans le périmètre ou en dehors du quartier).
- Mesurer le temps passé et les ressources consommées pour s'approvisionner en eau dans les trois quartiers.

- Etablir le contact avec les habitants.

Etape 2 – Des fonctionnalités réalisées aux fonctionnalités potentielles

- Constituer un panel d'une dizaine de personnes résidant dans les quartiers 2 et 3.
- Valider les réalisations permises par un accès amélioré à l'eau telles qu'observées lors de l'étape 1. Cette validation se fait en groupe. Elle permet d'ouvrir la discussion sur les fonctionnalités potentielles de façon à identifier le vecteur de fonctionnalités à partir duquel les individus ont opéré leur choix.
- Identifier les vecteurs des fonctionnalités potentielles sur la base desquels se sont opérés les choix individuels. Mettre à jour les caractéristiques sociales et environnementales qui ont été motrices (ou ont fait obstacle) dans le processus de réalisation. Cette identification est réalisée par entretiens individuels.

A l'issue de cette étape, il sera alors possible de mesurer l'impact d'un accès amélioré à l'eau sur le développement économique compte tenu du degré de liberté individuelle des individus. Autrement dit, il devient possible d'évaluer le temps nécessaire au développement humain pour que l'accès à l'eau s'inscrive dans la perspective d'un développement durable, à degré de liberté donné.

Etape 3 – Degré de liberté réelle et perçue

- Constituer un panel d'une dizaine d'habitants du quartier 1.
- Définir en groupes les réalisations qu'un accès amélioré à l'eau rendraient possibles.
- Comparer les réalisations effectives observées dans les quartiers 2 et 3 et validées par leurs "représentants" avec les réalisations "imaginées" par un panel d'habitants du quartier 1, dans l'hypothèse d'un accès amélioré à l'eau potable.
- Approfondir en entretiens individuels la représentation que les individus de Q1 se font des règles qui définissent l'étendue du spectre des fonctionnalités potentielles.
- Définir le degré réel de liberté des individus, en distinguant les caractéristiques qui limitent objectivement cette liberté de celles plus subjectives issues des modes de représentation que chacun nourrit à propos de son espace de liberté, avant et après connexion au service d'eau potable.

5. Résultats attendus

A travers cette méthodologie, nous espérons pouvoir contribuer à la connaissance des aspects les moins bien maîtrisés des vecteurs du développement humain. Cette contribution méthodologique constituerait une étape préliminaire pour l'intégration de la composante "liberté individuelle" dans la construction des indices de développement humain.

De nombreux travaux cherchent à élaborer une mesure de la dimension humaine du développement. Le "développement humain" est un terme que l'indice de développement humain (IDH) proposé par le PNUD a rendu populaire. Il traduit le niveau de bien-être humain et est fonction de caractéristiques individuelles (éducation, santé, revenu) et collectives (cohésion sociale, niveau et répartition des richesses).

L'IDH, comme tous les indices, agrège différents indicateurs. Il relève des indices dits synthétiques : il résume en un chiffre la position d'un pays et permet donc la comparaison des pays en fonction de leur durabilité humaine. Il se distingue d'indices dits sectoriels ou

unidimensionnels qui ne vont chercher à mesurer qu'une des composantes de la durabilité humaine, la santé, l'éducation ou le niveau de revenu, par exemple.

A la différence d'autres indices synthétiques, l'IDH synthétise des indicateurs sur la base d'une moyenne non pondérée. Les critiques qui lui sont généralement adressées portent essentiellement sur le caractère réducteur d'une telle moyenne, et sur le présupposé selon lequel les différentes composantes du développement humain seraient parfaitement substituables, de sorte que la faiblesse de l'une puisse être compensée par l'importance de la ou des autres, niant de fait les problèmes d'effets de seuil ou d'irréversibilité liée à la perte de certaines composantes. Si l'on considère par exemple la santé et l'éducation, la première est une composante très sensible à l'irréversibilité alors que la seconde peut être considérée comme inaltérable, une fois qu'elle est acquise: les savoirs fondamentaux que sont l'écriture, la lecture et le calcul ne se dégradent pas dans le temps. Les effets de seuil sont en revanche pris en compte par les indices sectoriels qui sont, en général, spécifiques à un pays et permettent de capter assez finement ses caractéristiques historiques, politiques et sociales.

D'une manière générale, ces indices, destinés aux instances de régulation (locales, nationales ou internationales) sont peu utilisés : les difficultés techniques (recueil de données, comparaison internationale...) demeurent en effet un obstacle majeur à leur élaboration et à leur exploitation. D'aucuns estiment qu'en attendant de disposer de données homogènes, l'utilisation d'indicateurs composites simples, combinés à des approches sectorielles (santé, éducation, inégalités, libertés, ...) constitue la voie la plus souhaitable.

Parmi les composantes les moins traitées du développement humain, figurent les préoccupations d'ordre politique et civil (les libertés politiques pour ne citer qu'elles) et d'estime de soi, qui sont au cœur de l'analyse conduite par Amartya Sen. "Cela constitue une limite importante pour la mesure du bien-être car ces dimensions constituent à juste titre un objet d'étude en expansion et une dimension reconnue comme essentielle au bien-être."

Nous espérons que notre projet de recherche permettra de tenir compte de la variable liberté dans l'élaboration d'un indice de développement humain. Cet indice se traduirait sur le plan opérationnel par un outil de prospective, mobilisable lors de la conception des projets d'investissement en eau dans les PED.

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De l'eau gratuite : à quel prix ?

La gratuité de l'eau est un mythe : si la ressource naturelle peut être considérée comme gratuite de part son statut de bien public, « patrimoine de la nation » selon la constitution sud-africaine, les autres étapes du « circuit » de l'eau (production d'eau brute, production d'eau potable, puis distribution et assainissement) entraînent des coûts de fabrication qui peuvent être élevés.

De fait, dès lors qu'elle est manipulée, l'eau acquiert à la fois un prix, un coût et une valeur. La somme facturée au consommateur final doit ainsi refléter le coût des infrastructures (construction, amortissement et entretien), mais aussi la valeur attribuée à l'eau qui n'est pas uniquement un bien économique, mais aussi un bien social. L'établissement du prix de l'eau dans les différentes étapes du « circuit » de l'eau est donc toujours un compromis politique difficile où la puissance publique doit arbitrer entre le souci d'équité et la pérennité économique du service.

Dans ce contexte, la volonté politique de distribuer gratuitement six mètres cubes d'eau par mois à tous les foyers sud-africains pose plusieurs questions :

- Que représentent ces 6000 litres du « *Lifeline Service* »¹ en terme de volume d'eau par rapport à la consommation totale ?
- Quel est l'effort financier demandé aux gouvernements locaux ?
- Qui en paye le prix ? Comment est répartie cette charge financière entre les consommateurs ?
- Est-ce que la fourniture gratuite d'eau apporte une amélioration réelle de la situation des plus défavorisés ? Comment sont répartis les bénéfices ?
- Cette solution est-elle durable et « exportable » ?

La réponse à ces questions dans le cadre de la municipalité de Johannesburg demande deux réflexions préalables : tout d'abord l'étude de l'origine et du contexte de mise en place de la mesure puis la présentation de la constitution du prix de l'eau dans cette métropole, la plus peuplée et la plus riche du subcontinent.

Origine et contexte de la mise en place du « *Lifeline Water Service* »

L'arrivée au pouvoir de T. Mbeki en 1999 après la présidence de N. Mandela (1994-1999) fut marqué par la poursuite de politiques macro-économiques néo-libérales fondées sur l'équilibre budgétaire, la délégation des services publics et le recouvrement des coûts², mais aussi par des initiatives novatrices en faveur des plus pauvres. C'est dans le droit fil de ces politiques que T. Mbeki proposa, juste avant les élections municipales de décembre 2000 (les

¹ Appelé également *Free Basic Water*.

² La nouvelle politique économique est connue sous l'acronyme de GEAR (Growth, Employment and Recovery), qui remplace le RDP (Recovery and Development Programm).

premières à se dérouler dans les nouvelles circonscriptions définies à la fin des années 1990) de fournir gratuitement les services de base (eau et électricité) à tous les foyers sud-africains. Cette annonce était destinée à faire taire les critiques envers le virage libéral prit par l'ANC, mais aussi pour être en conformité avec la Constitution adoptée en 1996, qui prévoit dans la Déclaration des Droits que « toute personne doit avoir accès à suffisamment d'eau »³.

Cette question était d'ailleurs particulièrement pressante dans le domaine de l'eau, puisque la volonté de rationaliser l'usage de l'eau dans un contexte de rareté⁴ et l'application des politiques tarifaires préconisées par la Banque Mondiale⁵ ont conduit à une forte augmentation du prix de l'eau pour les consommateurs finaux et à la déconnexion des ménages les plus pauvres, souvent insolubles. L'épidémie de choléra dans la province du Kwazulu-Natal, directement liée aux déconnexions, ainsi que les critiques de plus en plus virulentes contre les politiques de délégation aux entreprises privées (*public private partnerships*) ou de « corporatisation »⁶ des services de distribution d'eau, demandaient une traduction pratique rapide du discours de T. Mbeki par le *Department of Water Affairs and Forestry* (DWAF).

Ainsi les services du DWAF ont été contactés dès le début de l'année 2000, et l'annonce officielle des modalités de la politique de gratuité de l'eau par le Ministre des Eaux et Forêts R. Kasrils fut faite dès février 2001 (DWAF 2001c). La mise en œuvre fut prévue dès juillet 2001, pour la première année fiscale des nouvelles municipalités élues en décembre 2000. Cette rapidité explique pourquoi il y a eu peu de concertation préalable, contrairement aux autres grandes mesures du DWAF, comme la mise en place de Agences de Bassin ou la rédaction de la loi sur l'eau de 1998.

Pour prouver la faisabilité du *Lifeline Service* et considérer les détails pratiques, le DWAF s'appuyait sur l'exemple des 21 municipalités qui offraient déjà entre 5 et 10 m³ gratuitement par mois, parmi lesquelles l'expérience très médiatisée de Durban (Loftus 2005). L'extension du service gratuit visait aussi à réduire les inégalités pour l'accès à l'eau entre consommateurs au niveau national.

Pour justifier le fait de ne plus faire payer l'eau, le DWAF s'appuie sur la valeur sociale de l'eau, en avançant que le coût général de la mesure pour la collectivité serait largement amorti par les bénéfices en terme de santé publique : la mortalité des moins de 5 ans est ainsi deux fois plus forte chez les foyers qui n'ont pas accès à l'eau. De plus la prise en charge financière du *Lifeline Service* doit reposer essentiellement sur les consommateurs finaux les plus aisés par le biais des politiques de modulations tarifaires (DWAF 2001 a et b).

L'application de cette politique nouvelle -à notre connaissance seule la région Flandres en Belgique l'a adoptée⁷- a été rapide, puisque au 31 octobre 2005, près de 75 % des foyers sud-africains en bénéficient⁸.

³ Bill of Rights : § 27.

⁴ La ressource en eau en Afrique du Sud est estimée à 1200 m³/hb/an ; la consommation est répartie comme suit : irrigation 63 %, Industrie 8 %, consommation domestique 29 %.

⁵ Il s'agit notamment du recouvrement total des coûts (*cost recovery*), de l'autonomie financière imposée aux services de l'eau (*ring-fencing*) et de l'abandon de toutes subventions. Ces politiques, qui découlent partiellement des « principes de Dublin » ont été officiellement adoptées par l'ANC en 1994.

⁶ La « corporatisation » consiste à appliquer aux services de distribution qui restent propriété de la municipalité les méthodes de gestion du secteur privé. De fait, la gestion des services délégués ou « corporatisés » est sensiblement la même. (Macdonald et Ruiters 2005)

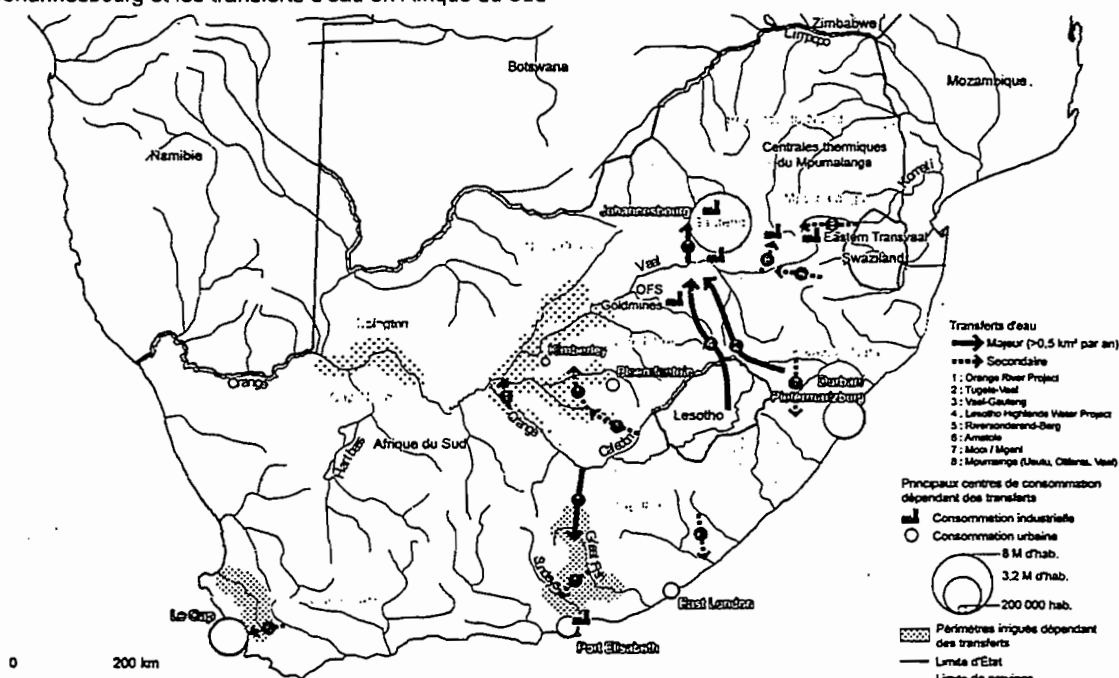
⁷ En Flandres les services de distribution d'eau doivent fournir gratuitement 15 m³ par habitant et par an, ce qui représente 4.8 m³ par mois pour un foyer de quatre personnes.

2) La constitution du prix de l'eau à JHB

L'introduction du *Lifeline Service* introduisit des changements importants dans les politiques de gestion de l'eau dans les nouvelles municipalités, qui avaient déjà connu de profondes transformations depuis 1994. Johannesburg ne fait pas exception à la règle, et accumule même les problèmes liés à la gestion d'une ressource rare dans un milieu urbain très profondément marqué par l'héritage des politiques de ségrégation du régime d'apartheid.

Au cœur de la province du Gauteng, la municipalité de Johannesburg se situe exactement sur la ligne de partage des eaux entre les bassins versants de l'Orange (plus précisément de son affluent le Vaal) et du Limpopo. Les ressources locales sont faibles, et la ville, fondée après la découverte de l'or en 1887, a fait appel très tôt à des ressources éloignées : le Vaal, situé à 70 km au sud dès 1923, puis la Tugela qui coule vers l'Océan Indien dans les années 1970, et enfin, depuis 1998, les eaux du Lesotho par l'intermédiaire du dernier projet en date, le très contesté Lesotho Highlands Water Project (LHWP). Johannesburg est aujourd'hui au centre d'un réseau maillé de transferts d'eau d'ampleur continentale (figure 1)

Figure 1 :
Johannesbourg et les transferts d'eau en Afrique du Sud



Source : Divers documents du DWAF

La constitution du prix de l'eau pour le consommateur final dépend de trois facteurs : la production d'eau brute (*raw water*) au niveau national (*first tier* dans la terminologie sud-africaine), la production d'eau potable « en gros » (*bulk water - seconde tier*) et la distribution de l'eau et l'assainissement (*third tier*).

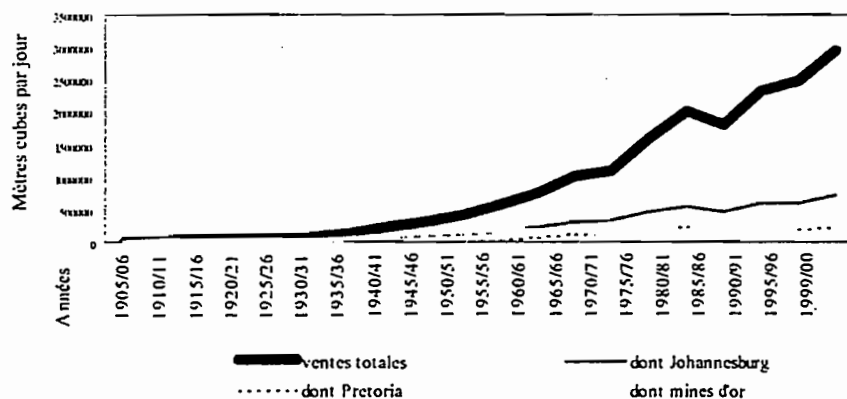
⁸ Cette rapidité est un bon exemple de l'introduction rapide des « innovations » dans le domaine de l'eau en Afrique du Sud : compteurs prépayés, restricteurs électroniques et physiques de débits, nouveaux systèmes de tarification, etc.

Pour Johannesburg comme dans presque toute l'Afrique du Sud, l'eau brute est produite par le Department of Water Affairs and Forestry (DWAF). Pour l'ensemble de la province du Gauteng, le DWAF doit verser une taxe à l'organisme qui gère le LHWP, le Trans Caledon Tunnel Authority de 1,2 Rands/m³. Celle-ci est passée de 0.02 à 1.2 R/m³ entre 1989 et 2005, en Rands constants et représente aujourd'hui près du tiers du prix de l'eau vendue aux consommateurs finaux. Le prix de l'eau brute (*raw water*) vendu par le DWAF aux Water Boards qui ont en charge la potabilisation est donc en constante augmentation (plus 5.7 % entre avril 2004 et avril 2005). Au coût de l'eau venant du Lesotho s'ajoute une taxe pour les eaux soutirées à la Tugela.

Cette eau brute est achetée par un seul organisme depuis 1903 : le Rand Water Board, devenu Rand Water. Il couvre toute la province du Gauteng et fournit 1250 millions de m³ par an à plus 10 millions d'habitants. C'est une entreprise de droit privé, propriété à 100 % du DWAF, qui a un chiffre d'affaire de 3 milliards de Rands⁹ et dégage 281 millions de Rands de profits, « chiffre en hausse à cause du volume vendu » selon le rapport annuel de Rand Water (Rand Water 2005). Comme le montre la figure 2 la consommation est historiquement en hausse, et l'approvisionnement en eau brute, de plus en plus lointain, devient toujours plus cher. Le prix auquel Rand Water vend son eau aux municipalités s'élève rapidement depuis 25 ans, une accélération marquée depuis le milieu des années 1990, une augmentation de 17 % entre 2001 et 2004, et de 5.3 % entre 2004 et 2005 (Figure 3).

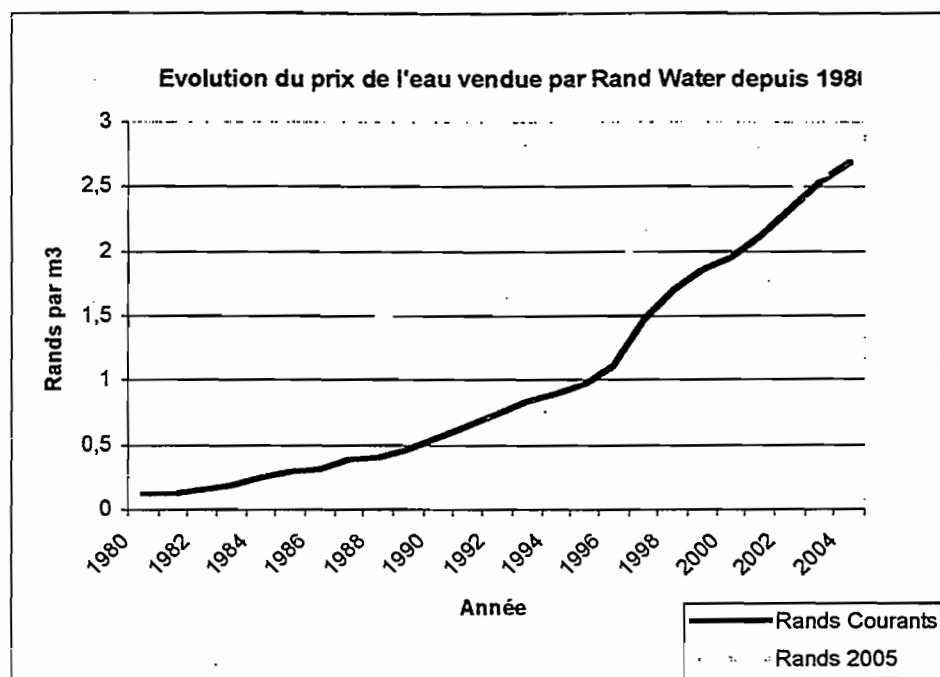
Figure 2

Vente d'eau quotidienne moyenne du Rand Water Board
(1905-2000)



⁹ Un euros vaut approximativement 8 Rands.

Figure 3



Source : Rand Water 2005

Les structures municipales ont enfin la charge de la distribution de l'eau et l'assainissement. Celles-ci ont connu un profond bouleversement depuis 1994, avec le rassemblement des Black Local Authorities et de 13 anciennes municipalités blanches dans une seule municipalité, Johannesburg Metro. Celle-ci s'étend de Sandton à Soweto sur près de 50 km, compte 2 800 000 habitants, et représente 11 % du PNB sud-africain. Dans un contexte d'extrême fragmentation urbaine, le rassemblement de quartiers noirs et blancs devait permettre le rattrapage rapides des inégalités, par le biais d'investissements importants¹⁰. D'après des estimations récentes de la municipalité (JW 2005), une famille riche qui habite dans une villa de cinq pièces avec piscine, jardin et plusieurs salles de bains utilise en moyenne 60 à 65 m³ par mois et qu'une famille de classe moyenne vivant également dans un appartement de cinq pièces sans jardin, ni piscine avec une seule salle de bain utilise 30 à 35 m³ par mois. Selon ces mêmes estimations, un foyer « moyen » de quatre personnes à Soweto, correspondant aux classes moyennes inférieures, utilise encore près 20m³ par mois¹¹. A l'autre extrémité de l'échelle sociale, selon le recensement général de 2001, 10% des foyers de la municipalité ne disposent pas de l'eau courante chez eux¹².

Alors que les besoins liés au rattrapage des inégalités étaient énormes, la municipalité de Johannesburg était en banqueroute en 1997 et ne pouvait plus réaliser aucun investissement, et ce jusqu'en 1999. C'est à cette date qu'a été mis en place le plan Egoli 2002 qui prévoyait la « corporatisation » de 14 services municipaux qui devinrent des entreprises de droit privé, propriété à 100 % de la municipalité. Les services de l'eau ont fait partie de cette politique,

¹⁰ La fragmentation urbaine avait produit de nombreux cas de redistribution inverse (Jaglin 2001) : les impôts prélevés dans les quartiers noirs pauvres subventionnaient investissements destinés aux quartiers Blancs riches. C'est le cas notamment du LHWP, payé sur le budget de l'Etat.

¹¹ Ces volumes sont importants : rappelons que la consommation mensuelle moyenne en France pour un foyer de quatre personnes varie en 12 et 15 m³ selon les estimations.

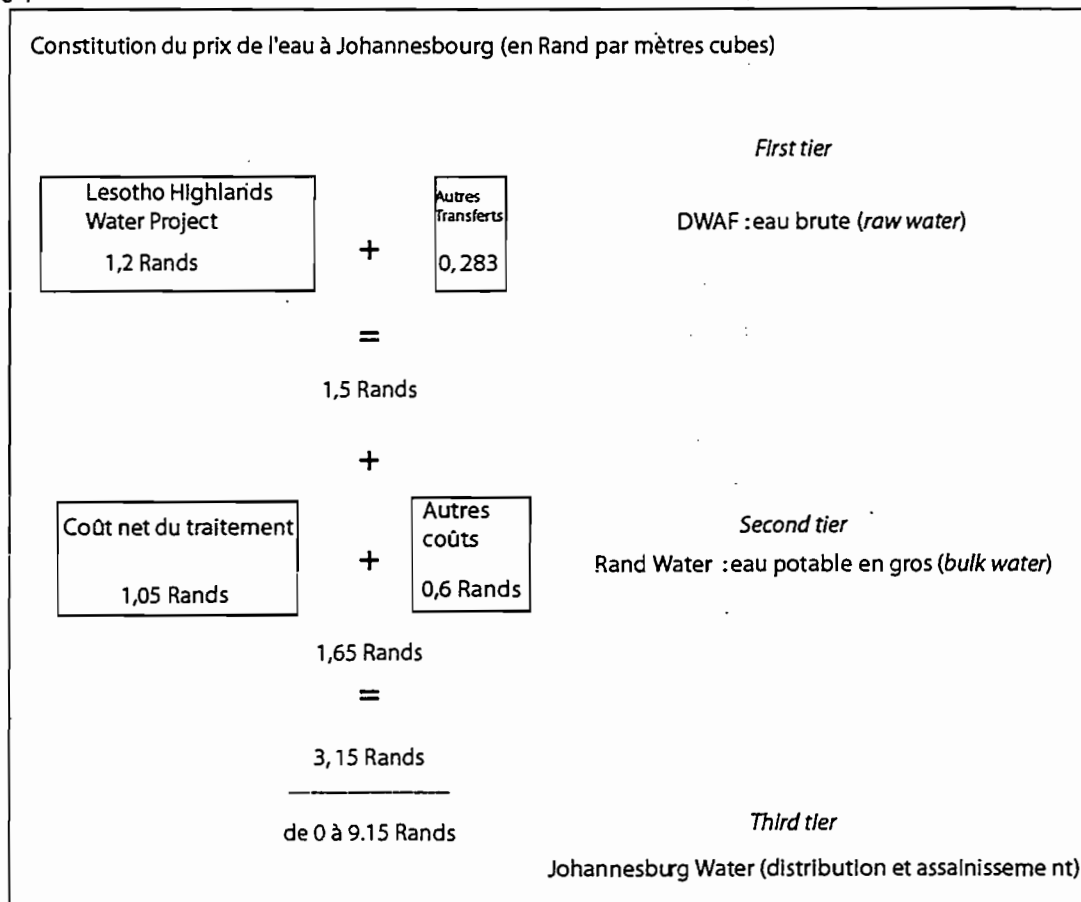
¹² Ce chiffre atteint 32 % dans des zones défavorisées comme Orange Farm, comme 5 % seulement dans les quartiers riches du Nord.

avec la création en 2001 de Johannesburg Water (JW)¹³ qui a à son tour signé un contrat de gestion avec Jowam, consortium composé notamment d'Ondéo et Water Sanitation Services South Africa (elle-même filiale de Ondéo en Afrique du Sud).

Le contrat, qui s'étend d'avril 2001 à juin 2006, précise que JOWAM a la charge de l'amélioration du réseau et du recouvrement des coûts¹⁴. Il est relativement favorable à la municipalité, car Suez considérait à l'époque Johannesburg comme une vitrine pour le continent africain et pensait acquérir une position favorable en vue d'un futur contrat de concession de longue durée « à la française ».

La figure 3 résume la constitution du prix de l'eau à JHB ainsi que la répartition des responsabilités entre les différents niveaux de responsabilité. (figure 4)

Figure 4



Source : DWAF et Rand Water

3) Une mesure relativement peu coûteuse

Même si les problèmes liés aux déconnexions étaient moins importants à Johannesburg qu'à Durban, la capacité des ménages pauvres à payer leur facture d'eau était très limitée et les menaces de déconnexions de plus en plus sérieuses. En 2001, les arriérés de paiement pour l'ensemble des services municipaux s'élevaient à 4,5 milliards de Rands. De plus, une grande

¹³ La qualité d'autorité régulatrice (Water Service Authority), prévue par le Water Act de 1997, reste au main de la Municipalité.

¹⁴ Les pertes totales sont estimées à 550 millions de Rands, dont 120 millions de pertes « physiques », 25 millions dues aux connections illégales, 170 millions d'erreur de facturation ou encore 130 millions d'arriérés de paiement. JW est un *Water Service Provider*

partie des foyers dans les anciens townships payaient une somme fixe mensuelle de plus de 100 Rands à JW, qu'elle que soit leur consommation d'eau¹⁵, somme très importante alors que près de 240 000 foyers déclarent avoir un revenu annuel inférieur à 400 R par mois.

La mise en place du *Lifeline Service* était donc, comme dans le reste de l'Afrique du Sud, très attendue. Elle fut rapide : il y avait en octobre 2005, 1 076 250 foyers concernés par la mesure dans le périmètre de JW sur les 1 250 000 foyers que compte la municipalité. D'après les estimations présentées par Johannesburg Water, les 6000 litres, conçus pour un foyer de 8 personnes, représentent trois lavages corporels, un petit bain, deux bouilloires, un évier de vaisselle, une lessive tous les deux jours.

Les 6 m³ gratuits représentent ainsi 6,45 millions de m³ par mois ou 77,5 millions de m³ par an, soit 25 % de la consommation de la ville qui est de 312 millions de m³, tous usages confondus¹⁶ (Rand Water 2005). Même si cela représente une part importante de la quantité d'eau utilisée à Johannesburg, c'est encore douze fois moins que l'apport du LHWP, conçu pour répondre à la demande marginale de l'ensemble du Gauteng, et qui a coûté plus de 8 milliards de Rands depuis le début des travaux. C'est encore largement moins en volume que la consommation des 130 000 foyers les plus aisés de la municipalité (ayant un revenu par foyer annuel supérieur à 153 000 R¹⁷), dont la consommation moyenne, estimée à 60 m³ par mois, représente près de 100 millions de m³ annuels.

Au prix de l'eau achetée par JW à Rand Water, cela représente 245 millions de Rand par an (avec un m³ à 3.15 R), c'est-à-dire près de 10 % du budget de JW (qui est de 2.6 milliards de Rands), mais à peine plus de 1% du budget municipal pour l'année 2005/2006¹⁸. C'est moins que les pertes (physiques et commerciales) estimées à 381 millions de Rands par Johannesburg Water. De plus, comme une partie du coût de cette mesure a déjà été répartie sur les autres consommateurs par le biais de la grille tarifaire, le manque à gagner pour Johannesburg Water ne dépasse pas 80 millions de Rands par an.

4) Qui paye ?

Ces estimations expliquent en partie la construction de la nouvelle grille tarifaire de JW. Comme promis, les six premiers mètres cubes sont gratuits¹⁹. Les quatre suivants sont facturés en 2005/2006 à 3.90 R/m³ ; la consommation au-delà de 40 m³ (celle qui est censée distinguer les classes moyennes des classes aisées, essentiellement blanches) est facturée 9,15 R/m³.

L'idée générale est de faire payer le coût marginal de l'eau (celui qui est nécessaire pour équilibrer l'offre et la demande, c'est-à-dire à Johannesburg le coût du LHWP) aux gros

¹⁵ Le quota est fixé à 20 m³ par foyer à Soweto, 15 m³ à Alexandra.

¹⁶ Dont 250 millions de m³ d'eau potable distribuée.

¹⁷ Rappelons qu'en 2001, 196 000 foyers déclaraient n'avoir aucun revenu, et 157 000 avoir un revenu inférieur à 9600 R.

¹⁸ A titre de comparaison, au niveau national, l'apport de l'accès à l'eau de foyers représente 3.2 milliards de Rand par an, soit 0.33 % du budget de l'Etat en 2003/2004, avec comme objectif un service minimal (standard RDP soit un accès à l'eau potable à moins de 200m) atteint pour toute la population en 2008¹⁸. Cela représente 915 R par personne. (Hemson 2004).

¹⁹ Selon la Government Gazette 22472 du 20/07/2001 : les municipalités doivent recouvrer tous les coûts et différencier les prix entre les usagers, avec une politique tarifaire induisant au moins un « block » gratuit 6000 l et un « block » pour décourager l'utilisation. Dans le cadre du *Free Basic Water*, il y a une possibilité de passer outre le principe de « *ring fencing* » et de faire appel à d'autres ressources municipales (voire à des subventions nationales), mais cela uniquement pour les 6000 premiers litres et non pour la consommation au-delà de ce volume, ni pour l'eau potable en gros (*bulk water*).

consommateurs : les 60 000 foyers (en très grande majorité Blancs) gagnant plus de 300 000 Rands par an (soit 37 500 euros)²⁰.

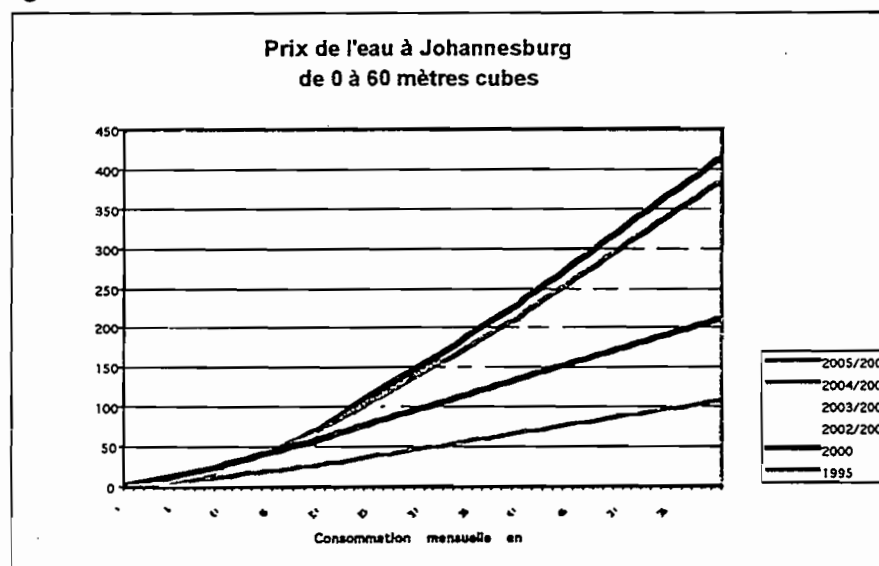
Dans les tranches intermédiaires, les plus forts sauts sont entre la deuxième (7-10 m³) et la troisième tranche (11-15 m³) avec une augmentation de 32 % ; en revanche, l'augmentation entre la quatrième (21-40 m³) et la dernière tranche (> 40 m³) est plus faible : + 18 %.

La structure tarifaire de Johannesburg est relativement semblable à ce qui se pratique dans d'autres grandes villes sud-africaines comme Pretoria ou Durban.

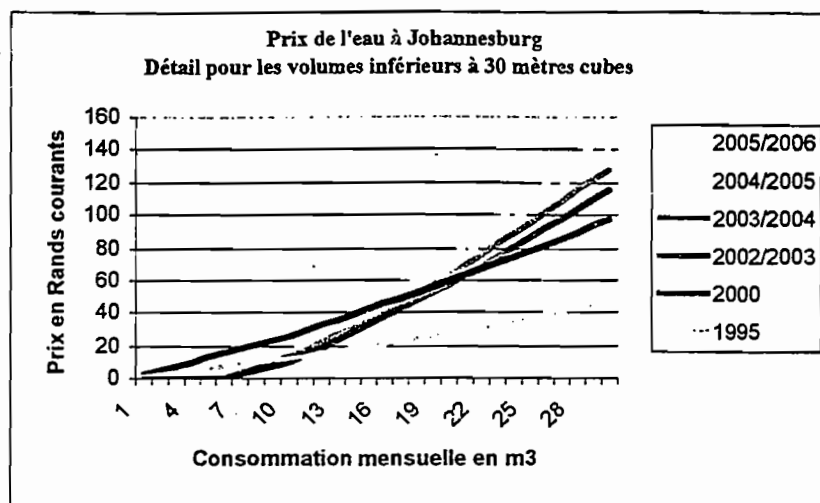
Si l'on considère l'évolution des prix depuis l'introduction des 6000 litres gratuits en 2001, toutes les tranches ont augmenté. Si l'on compare entre les prix en 2000 et les prix en 2005/2006, on s'aperçoit que seuls les consommateurs payant moins de 18 m³ par mois ont réellement connu une baisse de leur facture d'eau, compte tenu de l'inflation (l'augmentation a été de 15 % en Rands courants). Sur la période plus longue 1995-2005, seuls les foyers consommant moins de 12 litres ont été bénéficiaires (cf. figure 5). Si l'augmentation de 6 à 8 % de toutes les tranches constatée depuis 5 ans se poursuit, dès 2008 seuls les consommateurs restant sous les 6 m³ auront profité de la mesure. Pour les « classes moyennes », définies par Johannesburg Water (30 m³ par mois), l'augmentation du prix de l'eau aura été de près de 200 %, pour les classes aisées (60 m³) de 300 %.

Mais une consommation de 60 m³ par mois revient en 2005 à 5000 R par an, soit 1,7 % ou moins du revenu annuel des foyers gagnant plus de 300 000 R par an. En revanche, une consommation de 12 m³ par mois revient à 300 R sur une année, ce qui représente 4,2% du revenu annuel des 114 000 foyers gagnant entre 4800 et 9600 R par an. La grille tarifaire condamne également les 250 000 foyers qui ont moins de 4800 R par an à se contenter des 6000 litres gratuits, sauf à consacrer une part très importante de leur budget à l'eau.

Figure 5



²⁰ Rappelons qu'en France le prix moyen de l'eau est d'environ 3 euros par mètre cube, soit environ 24 R. Cela représente pour un ménage classique 360 euros par an, pour un revenu annuel de 26 600 euros, soit 1.2 % du revenu annuel (Guérin-Schnieder et Lorrain, 2003)



Source : Rand Water

Enfin, rappelons que seuls les foyers qui disposent d'un compteur peuvent bénéficier du *Lifeline Service*, ce qui excluait *a priori* ceux qui en avaient le plus besoin, les habitants des townships qui étaient sous le contrôle de Black Local Authorities et qui n'avaient pas de compteurs d'eau. Dans ces townships les pertes physiques étaient de 11% (ce qui est relativement bas), et les pertes « commerciales » de 58 %. Ces dernières sont en partie un héritage de la culture de non-paiement hérité de la période d'apartheid, mais aussi de l'impossibilité de paiement de nombreux ménages : à Soweto, le taux de chômage officiel est de 53%, et 83 % des foyers vivent sous le seuil de pauvreté fixé à 1400 R par mois.

C'est donc à la fois pour introduire le *Lifeline Service* et pour réduire ces pertes par non-paiement que la municipalité a lancé le projet *Gcin-Amanzi* (*Conserving Water* en Zulu) qui consiste à installer des compteurs d'eau prépayés, et qui donnent en contrepartie l'accès aux 6000 litres gratuits.

Après l'installation de ces compteurs, qui a fait l'objet de vives protestations (Bond 2002, Harvey 2005), les pertes ont été effectivement réduites, mais surtout du fait de l'auto-restriction dans la consommation de foyers les plus pauvres. La consommation par robinet dans un quartier de Soweto pilote de cette opération (Phiri Block B) est ainsi passée de 58 à 13 m³ par raccordement selon JW (JW 2005). Si le foyer dispose d'un compteur prépayé, le débit « normal » s'arrête après 6 m³ (un débit très réduit continue à couler); si c'est un compteur normal, la pression est fortement réduite pour ne laisser l'équivalent de 6 à 10 m³ par mois.

5) Les critiques

L'installation des compteurs prépayés a fait apparaître au grand jour les premières critiques contre la politique du *Lifeline Service*.

Les critiques les plus évidentes portent sur le seuil choisi. Selon l'OMS, 25 litres par jour et par personne représentent le minimum pour assurer la survie et 50 litres le minimum pour maintenir une hygiène corporelle minimale. Il faut 100 litres par personne et par jour pour les besoins personnels normaux et garder une bonne hygiène. Cela représente donc 12 m³ par mois pour une famille de quatre personnes et 24 m³ pour une famille de huit personnes.

La taille de foyers et la disparité des revenus posent donc de graves problèmes pour l'équité de la mesure. Si l'on compare deux zones opposées dans l'agglomération, les riches quartiers de Sandton et Rosebank d'une part et le township d'Orange Farm, ces facteurs prennent toute

leur importance. A Orange Farm, 26 % des foyers comprennent plus de 5 personnes (plus que la situation « idéale » décrite par JW) et 51 % des ménages gagnent moins de 9600 R par an (29 % déclarent n'avoir pas de revenus). En revanche, à Sandton, seuls 7 % des ménages ont plus de 5 personnes, et 37 % gagnent plus de 150000 Rands. De plus, il y a seulement 5 % d'enfants de moins de cinq ans à Sandton contre 10 % à Orange Farm, alors que cette dernière catégorie de population demande généralement plus d'eau. Dans le même ordre d'idées, on sait que les malades du SIDA, nombreux en Afrique du Sud et souvent peu traités, ont également besoin de beaucoup plus d'eau.

La deuxième série de critiques porte sur les contreparties demandées. Il s'agit bien sûr de toutes les mesures restrictives que nous avons évoquées pour les volumes supérieurs à 6 m³ par mois. Mais également de l'abandon ou d'une limitation des droits à l'accès à l'eau prévus par la Constitution, comme le montre les attendus du jugement dans le procès *Manquele v Durban Transitional Metropolitan Council* Case No. 2036/2000²¹. Alors qu'une mère de famille de sept enfants, devant l'impossibilité de payer sa facture d'eau, contestait les mesures restrictives prises à son encontre et réclamait la suspension de la mise en demeure de paiement en se référant à la Constitution qui garantit l'accès à l'eau, le tribunal a jugé « qu'elle avait choisi de ne pas se limiter au six mètres cubes gratuits qui lui étaient alloués », et que les mesures prises à son encontre pour sa consommation au-delà de ce volume étaient donc légitimes.

Ce jugement apporte une consistance aux critiques plus radicales du *Lifeline Service* (Bond 2002, McDonald 2005) qui avancent que le DWAF (et plus largement le gouvernement sud-africain) se libère à peu de frais grâce au *Lifeline Service* de ses obligations de rattrapage des inégalités. De fait, la précarisation accrue des foyers défavorisés (rappelons qu'à Soweto, le taux de chômage est de plus de 50%, et que de nombreux emplois formels ont été perdus depuis 10 ans dans l'industrie), ne permet plus à de très nombreux foyers de payer leur facture d'eau. Etant donné que le recouvrement de ces impayés est à la fois très long et cher pour JW, avec des résultats aléatoires, le *Lifeline Service* ne viendrait alors, selon ces auteurs, qu'entériner une situation de fait, en contrepartie d'un contrôle accru sur la consommation des ménages pauvres.

Cinq ans après : un premier bilan du *Lifeline Service*

Pour juger des effets de cette mesure novatrice, un premier bilan peut être tiré en considérant les réponses apportées aux questions posées en introduction.

- *Que représentent ces 6000 litres en terme de volume d'eau par rapport à la consommation totale ?*

Approximativement un quart de la consommation d'une grande ville, ce qui reste très peu par rapport aux volumes consommés par l'agriculture.

- *Quel est l'effort financier demandé aux gouvernements locaux ?*

Il est relativement important, mais on doit le comparer aux efforts financiers beaucoup plus importants effectués pour répondre à la demande marginale. Il reste, à Johannesburg, sans commune mesure avec le coût du transfert des eaux du Lesotho.

- *Qui en paye le prix ? Comment est répartie cette charge financière entre les consommateurs ?*

²¹ Un résumé de ce procès est disponible sur : http://www.communitylawcentre.org.za/localgov/bulletin2001/2001_1_manquele.php

La question de la répartition de la charge financière sur les plus gros consommateurs paraît à première vue équitable. Mais, avec l'augmentation progressive du prix de l'eau brute (*bulk et raw water*), les classes moyennes aisées et bientôt les couches moyennes inférieures voient leur facture d'eau augmenter rapidement.

- *Est-ce que la fourniture gratuite d'eau apporte une amélioration réelle de la situation des plus défavorisés ? Comment sont répartis les bénéfices ?*

A cause de la contre-partie demandée (restricteurs de débit, compteur prépayés), les réactions sont très variées. De façon générale, on peut dire que les consommateurs qui n'avaient jamais bénéficié de l'eau courante sont en général relativement satisfaits, alors que les foyers qui bénéficiaient auparavant d'un quota d'eau sans coupures (notamment à Soweto) ne ressentent que les effets négatifs du contrôle accru (Harvey 2005, Loftus 2005).

La réponse à la dernière question (*Cette solution est-elle durable et « exportable »?*) est sans doute la plus difficile.

Le calibrage du volume d'eau nécessaire aux plus pauvres semble notoirement insuffisant, aux dires de responsables de JW : un volume de 12 m³ par mois semble le minimum acceptable pour offrir un vrai service universel. Une révision future du quota gratuit semble inévitable.

De plus, le fait de prendre en compte uniquement la dernière étape du « circuit » de l'eau est également contestable, car l'augmentation du prix de l'eau brute finit toujours par se répercuter sur la première tranche payante, celle qui concerne en premier lieu les classes moyennes inférieures. De plus le prix de la dernière tranche est peu dissuasif pour les consommateurs aisés : on peut même penser que JW compte sur les volumes vendus à ces « gros » consommateurs pour financer ces autres programmes car les forts volumes consommés sont les plus profitables pour la pérennité économique du service. Le prix est calculé pour maintenir voire augmenter cette consommation, qui demande des investissements coûteux. Le *Lifeline Service* ne peut se concevoir sans des actions efficaces pour limiter la consommation marginale d'eau, et arrêter la tendance haussière des prix de la première (*raw water*) et de la seconde étape (*bulk water*) du circuit de l'eau.

Enfin, il faudrait également prendre en compte l'héritage historique : pendant les années d'apartheid, les consommateurs blancs ont largement bénéficié des phénomènes de redistribution inverse pour des volumes d'eau considérables ; limiter la redistribution à 6 m³ par mois au nom de l'équité économique peut sembler une injustice grave envers ceux qui ont le plus souffert du régime d'apartheid.

L'application et l'appréciation des bénéfices du *Lifeline Service* sont donc très intimement liées à la situation et à l'histoire hydrologique d'une région : seule une analyse poussée du contexte politique et social peut permettre de juger de sa faisabilité dans d'autres grandes métropoles au Nord comme au Sud.

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Raréfaction de l'eau dans les oasis: Crise de la ressource ou crise de gouvernance?

Cas des oasis du sud-est tunisien

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Résumé

Depuis les années 80, les oasis du sud-est tunisien qui font vivre plus de 100 000 paysans et paysannes connaissent une crise hydrique sans précédent. L'eau d'irrigation se fait de plus en plus rare pour les oasiens. Ce problème a affecté considérablement l'économie des exploitations agricoles et a conduit à une baisse significative des revenus des agriculteurs. La souffrance de ces usagers s'affirme de jour en jour. Leur appauvrissement économique et social et parfois même leur délocalisation sont devenus inévitables. Les facteurs physiques de rareté de la ressource en eau sont les plus montrés du doigt (aridité climatique, offre en eau faible, nappes salées, fuites dans le réseau, etc). Notre investigation révèle que cette explication est non uniquement superficielle et simplificatrice, mais qu'elle dévie le raisonnement et masque les vrais arguments. Il s'avère manifestement que la raréfaction de l'eau dans ces oasis est une production sociale et économique avant tout.

Aujourd'hui, les oasiens, surtout les plus démunis d'entre eux, sont empêchés implicitement d'accéder à l'eau alors que celle-ci ne fait pas défaut. Un bon nombre de facteurs en rapport avec la gestion de cette ressource et à son allocation éclaire cette controverse. La répartition de l'eau dans l'espace oasien (entre quartiers, et individus) n'est pas uniforme. La diversité agronomique et écologique et les besoins inégaux en eau des différents utilisateurs au sein de l'oasis sont ignorés dans l'allocation de cette ressource. De plus, le nouveau système d'irrigation, d'apparence très sophistiqué, a complètement négligé les savoirs traditionnels des paysans en matière d'irrigation et leur capacité financière et technique à gérer un système hydraulique complexe.

Ainsi, la faible adhérence et participation à la gestion et aux processus de prise de décision des usagers d'une part et le coût devenu excessif de production de l'eau d'autre part, ont mis les associations de gestion de l'eau dans des conditions budgétaires et sociales difficiles et a conduit à la raréfaction de l'eau dans ces périmètres.

En outre, cette crise hydrique est également accentuée par les nouveaux modes de productions adoptés par les paysans eux-mêmes et impulsés par les nouvelles règles de marché et de modernité.

Aussi, cette contribution va-t-elle tenter de montrer, à travers l'analyse de cas des oasis du sud-est tunisien, que contrairement à l'intention prépondérante, les causes de la pauvreté hydraulique sont plutôt socio-économiques et que le mode de gouvernance de l'eau est à l'origine de la pénurie.

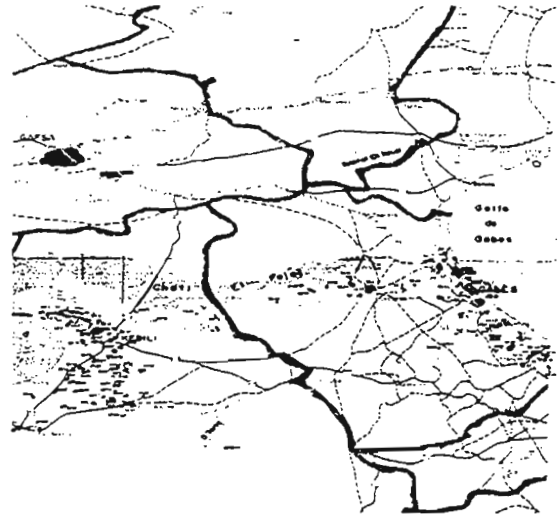
Mots clés: Oasis de Gabès, gestion de l'eau, pauvreté hydraulique, Gouvernance.

1. Introduction

On a l'habitude d'expliquer que la rareté de l'eau en Tunisie comme ailleurs résulte d'une part d'une offre en ressource en quantité/qualité limitée et insuffisante et d'un accroissement accru de la demande en eau d'autre part. Bien que ce constat soit tout à fait incontestable compte tenu surtout de la flambée qu'a connue la demande sociale en eau, il n'éclaire pas toute la question et l'explication de la situation reste inachevée. On s'aperçoit à l'évidence qu'en Tunisie l'approvisionnement en cette ressource s'est amplifié à la même vitesse que la demande, de sorte qu'on n'a pas eu de preuve que l'eau a véritablement manqué aux différents usagers aussi exigeants soient-ils (SGHAEIR, 1993). Aujourd'hui, dans le sud tunisien, quoique climatiquement de plus en plus sec, il existe une gigantesque réserve d'eau souterraine constituée depuis le quaternaire (BEN MARZOUG, 1996). En dépit de la nature fossile de ce réservoir d'eau,

l'accroissement de la demande en eau et sa diversification a contraint le pouvoir public à extraire les ressources qu'il faut. Cependant avec tous les efforts déployés par l'Etat pour la mobilisation de la ressource en eau et la rationalisation de son utilisation au profit de tous les usagers, les oasis du sud-est tunisien qui font vivre plus de 100 000 paysans et paysannes connaissent depuis les années 80, une crise hydrique sans précédent. L'eau d'irrigation se fait de plus en plus rare pour les oasiens. Les facteurs physiques de rareté sont les plus montrés du doigt (aridité climatique, offre en eau faible, nappes salées, fuites dans le réseau, etc). La question de la rareté de l'eau en rapport avec le mode de gouvernance de cette ressource en terme d'accès, de partage et de gestion est très peu abordée. Il s'agit dans ce travail de tenter de répondre à la question: insuffisance réelle de l'eau ou problème de gouvernance? L'objectif ultime est de mettre l'accent à travers l'étude du cas des oasis littorales, sur des aspects plutôt sociaux et économiques considérés dans la plupart du temps comme complexes et absurdes.

Les oasis littorales en nombre de 49 couvrent une superficie d'environ 7000 ha¹. Elles sont situées dans le sud-est Tunisien. Malgré leur similitude générale avec les autres oasis, on peut reconnaître aux oasis littorales un certain nombre de spécificités techniques, spatiales, historiques et sociales.



Carte n°1 : localisation des oasis littorales

2. Pénurie ou suffisance : quels indicateurs ?

L'eau douce est certes la ressource la plus indiquée comme étant un bien rare et elle l'est de plus en plus, néanmoins, à chaque fois que ce concept est évoqué, tout le monde semble ne pas parler de la même chose. Ainsi, la rareté de la ressource en eau est dans la littérature bien un objet de controverse. Une multitude de facteurs de nature très variée (physique, sociale, économique, politique, etc.) peuvent être à l'origine de la situation. Parfois la rareté peut même être artificielle et psychique dans le cas surtout où elle est liée à une demande de même nature. De ce fait, Oser poser la question si l'eau se fait effectivement rare dans les oasis du sud tunisien devient une question très légitime, voire pertinente et appropriée. Cependant, la réponse ne peut être exhaustive: chaque situation de rareté est unique. Le cas que nous analyserons, celui des oasis littorales ne peut être hélas généralisé même si quelques ressemblances avec d'autres oasis se trouvent confirmées.

Appréhender cette situation revient alors à chercher des indicateurs palpables et plausibles qui permettent de savoir si l'eau manque pour ce groupe d'oasis ou bien si elle est suffisante.

2.1. Une offre en eau satisfaisante

Il s'agit en premier lieu d'analyser l'offre en ressource. L'objectif est de savoir si l'approvisionnement fait aujourd'hui défaut et par conséquent s'il est à l'origine de la raréfaction de l'eau pour les oasis.

Rappelons que ces oasis étaient desservies depuis leur création jusqu'aux années quatre vingts par des sources naturelles. A partir de cette date et afin de remédier à la chute du débit des sources et l'insuffisance des ressources en eau, l'Etat a créé des forages. (MAMOU, 1980)

L'eau d'irrigation provient actuellement de 75 forages qui captent l'eau dans la nappe de djeffara à une profondeur variant de 50 à 200 m.

Bien que l'évolution du mode d'exhaure de l'eau dans les oasis littorales soit marquée par un passage très accéléré d'une forme millénaire qui était à l'origine de la création des oasis (source), à une forme nouvelle basée sur des techniques récentes (forage), le suivi de l'évolution du débit total disponible a ces oasis ne révèle pas une variation significative. En effet, le débit

1. La superficie irriguée dans le gouvernement de Gabès est 12400 ha dont 7000 ha sont des oasis rapporté à chaque fois à la superficie irriguée nous décèle un taux dit d'irrigation, considéré comme étant l'indicateur technique de base pour tout périmètre irrigué qui renseigne sur le degré de l'approvisionnement en eau.

Pour ces oasis, le débit total disponible est d'environ 4 m³/seconde, le volume annuel exploité est estimé à 118 millions de m³ /an, l'équivalent de 46m³ /jour/hectare. (CRDA de Gabès, 2004). En comparant cet apport d'eau journalier aux besoins théoriques des cultures en période de forte demande estimés à environ 40 m³ /jour, on constate qu'il satisfait largement cette demande. En outre, cet apport d'eau est comparable à celui utilisé au début des années soixante.

Il va sans dire que les besoins en eau théoriques des oasis sont relativement élevés compte tenu de l'environnement climatique de ces oasis et la prépondérance de la culture du palmier dattier et des cultures fourragères d'été qui sont des cultures relativement exigeantes en eau.

De cette sorte les oasis littorales, quoique alimentées par une eau d'origine souterraine et de caractère non renouvelable, semblent être convenablement bien approvisionnées en eau.

2.2. Un réseau d'irrigation à haut rendement

Le deuxième indicateur est l'état du réseau d'irrigation actuel qui permet la distribution de l'eau dans ces oasis. Ce réseau a été créé par le ministère de l'agriculture en 1985 dans le cadre du Plan Directeur des Eaux du Sud (PDES²). Il a remplacé complètement le réseau d'irrigation traditionnel. L'objectif assigné est la modernisation du réseau d'irrigation afin de réduire les pertes d'eau par infiltration et permettre une meilleure répartition de l'eau sur l'ensemble des oasis.

L'eau d'irrigation, une fois sortie du forage, est transportée jusqu'à l'ouvrage de répartition dans des conduites enterrées, en amiante-ciment ou en acier. Chaque secteur d'irrigation est connecté à l'ouvrage de partage par un réseau de distribution enterré. La longueur totale des conduites d'adduction et de distribution est de 500 km.

Les ouvrages terminaux de distribution ou bornes d'irrigation sont composés d'une chambre de vanne et d'un bassin de régulation de pression. Chaque borne d'irrigation irrigue une superficie d'environ 5 ha. L'eau sera par la suite acheminée jusqu'aux parcelles dans des canaux à ciel ouvert en béton.

Ainsi, l'eau sortant des forages, qui semble suffire aux oasis, est acheminée dans un réseau répondant aux normes techniques de pointe. La réduction des pertes d'eau, permet d'avoir un rendement hydraulique du réseau installé quasi- parfait.

2.3. Des parcelles sous -irriguées

Malgré tout ça, l'eau ne parvient pas aux agriculteurs comme ils la souhaitent. Elle se fait de plus en plus rare pour les oasisiens. En effet, l'espacement de deux irrigations consécutives dépasse les 30 jours en période de forte demande (Juillet- Août.). Ce nouvel indicateur, cette fois ci du côté irrigant prouve que l'insatisfaction des bénéficiaires de l'eau d'irrigation est manifeste et bien fondée.

L'antinomie entre deux indicateurs irréfutables : la disponibilité de l'eau d'un côté et l'embarras des irrigants de l'autre nous a incité à approfondir notre diagnostic pour tenter de clarifier cette ambiguïté et répondre à cette polémique.

Plusieurs raisons de la raréfaction de l'eau pour les oasisiens, autres que physiques ont été identifiées. Nous présenterons dans ce qui suit les principales:

3. Raréfaction liée au mode de distribution de l'eau

Il ne suffit pas d'avoir de l'eau en tête d'une oasis, pour s'assurer que celle-ci parviendra équitablement et au moment voulu à ses différents secteurs et à ses différentes parcelles. Il semble que la problématique du manque d'eau dans ces territoires soit imputée à l'organisation de la distribution de l'eau et à la méthode avec laquelle elle est gérée.

2. Le plan directeur des eaux du sud (PDES), adopté en 1976 s'est fixé quatre objectifs (CNEA. 1977)

-Satisfaction des besoins en eau potable de toute la région.

-Sauvegarde des anciennes oasis qui souffrent d'un déficit important en eau, et couvrent une superficie globale de 22 000 ha (129 oasis au Total).

-Création de nouvelles oasis sur les meilleurs sols dans la limite de 8000 ha, axés sur les zones du Jérid et Nefzaoua.

-Satisfaction des besoins en eau des activités industrielles à Gabès, particulièrement, et des activités touristiques à Jerba Zarzis essentiellement.

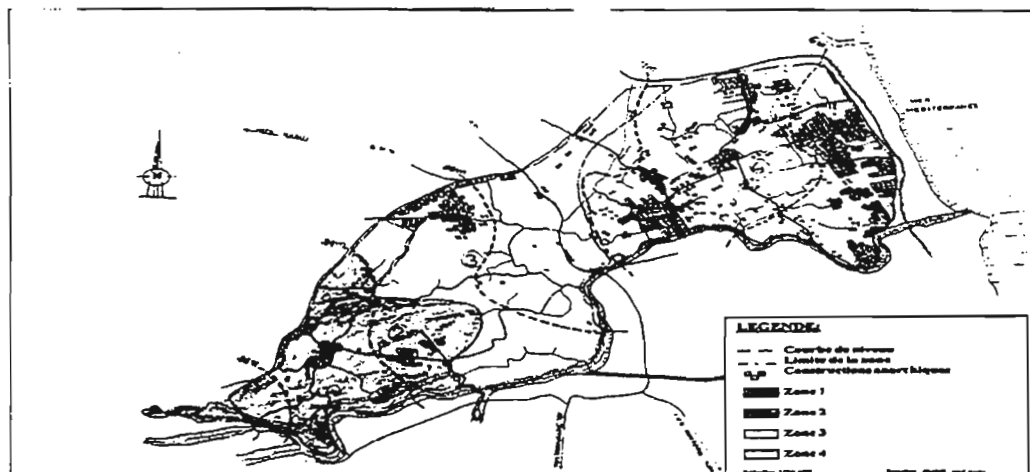
Le volet hydraulique du projet vise le comblement du déficit hydrique des oasis par la création des forages et l'installation des réseaux d'irrigation et la réalisation des travaux de drainage.

3.1. Une irrégularité de répartition de l'eau dans l'espace

Au sein des oasis, l'eau d'irrigation est inégalement répartie. Les différents recoins bénéficient de l'eau d'une manière dissemblable. De plus, cette variabilité est ressentie entre l'amont et l'aval de chaque oasis, entre les différents secteurs et également entre les différentes parcelles. Le partage de l'eau entre les secteurs ne prend en compte ni la superficie réellement irriguée, ni la nature du sol. Ainsi, le débit alloué à chaque secteur, rapporté à la superficie nous montre que la répartition de l'eau entre les différents secteurs n'est pas équitable. En effet, l'apport d'eau mensuel par secteur varie de 821 m^3 à 2051 m^3 . La périodicité des irrigations varie de 23 à 35 jours. Ainsi le manque d'eau n'est pas perçu par tout le monde de la même manière puisque certains secteurs sont largement irrigués alors que d'autres souffrent de pénurie.

3.2. La diversité agro-écologique est ignorée

La diversité agro-écologique au sein des oasis n'a pas été prise en compte lors de la mise en oeuvre du nouveau système d'irrigation qui a complètement négligé cet aspect et a considéré que toutes les oasis ainsi que tous les secteurs sont homogènes. En effet, les oasis se présentent aujourd'hui comme étant des espaces hétérogènes sur les plans physique, agronomique et social (ABDEDAYEM ; 1997).



Carte n°2 : Zonage agro-socio-écologique de l'oasis de Gabès

Par ailleurs le système d'irrigation tel qu'il est conçu actuellement ne permet pas une autonomie entre les secteurs d'un même périmètre.

L'irrigation se fait dans les oasis suivant le principe de "Tour d'eau" et ce en respectant un calendrier d'arrosage qui affecte à chaque parcelle un temps d'irrigation déterminé. Ce calendrier tient compte du débit entrant, de la superficie de la parcelle. Ce même programme précise la périodicité du tour d'eau. Ce principe ignore lui aussi la diversité des systèmes de production

agricole. Les agriculteurs d'une même oasis, n'ont pas les mêmes besoins en eau en terme quantitatif comme en terme qualitatif. Ces besoins sont étroitement liés au type d'activité agricole qu'ils pratiquent. La conception du système d'irrigation selon le mode de distribution actuel, ne permet pas alors de répondre à des demandes inégales. En outre, ce système de distribution se présente comme une contrainte majeure devant un accès libre à l'eau et à une demande des agriculteurs devenus de plus en plus exigeants.

3.3. Accès inégal à l'eau

A ces lacunes dans la gestion de la ressource en eau s'ajoutent des inégalités liées à l'accès à l'eau. On peut a priori distinguer des irrigants qui n'ont accès à l'eau que lors du tour d'eau, d'autres accèdent à l'eau par plusieurs autres moyens. La source secondaire d'eau peut être continue (puits illicites, branchement privé sur le réseau d'irrigation ou sur le réseau d'eau potable) ou temporaire (récupération de l'eau du drainage, des privilèges donnés par les GIC à quelques-uns, vol d'eau, etc.)

4. Raréfaction liée à l'incapacité des organisations locales à bien gérer l'eau

Même si l'eau est abondante à la source, seul un organisme de gestion bien compétent, bien doté de savoir-faire et de moyens peut garantir sa fourniture aux usagers. La gestion de l'eau dans les oasis de Gabès est assurée par cinquante deux groupements d'intérêt collectif (GIC), qui s'apparentent à des associations des usagers de l'eau agricole. (MEJRI, 1985) Sur le plan de l'organisation, Chaque GIC présente une structure hiérarchique, son conseil d'administration est placé sous la direction du président du Groupement d'intérêt hydraulique (GIH) qui n'est donc autre que le gouverneur, lequel assure l'autorité de tutelle. Le comité du GIC comprend un président, 6 membres ou conseillers, et leur mandat est de trois ans. Actuellement, ces GIC comptent 19500 adhérents.

Il apparaît que le fonctionnement de ces GIC, a été toujours marqué par une présence forte des services techniques et du pouvoir politique. La gestion des systèmes irrigués a été prise en charge quasi-totalement par les services de l'encadrement du ministère de l'agriculture. Cette présence commence à se réduire avec la politique d'ajustement structurel et de désengagement de l'Etat (ELLOUMI ; 1996). Cette tendance exprime également une volonté de faire participer les usagers dans la gestion des systèmes d'irrigation. Ainsi les GIC sont désormais sollicités à prendre entièrement en charge la responsabilité de gestion de l'eau ainsi que l'entretien et la maintenance des équipements hydrauliques. L'administration n'a plus qu'un rôle d'encadrement et de consultation.

Cependant, ces organisations locales rencontrent aujourd'hui de multiples difficultés. Nos constatations révèlent un certain nombre d'anomalies dans la gestion du système hydraulique et le fonctionnement des GIC des oasis littorales, la situation est loin d'être satisfaisante.

4.1. Difficultés à gérer un système hydraulique complexe

Quoiqu'il soit un système hydraulique très moderne et très sophistiqué, il se présente pour ces structures locales comme étant un système hautement complexe, difficile à manœuvrer et à entretenir.

Non dotés d'un spécialiste, ces GIC saisissent mal les différentes composantes de leurs réseaux, ainsi que leurs fonctionnements. (Ouvrage de partage, de protection, de régulation, de comptage, de mise en charge, etc.), de sorte qu'ils conçoivent mal la façon adéquate pour mieux les gérer, les manipuler et les entretenir. Ce degré de qualification médiocre a eu des effets pervers sur la qualité de la gestion de l'eau et sur le service rendu aux agriculteurs. Outre le partage de l'eau qui à chaque fois est compromis, la dégradation progressive des ouvrages et des fuites d'eau considérables (manque d'étanchéité, usure des vannes, etc.) constituent une défaillance de taille. Les pertes d'eau dans le réseau d'irrigation variant globalement de 10 à 20 % du débit en tête, intègrent les fuites dans les conduites enterrées, dans la robinetterie et dans les seguias bétonnées (CRDA DE GABES, 1999) .

Par ailleurs, le suivi minutieux de l'exploitation de l'eau (volume pompé, volume distribué, etc.) dépasse largement ces groupements.

4.2. Des problèmes budgétaires

Après avoir été gratuite, l'eau est devenue de plus en plus chère. L'origine de cet enchérissement est:

- Le recours accru au pompage et le rabattement de la nappe
- La nécessité d'un personnel de gestion plus important
- Les besoins élevés en maintenance d'un réseau plus sophistiqué

Ainsi, le coût de production du mètre cube d'eau varie actuellement 40 à 75 Millimes alors qu'il n'était que de 10 Millimes en 1980. La consommation en énergie électrique des forages pompés vient en tête des frais de gestion de l'eau, soit environ 60% des frais des GIC.

Devant l'accroissement des charges liées à la quasi-généralisation du pompage et la réticence des agriculteurs de l'oasis quant au paiement de l'eau, et leurs refus catégoriques à l'augmentation de son prix, les GIC n'arrivent plus à gérer cette situation et à assurer leur équilibre budgétaire. Les conséquences de cette situation sur le service de l'eau sont parfois épouvantables. Des coupures d'électricité par la STEG pour non-paiement sont de plus en plus fréquentes. L'oasis est parfois dépourvue de ses ressources en eau alors qu'elle en a expressément besoin.

Ainsi, à défaut d'une structure de base compétente et bien dotée de moyens humains et financiers la gestion collective de l'eau et des infrastructures hydrauliques, reste en deçà des aspirations des usagers et demeure par conséquent source de raréfaction de l'eau pour l'oasis.

5. Raréfaction liée à des usagers peu impliqués:

La forte imbrication des oasis, considérées dans le sens commun comme " rural ", et de la zone urbaine nous a poussé à poser la question suivante: qui exploite aujourd'hui ces oasis? Sont-ce des agriculteurs au vrai sens du terme, c'est à dire des exploitants à temps complet et vivant uniquement du revenu agricole, donc ayant un statut plus ou moins homologué? ou bien une autre catégorie qui n'a plus de lien que partiel avec sa terre, et a bien d'autres activités urbaines qui l'attachent à la ville.

L'identification du profil général des usagers de l'eau agricole, révèle que moins de 3% seulement, se contentent du revenu de leurs exploitations. Les sources de revenus extra-agricoles se répartissent de la manière suivante:

Tableau n°11: La pluri-activité dans l'oasis de Gabès (ABDEDAYEM ; 1997)

Sources de revenu extra-agricole	%
Les industries	27
La fonction publique	36
La fonction libérale	19
L'émigration	11
Divers	7
Total	100

Pour ces pluriactifs, le revenu agricole représente moins de 20% de leur revenu global.

On ne peut, néanmoins, mettre tous les bénéficiaires d'un revenu extra-agricole dans la même catégorie; en effet, cette répartition masque une différenciation beaucoup plus variée du moment qu'on s'intéresse à la base matérielle et au statut social de chacun. On rencontre, à côté des petits paysans, des commerçants-agriculteurs, des entrepreneurs-agriculteurs, des instituteurs-agriculteurs, etc.

Ainsi, on ne peut désormais parler des usagers de l'eau agricole comme une catégorie bien identifiée que sont les agriculteurs, mais plutôt comme une panoplie d'usagers. La prépondérance des citadins marque cette esquisse de typologie des usagers de l'eau agricole. Ce changement radical dans le profil de l'usager d'un paysan pleinement engagé dans l'activité agricole et dans tout ce qui s'y rattache (coopérative de service, gestion de l'eau, etc), en un usager quasi-indépendant de l'agriculture n'est pas sans conséquence sur la gestion de l'eau. En

effet, ce nouvel exploitant de l'oasis est faiblement impliqué dans les affaires qui ont trait à la gestion collective de l'eau et n'adhère presque pas aux différentes interventions sur le réseau d'irrigation (entretien réparation, etc.) Il considère cependant que c'est la tâche des GIC, voire de l'Etat. De plus, il est moins sensibilisé à la problématique de l'eau et à la nécessité de l'économiser et il répond mal même aux différentes incitations de l'Etat pour aménager sa parcelle. Cette passivité complique davantage la gestion de l'eau dans l'oasis et conduit vraisemblablement à une nouvelle rareté.

6. Raréfaction liée à une parcelle exiguë et des comportements ancestraux

La prédominance de la micro-propriété dans la majorité des oasis littorales (0.35ha au moyenne) constitue une contrainte majeure qui a rendu très complexe la gestion de l'eau et sa valorisation, ceci se manifeste au moins sur trois niveaux :

- L'acheminement de l'eau entre les différentes parcelles est très complexe et engendre des pertes d'eau énormes.

- La collecte des redevances annuelles est très lourde.

- Difficultés de valorisation par petits exploitants d'une eau de plus en plus chère.

D'un autre côté, L'architecture de la parcelle garde encore ses spécificités premières. En effet, le trajectoire des canaux en terre à l'intérieur de celle-ci avec ses différentes dérivations ainsi que les larges sections de ces canaux sont façonnées pour assurer le transit d'un débit qui ne descendait guère au dessous de 80 l/s (alors que le débit actuel n'est que de 25 l/s). De plus, les planches sont très spacieuses (plus de 50 m²) et aplanies avec une légère contre pente pour éviter que l'eau pressée n'érode ces planches et ne transportent les semences sommairement enfouies. De même, le comportement actuel des irrigants lors des irrigations n'a pas suivi les exigences du nouveau système d'irrigation (Maniement d'un débit par agriculteur moins important), cependant, les irrigants continuent à manier l'eau comme si elle était abondante (ouverture simultanée de plusieurs planches, nivellement en contre pente, travail en sous module en commençant toujours par la partie du terrain la plus haute, etc).



Mode d'irrigation actuel dans les oasis littorales

Il est vrai que ce savoir-faire est d'une grande richesse, mais il semble inadapté au nouveau mode d'irrigation. La modernisation du système d'irrigation nécessite un bouleversement total dans

l'architecture de la parcelle ainsi que dans les comportements des agriculteurs, chose qui n'est faite que d'une manière insignifiante vu le poids de la tradition hydraulique dans les oasis (BECHRAOUI, 1980).

Quoi qu'il en soit, cette architecture héritée de la parcelle oasienne et ce comportement incompatible sont aujourd'hui à l'origine de beaucoup de fuite d'eau et de sa mauvaise gestion.

7. Raréfaction liée à des systèmes de production différenciés

Alors que les années 60 étaient caractérisées par des activités agricoles intégrées ressemblantes et s'identifiant bel et bien au mode de production paysan, on assiste aujourd'hui à un éclatement sans précédent de ces systèmes et à une nette différenciation de l'espace oasien. Tous les systèmes de production n'ayant pas eu les mêmes capacités d'adaptation, sont devenus très diversifiés et dotés d'un fonctionnement économique, technique et social très différencié.

Un premier groupe de systèmes, qui avait un fonctionnement normal jusqu'à la moitié des années quatre-vingts, se caractérise aujourd'hui par un niveau d'intensification relativement bas et par un revenu agricole qui régresse. Les facteurs qui ont freiné ces systèmes et l'ont empêché d'évoluer et de s'adapter sont quasiment les mêmes:

- L'exiguïté de l'espace
- Une main d'œuvre familiale limitée et vieillie
- Absence de moyens financiers
- Revenu extérieur et indépendance vis-à-vis de l'exploitation

L'avenir de ces systèmes immobiles est en question. Un seul choix s'impose: soit évoluer vers des systèmes plus intensifs, soit régresser davantage pour prendre une forme d'abandon.

Ce groupe en difficulté est dans l'incapacité de supporter les charges de production et particulièrement à payer l'eau et à bien la valoriser. Au fur et à mesure que leurs difficultés s'accroissent, il demande de moins en moins d'eau. C'est une rareté provoquée par la régression du système lui-même.

Un deuxième groupe de systèmes de production, moins répandu que le premier, ayant tous au moins trois points communs: une forte implication des exploitants dans l'activité agricole, un niveau d'intensification relativement élevé et un revenu agricole important. Engagées délibérément dans l'économie de marché, ces exploitations privilégient les cultures spéculatives. Toute la production est exclusivement destinée à la vente.

Cette tendance vers la spécialisation est un fait très récent et original. Elle répond également à une demande urbaine sans cesse accrue. Son originalité réside dans le fait de sa dualité avec l'image même du système oasien en tant que système diversifié.

Cette évolution poussée de ces exploitations a été soutenue par:

- Un accès secondaire à l'eau
- L'âge relativement jeune de l'exploitant
- Une contribution familiale dans les travaux de l'exploitation
- Une capacité d'investissement plus importante (intrant, travail du sol, etc.)
- Une exploitation relativement grande

Ces systèmes spécialisés, quoi qu'ils valorisent beaucoup mieux l'eau, agissent désormais dans une logique productiviste qui ne fixe pas de limite quant à leur consommation en eau. Leur demande en eau reste toujours insatisfaite. En outre, ce groupe aisé paye l'eau au même prix que les plus démunis.

8. Conclusion :

Pour combattre un climat sudiste aride, sinon avare, et répondre à une demande en eau d'une société en pleine expansion, les moyens déployés par l'Etat durant les dernières décennies pour mobiliser de l'eau de la nappe du Djefara sont à leurs extrêmes. Les oasis du sud-est tunisien ont largement profité de cette politique. L'eau qui y est allouée ne fait plus défaut, néanmoins, il s'avère que la demande en eau de ces oasis n'est pas totalement satisfaite, des secteurs sont parfois assoiffés.

Les constats relevés aujourd'hui, (en réponse à la question posée au départ: la rareté de l'eau est-elle physique, réelle ou bien liée à des facteurs plutôt sociaux et économiques) permettent, non d'apporter une réponse catégorique mais d'instituer et de fonder un nouveau cadre de réflexion et de vision. La question est d'une nature multidisciplinaire et ne peut par conséquent être abordée que dans l'analyse du rapport de la société avec les ressources naturelles d'une

manière générale et les ressources en eau en particulier et de l'évolution de ce rapport. En effet, auparavant, la situation ne se caractérisait pas uniquement par une demande sociale en eau faible, (puisque les oasis étaient l'unique demandeur), mais essentiellement par un système social de gestion beaucoup moins contraignant et stable et une harmonie quasi-parfaite entre la société et son hydro-agro-système. Aujourd'hui, la situation se complique non du fait de l'amplification de la demande mais surtout à cause du bouleversement et de la perturbation du rapport de l'homme avec les ressources d'une manière générale liés aux changements que connaît la société rurale. Les raisons explicatives de la rareté de cette ressource ou plutôt de sa raréfaction qui ressortent donc sont en étroite liaison avec des aspects socio-économiques et avec le mode d'organisation collective dans ces territoires. L'eau est inégalement répartie entre les différents secteurs de la même oasis ainsi qu'entre les exploitants du même périmètre. La diversité agro-écologique au sein de l'oasis a été complètement négligée dans l'allocation de cette ressource. De plus, les GIC dans le nouveau contexte économique sont confrontés à des difficultés insurmontables. Avec la nouvelle situation hydraulique à laquelle s'ajoutent les conditions techniques et économiques difficiles de l'exploitation oasienne et la faible participation des paysans, ces structures ne sont pas en mesure d'assurer une gestion durable des infrastructures et des ressources hydrauliques. En outre, les modes de productions nouvelles sont dans la plupart des cas sources de raréfaction de l'eau pour eux-mêmes.

Finalement, on peut dire que ni l'offre en ressource, ni la demande accrue de l'eau ne doivent être placées au premier plan dans l'étude de la question de la rareté de l'eau dans les oasis. Il est impératif de donner plus d'intérêt au système de gestion, et de tenir compte de la diversité des situations, car quelle que soit la quantité d'eau mobilisée pour l'oasis, si des efforts en terme de gestion ne sont pas consentis, la crise subsistera.

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Les acteurs¹ de l'eau des territoires péri-urbains Nord-Est de Mumbai² *Rôle des opérateurs informels³*

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Les territoires péri-urbains des mégapoles du Tiers-Monde font l'objet de transformations démographiques, économiques et environnementales, lesquelles influent sur le niveau de l'offre et de la demande en eau. Souvent, les politiques publiques d'alimentation s'y adaptent difficilement et l'approvisionnement en eau par le réseau de la grande distribution n'est pas satisfaisant. Ainsi, la satisfaction (ou la non-satisfaction) des besoins des populations péri-urbaines passe aussi par des opérateurs informels qui fonctionnent en complémentarité du réseau municipal. Par opérateurs informels, on entend tout type d'approvisionnement en eau hors du cadre institutionnel de gestion de la ressource et du service de la municipalité. Il s'agit souvent de petits opérateurs privés - alternative aux opérateurs officiels.

Cette communication a pour but

- d'identifier le rôle des opérateurs informels dans la satisfaction de la demande des ménages péri-urbains dans la région de Vasai-Virar, d'examiner comment ces opérateurs fonctionnent et évoluent, et en quoi ils constituent une solution alternative au réseau municipal ;
- de les mettre en relation avec les différentes strates de population et de tracer la frontière entre ce qu'il est convenu d'appeler la population pauvre et le reste de la population ;
- d'identifier les différents types d'insatisfaction de la demande, afin de comprendre les stratégies des ménages dans le choix des opérateurs d'approvisionnement.

Après un bref survol des territoires péri-urbains de Mumbai et de la région de Vasai-Virar, on présentera les différents types d'approvisionnement formels et informels présents sur le territoire. Par la suite, on mettra en lumière les disparités apparaissant dans l'approvisionnement des ménages, qu'il soit assuré par les municipalités ou par de petits opérateurs privés. Enfin, on dressera une première liste des déterminants pour le développement des opérateurs informels.

¹ Ils ne sont pas présentés sur cette communication les acteurs qui indirectement influent sur les marchés de l'eau, ex : constructeurs, ONG, etc...

² Région de Vasai-Virar.

³ Cette communication fait suite à un travail de terrain sur les territoires péri-urbains de Greater Mumbai (région de Vasai-Virar), de janvier à octobre 2005, travail réalisé en collaboration avec le CSH - Centre de Sciences Humaines - à New Delhi.

1 – Présentation des territoires d'étude

1.1 Description des territoires péri-urbains de Mumbai⁴

La ville de Mumbai et ses territoires péri-urbains forment la MMR⁵. C'est un territoire de 4.355 km², qui regroupe quatre *Municipal Corporation*⁶ (Mumbai, Thane, Kalyan, Navi Mumbai), dix-neuf *Municipal Council*, sept *Gram Panchayat* et 995 villages. Les limites administratives du territoire couvrent le *District* de Mumbai et une partie des *Districts* de Thane et de Raigar. Les limites de la MMR évoluent depuis quarante ans et incluent les nouvelles zones d'influences de Mumbai. Elles ne suivent ni les limites administratives, ni physiques. Elle est plutôt la zone d'influence de Greater Mumbai. Les territoires péri-urbains de Mumbai se transforment depuis les années 1960. Jusqu'en 1968, la part importante de l'urbanisation s'est réalisée dans les limites de Greater Mumbai. L'idée était, dans les années 1970, de mettre en place par une politique de décentralisation, la promotion des nouveaux centres urbains dans la périphérie de Mumbai. Mais durant les années 1980 et 1990 le développement industriel dans la MMR a été lent, les emplois industriels ont régressé, les moyens financiers nécessaires à la promotion du développement poly-centrique n'ont pas été suffisants et l'opération s'est soldée par un échec. Ainsi, le développement urbain s'est concentré le long des couloirs de transports, notamment ferroviaire, initialement sur l'axe Mira-Bhayander / Vasai-Virar et Thane / Kalyan et par la suite sur l'axe Vashi / Panvel.

1.2 Le développement de la région de Vasai-Virar

La région de Vasai-Virar fait partie des territoires péri-urbains Nord-Est de Mumbai. Séparée de Greater Mumbai par la baie de Vasai, la région est liée par un réseau routier et ferroviaire à Mumbai et aux autres territoires péri-urbains. Le développement et la croissance de la région commencent dans les années 1970. La mise en application de *Urban Land Ceiling and Regulations Act*⁷ sur une partie des territoires de la MMR (à l'exclusion de la région de Vasai-Virar) ainsi que le développement du réseau ferroviaire ont favorisé le développement et l'urbanisation rapide de la région. Depuis, de nouvelles populations s'y installent, de nouvelles activités s'y développent, les usages du sol évoluent, changent, créant des tensions entre zones agricoles et zones urbaines, zones vertes et zones industrielles. Ces changements vont notamment renforcer les conflits sur l'appropriation de la ressource.

Le fort accroissement démographique de la région trouve ses racines dans un taux de natalité soutenu et par un double flux de population : le premier en provenance de Mumbai vers les territoires péri-urbains, et le second en provenance de l'arrière-pays vers la ceinture de Mumbai, dans l'espoir de trouver un travail. Avec un

⁴ Carte de la MMR en fin de la communication

⁵ MMR : Mumbai Metropolitan Region – Aire Métropolitaine de Mumbai.

⁶ Municipal Corporation : c'est l'organisation administrative des villes de plus de 500.000 habitants. Les villes de 20.000 à 500.000 habitants sont organisées en Municipal Council. Gram Panchayat est une organisation administrative qui regroupe des villages.

⁷ Urban Land Ceiling and Regulations Act, 1976 : Cette loi imposait des restrictions au développement urbain de Greater Mumbai, et certaines zones péri-urbaines (Thane, Mira Bhayandar, Kalyan).

accroissement rapide du prix du sol à Greater Mumbai, des ménages de classe moyenne et inférieure s'y installent et trouvent là un logement à prix raisonnable.

La croissance démographique de la région entre 1971-1991 a été plus forte que ce qui était prévu par le *Regional Plan*⁸ de 1973. La population de la région de Vasai-Virar de 1.86 lakhs⁹ en 1981 est passée à 3.22 lakhs en 1991 et 6.22 lakhs en 2001.

La région de Vasai-Virar s'étend sur 380 km² et regroupe quatre villes (Vasai, Navghar-Manikpur, Nallasopara, Virar) et quarante-sept villages, deux zones industrielles et des terres agricoles et forestières. La superficie de ces quatre villes est d'environ 11 % du territoire total de la région. Initialement, le développement régional s'est concentré autour de trois stations du train péri-urbain (Vasai Road, Nallasopara, Virar), ce qui implique que cette région peut supporter encore plus d'urbanisation dans les années à venir.

Tableau n° 1 : Evolution de la population

	Population				Taux d'accroissement		
	1971	1981	1991	2001	1971-81	1981-91	1991-01
Vasai	30.594	34.940	39.781	49.346	1.34	1.31	2.18
Navghar-Manikpur	+	+	59.324	116.700			7.00
Nallasopara	+	+	67.732	184.664			10.55
Virar	+	+	57.600	118.945			7.52
Greater Mumbai	5.970.575	8.243.405	9.925.891	11.914.398	3.28	1.87	1.84

Source : MMRDA, Census 1971, 1981, 1991, 2001. Les populations de Navghar-Manikpur, Virar et Nallasopara étaient comptabilisées comme rurales jusqu'au recensement de 1991.

2 – L'approvisionnement en eau

2.1 Les opérateurs officiels

L'approvisionnement en eau sur les territoires péri-urbains de Greater Mumbai est inégal et dépend des possibilités et moyens des pouvoirs locaux. Face à une demande croissante, les populations sont souvent dépourvues d'un réseau de distribution fiable. Le système de distribution d'eau ne suit ni la croissance démographique, ni l'étalement urbain.

Initialement, l'approvisionnement en eau de Vasai-Virar était organisé autour de puits et de forages privés et publics. Les premiers kilomètres du réseau approvisionnant les petits centres des villages urbanisés ont été mis en place dans les années 1980, à l'époque où les territoires étaient encore sous l'autorité de *Gram Panchayat*. Progressivement, les villages se sont regroupés en villes, sous le pouvoir administratif de *Municipal Council* la politique de l'eau a été déléguée au département hydraulique de chaque municipalité¹⁰. A un rythme plus ou moins soutenu, l'extension du réseau a

⁸ Document de planification de la MMR, réalisé par la MMRDA.

⁹ 1 lakh = 100.000

¹⁰ Sur le territoire de Vasai-Virar, chaque municipalité a son propre département hydraulique ; l'alimentation en eau des zones industrielles est gérée par le MIDC – Maharashtra Industrial Development Corporation- ; l'eau au niveau villageois est gérée par les Gram Panchayat. Il existe un organisme semi-étatique MJP – Maharashtra Jeevan Pratikharan- qui, sous demande des autorités locales, soutient techniquement les autorités locales et réalise les nouveaux projets d'adduction et de distribution d'eau de la région.

été entreprise, avec en parallèle la mise à disposition de nouvelles ressources en eau. Dès 1985, une politique locale de planification de la ressource commence, avec la mise en place de nouveaux projets d'adduction d'eau pour alimenter les centres urbains en expansion. Mais les pressions s'exacerbent entre les ressources. La demande en eau agricole se heurte à la demande croissante en eau des ménages ainsi qu'aux nouvelles activités industrielles et commerciales. Malgré les projets d'adduction, l'accès à l'eau sur ces territoires ne suit pas la demande croissante de l'urbanisation et a du mal à s'adapter aux nouveaux territoires urbanisés. Ainsi, l'approvisionnement en eau, jusqu'à aujourd'hui, ne respecte pas sur l'ensemble des territoires urbains la norme indienne de 70 lpcd¹¹.

Les quatre villes de la région s'approvisionnent à hauteur de 15 MLD¹² par des puits et des forages, 15 MLD par des camions-citernes privés et 25.5 MLD par le réseau municipal. Actuellement un nouveau projet d'adduction d'eau est en cours de réalisation le « Surya water supply scheme » qui fournira 100 MLD au territoire¹³. L'approvisionnement en eau sur ces territoires n'a ni vraiment une forme d'approvisionnement urbain, ni rural. Faute du manque et du retard de planification, de moyens financiers et de volonté politique, ces territoires sont dépourvus d'un système d'approvisionnement fiable. Ainsi, des opérateurs privés apparaissent pour combler la demande en eau domestique.

Tableau n°2 : Sources d'approvisionnement officielles et informelles des quatre villes

Ville	Population 2001	Offre MLD	Offre lpcd	Opérateurs alternatifs
Vasai	49.346	2.5	100	puits & forages, points d'eau en libre accès
Navghar-Manikpur	116.700	8.0	69	camions-citernes, puits & forages, revendeur privés, points d'eau en libre accès
Nallasopara	184.664	8.0	40	camions-citernes, puits & forages, revendeur privés, points d'eau en libre accès
Virar	118.945	7.0	55	puits & forages, camions-citernes, points d'eau en libre accès

Source : MJP. Les données communiquées sont pour 31/12/2003

L'offre en MLD et lpcd concerne l'approvisionnement par le réseau municipal.

2.2 Les petits opérateurs privés présents sur la région

Plusieurs types d'opérateurs à la fois publics et privés, officiels et informels coexistent pour la satisfaction de la demande des ménages péri-urbains.

En complémentarité au réseau municipal et/ou à la marge du réseau municipal, on identifie quatre groupes de petits opérateurs privés :

- 1) les entreprises de camions-citernes ;
- 2) les propriétaires de puits, forages et carrières ;

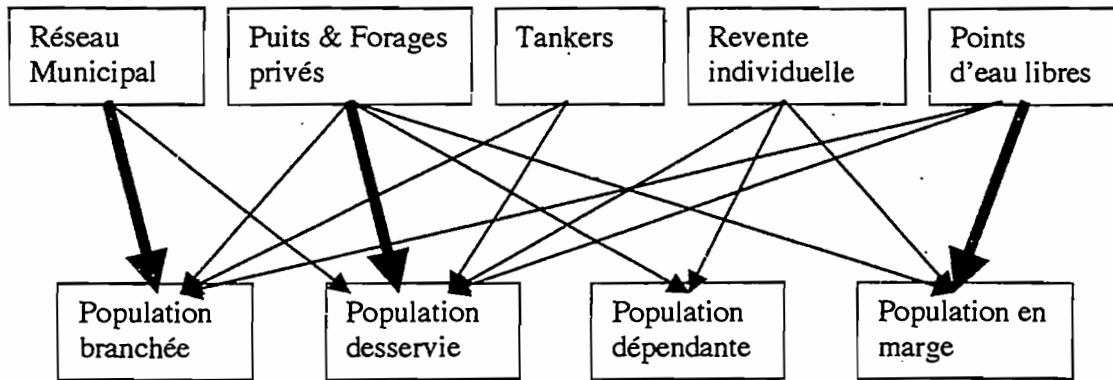
¹¹ 70 lpcd (litre per capita per day) est la norme indienne d'approvisionnement en eau des villes sans système d'évacuation des eaux usées.

¹² MLD : Millions Litres per Day

¹³ Ces 100 MLD d'eau sont à partager entre quatre villes et 47 villages. 30 MLD approvisionnent déjà la région, mais il n'existe pas de compromis entre les différentes autorités locales pour le partage de cette eau.

- 3) les ménages revendeurs d'eau municipale ;
- 4) les points d'eau en libre accès.

Graphe n° 1 : La desserte en eau



Les premières entreprises de camions-citernes apparaissent au milieu des années 1980. Faute d'un approvisionnement suffisant de la part des municipalités et d'une demande croissante par la population nouvellement installée dans la région, des petites entreprises informelles¹⁴ de camions-citernes se sont développées et atteignent aujourd'hui 140 entreprises, chacune avec 3-4 véhicules. Elles sont organisées en trois associations¹⁵. Elles s'approvisionnent à des puits, forages, carrières¹⁶, étangs et des rivières ; et sans aucun traitement vendent cette eau pour potable. Leur fonctionnement est très structuré. Des règles internes définissent le partage des nouveaux clients, l'arrivée d'une nouvelle entreprise, la fixation du prix, l'aire desservie, etc.

En ce qui concerne les propriétaires de puits et de forages, ils sont à la fois consommateurs et fournisseurs de leur ressource. Une grande partie de la population de la région s'alimente par des puits et des forages, privés et publics. C'est notamment le développement des sources privées qui sont les plus importantes sur la région, alors que les municipalités limitent l'usage des sources publiques à des fins autres que pour la boisson et la cuisson. Malgré cet usage accru de l'eau souterraine, les municipalités n'ont pas un registre exact du nombre de puits et forages sur leur territoire, même si une autorisation municipale et de la GWSDA¹⁷ est nécessaire pour tout nouveau forage.

Troisième catégorie de fournisseurs d'eau potable, les ménages qui ont une connexion individuelle au réseau de la ville et revendent quotidiennement cette eau aux ménages voisins. Cette pratique n'est pas généralisée sur tout le territoire, mais sur certains quartiers de Nallasopara et de Navghar-Manikpur.

¹⁴ Entreprise informelle : C'est une entreprise généralement individuelle, de petite ou moyenne taille, qui n'a pas de reconnaissance administrative, n'est pas fiscalisée et généralement pas comptabilisée dans le PIB officiel.

¹⁵ La première association s'est enregistrée sur le Registre des Associations au District de Thane en 1987. Aujourd'hui, trois associations existent, mais une seule regroupe la grande majorité des entreprises de camions-citernes.

¹⁶ Durant la mousson, les carrières qui ne sont plus exploitables sont remplies d'eau. Les propriétaires vendent cette eau aux entreprises de camions-citernes.

¹⁷ GWSDA : Ground Water Survey and Development Authority. C'est l'autorité responsable pour le monitoring de l'eau souterraine.

Dernière catégorie sont les points d'eau en accès libre. Une part de la population urbaine de la région s'approvisionne auprès des robinets publics, des puits et forages publics, des lacs, des étangs et récupère l'eau de pluie. C'est notamment les ménages les plus pauvres de la région et en habitat précaire qui s'approvisionnent auprès de ces sources de manière régulière ou saisonnière.

3 - Pauvretés hydrauliques sur la région de Vasai-Virar

Sur les territoires péri-urbains de Mumbai et notamment sur la région de Vasai-Virar, la notion de pauvreté hydraulique peut être vue sous différents angles. Cette notion se réfère :

- 1) Aux populations pauvres, qui faute de moyens financiers suffisants n'accèdent pas à une ressource en eau de quantité et de qualité pour satisfaire leurs besoins. Ces populations considérées comme insolubles, sont exclues de l'approvisionnement par les opérateurs officiels et satisfont leurs besoins par des sources d'approvisionnement alternatives gratuites et/ou payantes.
- 2) Aux populations qui ont un accès en eau de quantité et de qualité insuffisants pour satisfaire leurs besoins. Ces populations faute de la disponibilité de la ressource, de la qualité du service et des modes de gestion, sont dépourvues d'un approvisionnement fiable. Ainsi, les gens vont satisfaire leurs besoins par d'autres sources, alternatives aux opérateurs formels.

Sur la région de Vasai-Virar, la part de la population urbaine raccordée qui satisfait totalement ses besoins par le réseau municipal est limitée. Il est difficile d'avoir des chiffres exacts car, les municipalités ne connaissent pas, ne mesurent pas le nombre des ménages raccordés, qui ont recours à des moyens d'approvisionnement alternatifs. Ce problème s'aggrave par le fait d'une mauvaise connaissance du nombre de la population habitant dans des bidonvilles, ayant accès à des connexions de groupe ou des robinets publics. En étant prudent et selon le taux officiel de raccordement de chaque ville, on peut identifier des grandes tendances.

- Vasai : Sur une population de 49.346, 20.000 sont connectés au réseau municipal.
- Nallasopara : Sur une population de 184.538, environ 150.000 personnes sont connectées au réseau municipal.
- Navghar-Manikpur : sur 116.700 hab, la municipalité pense en desservir 110.000.
- Virar : La municipalité avance une couverture de 100% de la population par le réseau municipal.

Mais, il s'agit ici de chiffres indicatifs qu'il faudra traiter avec précaution. Il serait peut-être plus pertinent d'essayer de mesurer le phénomène de recours à des opérateurs informels pour chaque ville et de comprendre le choix (si c'est un choix) des ménages entre les différentes sources alternatives qui leur sont proposées ou imposées.

3.1 Le choix des opérateurs informels d'approvisionnement

Il s'agit d'essayer de dresser une première liste des facteurs qui influent sur les stratégies des ménages dans le choix des sources alternatives d'approvisionnement. S'agit-il d'un choix, sachant que les différents modes d'approvisionnement informels sont très localisés et saisonniers et dépendent de l'insatisfaction de la demande des ménages ?

Selon le mode d'accès à l'eau des ménages, on peut les classer en quatre groupes :

- **Population branchée**. Sa principale source d'approvisionnement c'est le réseau municipal.
- **Population desservie**, dont la principale source d'accès à l'eau est les puits ou les forages privés.
- **Population dépendante**, qui n'a pas un accès direct à la ressource et qui achète l'eau aux propriétaires des puits et forages privés et/ou aux revendeurs privés.
- **Population en marge**, qui s'approvisionne principalement à un point d'eau en accès libre.

La disponibilité et l'accessibilité, tant physiques que temporaires, de la ressource sont un facteur décisif pour l'accès à des sources alternatives. Ainsi, sur la ville de Vasai, qui est bien dotée en eau souterraine, 30.000 personnes choisissent les puits et les forages privés. Les ménages desservis ont à leur disposition une eau abondante de très bonne qualité¹⁸. Cette disponibilité de la ressource pourrait expliquer l'absence d'entreprises de camions-citernes. Navghar-Manikpur, Nallasopara et Virar qui sont sur des territoires pauvres en ressources souterraines connaissent l'apparition d'entreprises de camions-citernes, en tant qu'alternative au réseau municipal. Les puits et forages (très profonds) sur ces territoires ne peuvent pas garantir l'approvisionnement tout au long de l'année.

Le type de besoins insatisfaits par le réseau pourrait définir le choix des opérateurs. L'étude indique que les ménages procèdent à une hiérarchisation de leurs besoins domestiques selon la quantité et la qualité d'eau nécessaire pour chaque usage. Ils définissent le type de source, la quantité et la qualité pour les différents usages :

- 1- eau potable et la cuisine,
- 2- eau pour la douche,
- 3- eau pour le lavage (vaisselle, lessive, nettoyage),
- 4- eau pour les toilettes,
- 5- eau pour le jardin,

et ensuite ils attribuent un budget.

Ainsi, nombre de ménages de Navghar-Manikpur utilisent l'eau municipale pour satisfaire leurs besoins en eau potable et la cuisine et puis selon la quantité disponible ils satisfont le reste de leurs besoins en s'approvisionnant à des entreprises de camions-citernes et auprès des puits et des forages. La municipalité estime qu'au moins 70.000 personnes utilisent les entreprises de camions-citernes. Dans la même ville, la population qui n'a pas accès au réseau municipal est desservie principalement par des puits et forages privés. Une part de cette population se tourne vers des revendeurs privés pour l'eau potable et la cuisine (en moyenne 20 à 40 litres) avec une ressource de bonne qualité. La lessive s'effectue avec l'eau des lacs¹⁹. Exceptionnellement, ces ménages recourent aux camions-citernes à cause du prix très élevé.

Autre pratique relevée, c'est la récupération de l'eau de pluie. Mode saisonnier, il s'agit d'une eau gratuite et abondante. Les ménages les plus démunis utilisent différentes sources gratuites : robinet public, puits, forages, lacs, eau de pluie et si nécessaire, achètent l'eau auprès des revendeurs individuels.

¹⁸ L'étude de terrain a montré que les ménages considèrent l'eau souterraine de bonne qualité quand il n'y a pas des problèmes de salinisation. Cette eau ne satisfait pas nécessairement les normes de potabilisation.

¹⁹ Il s'agit d'une eau de quantité abondante et gratuite mais de qualité médiocre.

Chaque ménage, selon la priorité de ces besoins et ces moyens financiers, s'approvisionne auprès des différentes sources. Mieux connaître la structure de la demande des ménages péri-urbains²⁰ permettra de mieux comprendre les différents niveaux de pauvreté hydraulique et ainsi définir le rôle des opérateurs informels.

Les ménages péri-urbains combinent différentes sources d'approvisionnement. Ils choisissent une première source et selon le niveau de satisfaction de leurs besoins, ils vont choisir une deuxième et une troisième. C'est un calcul complexe à la fois financier, qualitatif et quantitatif.

3.2 Le choix des ménages les plus démunis

L'ensemble de la population est touché par l'irrégularité du service, mais il reste à spécifier les problèmes propres aux populations les plus démunies.

En effet, cette région est surtout constituée de ménages à faible et moyen revenu, (Navghar-Manikpur et à Nallasopara²¹). Quantifier la part de la population la plus précaire n'est pas une simple affaire. Les habitants des bidonvilles sont estimés à 5% - 10% de la population de chaque ville. Mais ces estimations sont à prendre avec précaution, car il s'agit de bidonvilles informels, où les municipalités ne tiennent pas un registre exact de la population.

On peut essayer d'estimer la population précaire par le type de logement et les infrastructures hydrauliques²² de chaque ménage. On devrait comptabiliser les ménages qui vivent dans des *chawls*²³, des constructions semi-permanentes et des *huts*²⁴. Il s'agit de constructions qui avaient et/ou ont toujours un plus faible accès au réseau municipal que les autres, avec, selon les villes, des branchements individuels ou collectifs et qui disposent de peu d'infrastructures sanitaires. On associe ainsi la pauvreté hydraulique au type d'habitat et cela est un fait révélateur sur le territoire d'étude.

Dans Vasai, Navghar-Manikpur et Nallasopara 60 %, 5 % et 30 % respectivement de la population ne sont pas branchés au réseau et dans la ville. Mais les réalités hydriques ne sont pas les mêmes entre les villes, car pour Vasai, c'est un choix des ménages. Pour les deux autres villes, il s'agit des populations desservies qui combinent deux ou plusieurs types d'approvisionnements. La principale source d'accès à l'eau à Nallasopara sont les forages privés (1 pour environ 50 familles). Les ménages s'approvisionnent de manière régulière à des revendeurs individuels car l'eau souterraine n'est pas de bonne qualité. Troisième source d'approvisionnement que l'étude a relevé c'est le lac et quatrième source importante durant la mousson c'est la récupération d'eau de pluie, pour tout usage, même pour l'eau potable et la cuisine.

Une tendance forte émerge dans les politiques de la ville dans les territoires péri-urbains de Mumbai, (y compris depuis peu à Vasai-Virar). Elle concerne la suppression des robinets publics et leur remplacement par des connexions de groupe. Sur d'autres territoires, cela a provoqué l'augmentation de la précarité hydraulique des ménages, car

²⁰ Mon travail de thèse vise à répondre à cette exigence.

²¹ Nallasopara Est a les plus grands bidonvilles de la région.

²² Infrastructures hydrauliques : type de branchement (individuel, collectif, robinet public), point d'eau à l'intérieur ou à l'extérieur de la maison, équipement sanitaire.

²³ Chawl : Il s'agit de construction ouvrières RdC + 1, RdC + 2, ce sont des chambres alignées avec une coursive extérieure.

²⁴ Hut : Construction précaire en tissus, bout de bois et de carton, bâches plastiques, etc.

tous n'ont pas les moyens de payer des branchements de groupe et cela a aggravé les conflits sur l'accès à la ressource.

4 – Des disparités dans l'approvisionnement

De grandes disparités deviennent évidentes dans l'approvisionnement entre les quatre villes et à l'intérieur de chacune d'elles. Elles concernent à la fois le réseau municipal et les opérateurs informels. Les ménages selon leur localité, le type d'habitat et leurs moyens financiers n'ont pas accès aux mêmes sources, quantité et qualité d'eau.

4.1 Des disparités au niveau de chaque ville par le réseau municipal

Au niveau de chaque ville des disparités existent dans l'alimentation des différents quartiers par le réseau municipal. Elles sont dues à un déficit hydraulique, à un réseau inadapté aux besoins du territoire, à une mauvaise gestion municipale et à la politique de la ville.

- Le système du réseau n'est pas généralisable à moyen terme. Il est ségrégatif et son extension se fait souvent aux dépens de l'organisation d'un système minimum, reproduisant des exclus²⁵, lequel ne garantit pas la satisfaction des besoins essentiels de l'ensemble de la population.

- Des quartiers ou des îlots d'immeubles ne sont pas connectés au réseau de la ville. La régularisation du territoire et des logements²⁶ n'est pas nécessaire pour avoir des logements connectés au réseau de la ville. Ainsi, un premier niveau de disparité entre les ménages apparaît faute d'accès au réseau. Un second est lié à l'intermittence du service. Selon les villes et les quartiers, l'approvisionnement dure de 15 minutes à 3 heures et le service est journalier ou par alternance tous les deux jours, voir moins selon les saisons²⁷.

- Le troisième niveau de disparité réside dans la gestion de la ressource et du service, au sein de la municipalité. Un département hydraulique mal organisé, ne respectant pas les créneaux horaires pour l'alimentation en eau de chaque zone de la ville, a comme conséquence un service irrégulier. La quantité d'eau distribuée dans la ville étant fixe, il y a des quartiers qui recevront plus d'eau et pour plus longtemps que leur quota journalier et d'autres moins. Ce type de problème est directement lié à une mauvaise gestion du département hydraulique, avec des employés mal formés, aux tâches imprécises et surchargés de travail. Mais des problèmes de gestion sont liés à une politique de clientélisme des municipalités pour mieux alimenter certaines zones résidentielles « choisies » au détriment d'autres quartiers de la ville.

- Un dernier point qui favorise une distribution inégale entre les ménages, c'est le type d'habitat et par conséquent le type de connexion : connexion de groupe, individuelle ou robinet public. De même selon la taille de la connexion (1/2''²⁸, 3/4''). Sachant que chaque zone de la ville doit recevoir une certaine quantité d'eau pour une durée de temps précise, tous les ménages ne reçoivent pas la même quantité d'eau.

²⁵ Sur le terrain, le revenu des ménages n'est pas un déterminant pour l'accès au réseau.

²⁶ De même, la régularisation du terrain et du logement ne sont pas déterminants pour l'accès au réseau. Par régularisation du logement, on entend un logement avec un permis de construire ; par régularisation du terrain, un terrain révisé par le plan d'occupation du sol.

²⁷ De février à mai (été) le service peut être moins fréquent à cause de l'assèchement de la source ; de juin à septembre (mousson) le service peut être perturbé par les mélanges d'eau.

²⁸ Une connexion 1/2'' inches égale 1,27 cm de diamètre ; 3/4'' = 1,905 cm.

Les quantités communiquées par les municipalités (tableau n° 2) ne donnent qu'une moyenne de la quantité distribuée par tête et par jour par le réseau municipal. Une grande diversité existe sur l'accès à l'eau selon que l'on regarde les modes d'approvisionnement, le type de connexion et le nombre de ménages concernés. Ainsi, à Navghar-Manikpur, on estime que l'approvisionnement par des robinets publics est de l'ordre de 30 lpcd, alors que sur certains quartiers résidentiels, il est de 70 lpcd (par des connexions de groupe). Bien que les quatre villes aient, en grande partie, les mêmes sources d'approvisionnement, elles pratiquent des prix différents. Quelques compteurs sont installés dans la région, mais généralement la facture est calculée en fonction du diamètre de la connexion. Ainsi, un autre type de disparité apparaît entre les ménages, selon le mode de calcul de la facture d'eau. Toute la population branchée au réseau paie l'eau. On ne peut pas considérer que les municipalités appliquent une facturation sociale auprès des plus démunis.

A titre indicatif, à Nallasopara une connexion de groupe de 1/2" pour 12 à 16 appartements est facturé 200Rs/mois/connexion ; une connexion de 1/2" pour un bungalow est facturé 200Rs/mois. Durant une heure, la municipalité estime fournir (par une connexion de 1/2") 1.500-2.000 litres d'eau, la disparité dans la quantité obtenue par chaque ménage est considérable. Alors qu'à Virar, une connexion de groupe de 1/2" pour 12 appartements est facturée 100Rs/mois/appartement et une connexion individuelle de 1/2" pour un bungalow est facturée 100Rs/mois. Ainsi les appartements à Virar paient l'eau bien plus cher que ceux de Nallasopara, et le système de facturation indique un système inégal entre ménages en appartement et ménages résidant dans des bungalows.

Les ménages aisés sont autant touchés par un approvisionnement irrégulier que les ménages à faible revenu, et les territoires régularisés sont autant touchés que les territoires « en dehors » à cause d'un service municipal inadapté. Il est difficile de comprendre au premier abord la politique et la logique de l'organisation de l'approvisionnement des quatre villes. C'est peut-être de cette complexité que les opérateurs informels profitent afin de s'organiser et se développer.

4.2 Des disparités par rapport au service des opérateurs informels

L'activité des opérateurs informels n'est pas uniforme. La présence des sources alternatives dépend de la disponibilité de la ressource, de la localisation sur le territoire, du type d'habitat, des moyens financiers des ménages. Ainsi, tous les petits opérateurs privés identifiés ne couvrent pas la totalité du territoire et des grandes disparités existent sur la quantité distribuée, la qualité et le prix de l'eau.

L'approvisionnement par des puits et des forages prédomine, mais son utilisation n'est pas identique entre les quartiers et les villes. La quantité puisée dépend de la localisation des territoires. Elle peut être utilisée comme source principale, mais aussi comme source complémentaire ou d'appoint. La quantité et qualité fournie est variable dans l'année, à l'exception des puits de la zone de la ville de Vasai, la plupart connaît des problèmes de salinisation, d'épuisement et d'eau boueuse selon les saisons (à la partie Sud-Ouest de Vasai, les nouveaux forages sont formellement interdits depuis 1998²⁹). Vasai est la partie la mieux dotée de la région, avec des problèmes de sécheresse et de salinité très marginaux. Ce qui est intéressant sur ce territoire c'est la volonté des ménages de rester indépendants du réseau et de garder comme source principale, voire exclusive l'eau des puits et des forages. Mais, ce choix des ménages

²⁹ A cause d'une surexploitation des eaux souterraines.

de Vasai, n'est pas généralisable aux autres ménages de la région. Ainsi, des disparités existent par rapport à l'accès aux puits et aux forages, selon la disponibilité d'eau souterraine dans l'année et sa qualité.

L'eau souterraine est une ressource relativement bon marché. Le coût d'entretien annuel du forage est très faible, et le seul coût qu'on attribue à cette ressource est celui de l'électricité pour pomper l'eau (dans les cas d'une pompe électrique). En ce qui concerne la vente d'eau de puit, de forage ou des carrières à des camions-citernes, les propriétaires facturent chaque camion Rs.50 et ce prix ne dépend ni de la qualité de l'eau, ni de l'époque de l'année.

Une grande partie de la population urbaine (Navgar-Manikpur, Nallasopara et Virar³⁰) s'approvisionne par des camions-citernes. Ce sont les villes qui se trouvent près des trois stations des trains de banlieue. Ce sont les territoires les moins fertiles et riches en ressources en eau. Les camions-citernes fournissent quotidiennement des immeubles mal desservis ou exclus du réseau municipal. Ils répondent aussi, à une demande saisonnière accrue de mars à juin. Bien que la qualité de l'eau fournie soit souvent médiocre, ce type d'approvisionnement constitue pour les ménages un moyen sûr d'obtenir une certaine quantité d'eau quotidiennement.

Les prix appliqués par les entreprises de camions-citernes sont en grande partie uniforme sur l'ensemble du territoire. Un camion-citerne de 10.000 litres est facturé environ Rs. 500, mais durant les mois d'été les prix grimpent rapidement ; et les clients saisonniers paient un approvisionnement jusqu'à Rs. 1.000. C'est principalement les immeubles qui recourent à ce type d'opérateurs, mais durant la période estivale, l'étude a montré que même les ménages en habitat précaire³¹ s'y approvisionnent et paient le prix fort.

Dernier type d'opérateur informel identifié : les revendeurs d'eau municipale. C'est un phénomène très localisé sur certains quartiers de Nallasopara et de Navgar-Manikpur. Les « ménages acheteurs » s'approvisionnent quotidiennement pour 20 à 40 litres d'eau de boisson et de cuisson et ils paient environ Rs. 50 à 70 /mois³² pour avoir un minimum d'eau de bonne qualité.

Cette grande variété de fournisseurs, de qualité, de quantité et de prix de la ressource correspond à une multiplicité de situations locales. En regardant les types d'approvisionnement à l'intérieur de chaque ville, on s'aperçoit que les opérateurs informels présents et les types de service, sont propres aux besoins de chaque territoire, de chaque quartier. Ainsi, les marchés informels reflètent des situations locales particulières, qu'il sera intéressant d'étudier par la suite afin d'examiner les rapports de force entre les différents acteurs, afin de comprendre comment ces marchés se structurent.

5 – Le développement des opérateurs privés

L'informalité de l'eau en Inde n'est pas un fait nouveau, mais ces dernières années, ce phénomène s'est accru notamment en territoires urbains et péri-urbains. Aujourd'hui, l'économie informelle regroupe un nombre plus varié de dispositifs

³⁰ Le phénomène est marginal à Vasai

³¹ Des ménages qui habitent dans des quartiers, qualifiés de « bidonvilles » par les municipalités, achètent de l'eau à ces opérateurs.

³² Il faut se rappeler qu'à Nallasopara un bungalow a comme facture mensuelle Rs. 200/mois.

d'approvisionnement, qui va des pratiques coutumières de gestion et de partage de la ressource, à des pratiques hors du cadre institutionnel de gestion par l'autorité locale compétente, en profitant de l'absence de réglementation stricte sur la gestion d'eau de surface et d'eau souterraine, jusqu'à des pratiques illégales. C'est valable pour l'ensemble de l'Inde et donc pour la région qui nous occupe. On va essayer de dresser quelques premiers éléments³³ qui pourraient expliquer le développement de ces opérateurs privés. On va regarder en quoi les territoires péri-urbains peuvent être un support pour le développement des petits opérateurs privés, ainsi que l'influence du cadre institutionnel, l'inadéquation entre planification et politique d'approvisionnement et les droits de propriété sur les ressources mal définies, sur ces territoires pour l'apparition et le développement du marché informel de l'eau.

5.1 A la recherche de la spécificité des territoires péri-urbains

Peut-on parler d'une spécificité des territoires péri-urbains et comment est-elle propice au développement des petits opérateurs privés ? On peut penser que la forme, la localisation, la structure, l'évolution, le potentiel de ces territoires promeuvent le développement des pratiques informelles d'approvisionnement en eau potable.

Un trait marquant est qu'il s'agit de territoires en mutation et en transition, de zone rurale en zone urbaine, de développement de nouvelles activités économiques et industrielles et disparition des activités traditionnelles, des lieux de transition et d'installation des populations hétérogènes. On devrait faire de la zone de Vasai-Virar un pôle économique complémentaire au développement de Mumbai, mais cette politique industrielle a échoué.

Des moyens ont partiellement été mobilisés, avec des résultats mitigés. Les autorités locales ont à la fois accepté, ignoré ou transformé ces projets et engagements en cours. Ainsi, un des nouveaux statuts qu'on attribue à la région de Vasai-Virar, c'est le terme de « territoire dortoir », car une grande partie de la population³⁴ de la région se déplace quotidiennement à Mumbai pour travailler. Cette tendance ne va pas changer rapidement, car le taux d'urbanisation de la région de Vasai-Virar, certes plus lent aujourd'hui que dans la période 1970-1990, reste supérieur à celui de Greater Mumbai. Durant longtemps, il n'y avait pas de cohérence dans la planification du territoire entre la métropole de Mumbai et ses territoires péri-urbains. Les autorités locales n'étaient pas capables³⁵ de gérer de grands projets de développement et d'urbanisation sur la région. Ce n'est qu'à partir de 1991, qu'une autorité spéciale³⁶ pour la planification de la région a été instaurée par le Gouvernement de Maharashtra. Mais, malgré cela, on ne retrouve pas un discours cohérent pour le développement du territoire, à cause des divergences d'intérêts et de priorités entre l'autorité de planification et les quatre municipalités.

³³ Il s'agit là des pistes d'analyse qui seront explorées ultérieurement dans ma thèse.

³⁴ Les municipalités considèrent qu'entre 60% à 70% de la population de la région se déplace quotidiennement à Mumbai.

³⁵ Surtout à cause du type d'administration : Gram Panchayat et Municipal Council

³⁶ L'autorité spéciale de planification de la région c'est CIDCO.

5.2 Le cadre institutionnel

La mise en place d'une politique de décentralisation et surtout l'adoption de l'amendement 74³⁷, devraient donner les pleins pouvoirs aux autorités locales pour planifier et gérer les ressources en eau. Mais le transfert de pouvoir décisionnel n'a pas été accompagné par une plus grande allocation de moyens techniques et financiers auprès des autorités locales. Les municipalités se trouvent alors dépourvues de moyens pour répondre aux exigences de la population qui s'y installe et qui demande des services urbains adéquats. Ainsi émergent les opérateurs informels faute d'une politique publique de l'approvisionnement efficace. Le secteur formel connaît l'existence et l'action des opérateurs informels et accepte leur présence, mais il ne favorise pas pour autant leur développement. On peut considérer qu'un accord tacite a été mis en place entre les deux parties, afin de garantir l'accès à l'eau à la population de la région. On peut se demander si les municipalités se désengagent de leur devoir de service public et/ou si on est en présence d'un nouveau cadre d'organisation des services urbains et de relation entre les autorités locales et leurs administrés.

5.3 Inadéquation entre planification et politique d'approvisionnement

Quant en 1973, le *Master Plan* de la MMR³⁸ prévoyait le développement de la région de Vasai-Virar, il ignorait le développement de nouvelles sources d'approvisionnement. En 1992, CIDCO a publié le 1^{er} *Master Plan* de la région qui transformait une grande partie des zones agricoles en zones urbaines et prévoyait l'urbanisation des territoires près des trois stations des trains de banlieue. Mais, encore une fois, aucune prévision pour de nouvelles sources d'approvisionnement n'a été effectuée ; d'autant plus que ces territoires le long du réseau ferroviaire sont les plus stériles de la région. Ainsi, on peut considérer que l'urbanisation de la région a été planifiée sans prendre en compte les ressources en eau disponibles et c'est là une tendance qui se perpétue.

C'est surtout les entreprises privées de camions-citernes qui ont profité de cette situation. Nombre de nouvelles constructions³⁹ ne sont pas connectées au réseau municipal, notamment à Nallasopara et à Navgar-Manikpur. Elles s'approvisionnent par des forages privés et des camions-citernes. Ainsi, sur la région de Vasai-Virar, l'urbanisation se fait au détriment de l'existence du réseau municipal. On peut alors s'interroger sur l'importance de l'accès à la ressource, lors de l'installation des nouveaux ménages dans la région.

5.4 Droits de propriété sur la ressource mal définis

Autre piste pour comprendre le développement des opérateurs informels sont des droits de propriété sur les ressources mal définis et des lacunes sur la législation indienne dans la gestion et la planification de la ressource. La loi sur l'eau souterraine est floue, ce qui conduit à des comportements de surexploitation de la ressource. Le propriétaire de la terre est propriétaire de l'eau souterraine. Il a le droit d'usage, mais la loi ne précise pas s'il a le droit de commercialiser cette eau et dans quelles conditions. Ce qui

³⁷ Les Amendements 73 et 74 ont été adoptés en 1992 pour faciliter la décentralisation.

³⁸ C'est le document de planification de la MMR, qui a été réalisé par la MMRDA.

³⁹ Il s'agit là de constructions légales. Ce qui est intéressant de noter, c'est que pour obtenir le permis de construire, la connexion au réseau n'est pas obligatoire. Le constructeur peut justifier un service adéquat par la connexion de la construction à un forage.

conduit à des problèmes de surexploitation et d'épuisement de certaines sources au moins pendant quelques mois dans l'année. Cette raréfaction de la ressource va aussi créer des conflits⁴⁰ entre les différents usages : utiliser l'eau des puits pour l'irrigation ou pour l'alimentation des centres urbains de la région.

Aucune loi ne réglemente l'activité des entreprises de camions-citernes. A priori, ces entreprises fournissent de l'eau aux constructions. Mais, on ne peut pourtant pas caractériser leur activité d'illégale, car ils ne sont pas hors la loi, simplement aucune mention légale ne fait référence à cette activité.

Conclusion

L'intérêt de cette communication est de montrer les grandes tendances dans l'approvisionnement en eau des territoires péri-urbains de Mumbai et de révéler les différents niveaux de satisfaction et de dépendance des ménages par rapport aux sources d'approvisionnement officiels et informels. La multiplicité des situations hydrauliques rencontrées reflète la complexité de traiter les questions d'approvisionnement en eau sur ces territoires.

Un fort lien existe entre pauvreté et eau, et cela tant qu'on se réfère à la notion de pauvreté d'un point de vue financier qu'hydraulique. L'étude montre que des ménages avec des moyens financiers importants sont souvent dépendants de plus d'une source pour la satisfaction de leurs besoins. De plus, tous les gens connectés au réseau municipal ne voient pas leurs besoins satisfaits à cause de l'intermittence du service, des problèmes de gestion et de quantité et de qualité de la ressource. Ainsi, ni les moyens financiers ni la connexion au réseau ne garantissent pas l'accès à une ressource abondante et de bonne qualité.

On constate plutôt que cette précarité hydraulique des territoires conduit vers une marchandisation de plus en plus importante de la ressource, qui reproduit les inégalités dans l'accès et l'insatisfaction des ménages.

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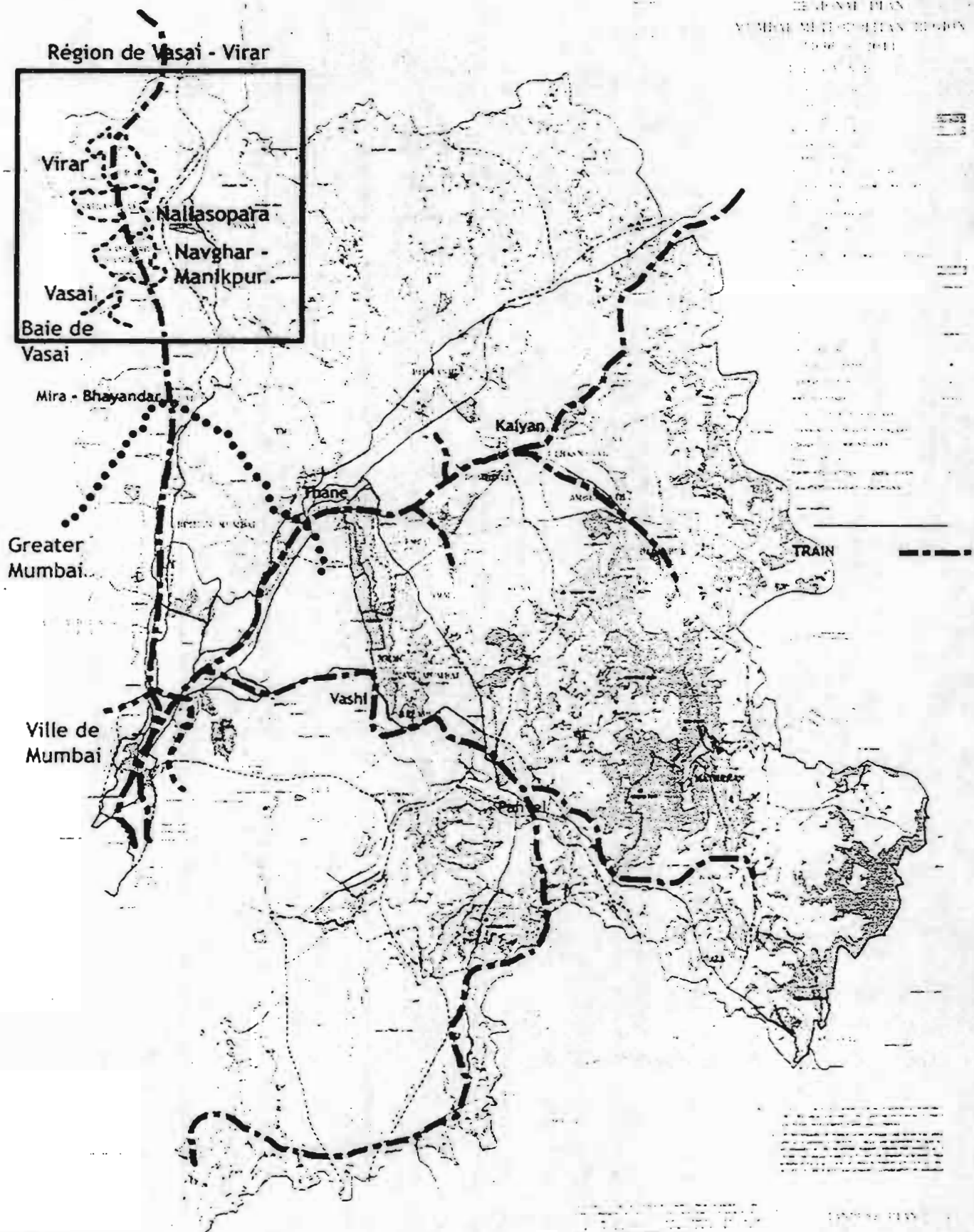
⁴⁰ C'est notamment en fin des années 1980 que des tensions existaient entre les propriétaires des puits et des entreprises de camions-citernes, pour le partage des eaux souterraines entre irrigation et approvisionnement urbain.

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Carte : Mumbai Metropolitan Region



Conflicts between national and local approaches to water usage, hydroelectricity generation and local communities living conditions in Tocantins River, Brazil

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Abstract

This paper presents how land occupation patterns along an Amazonian river, called Tocantins, have changed since the launching of big Brazilian national projects during the 1960s, particularly after the building of Tucuruí Dam, and how these socio-spatial changes have impoverished traditional population, due to changes in the role of water (before a means to build a livelihood and to move over the region, at present a landscape associated to poverty and to health problems). It also presents the evolution on governmental approaches to impacts caused by hydroelectric generation in the region and the mismatch between national policies regarding to energy generation and municipal development, and how little attention has been given to local government's limitations to follow national guidelines and to tackle impacts brought about by national projects. The paper explores the gap between the enforcement of a legal framework on access to hydric resources and the available local institutional system, which has imposed limitations on the use of water as part of social guarantees, and its dissociation with the living conditions of traditional population. The conflicts pointed here highlight the need of national policies to compensate historic elite bias despite Brazilian power transfers to municipalities.

Key-words: Impacts of hydroelectricity generation, Amazonian occupation patterns, Tucuruí Dam.

Introduction

Amazonia population has been historically connected to water. The region is a flood plain with a remarkable volume of fresh water, where spatial accessibility and social development has been historically delivered by rivers. Up to the 1960s cities were differentiated from small villages by scale of open markets and commercial activities, and both were precious support to forest people, who use to earn their living from exploitation of rubber, Brazil nuts, clay and china factories, fruits collection and fishing.

Farming was not a popular activity in old Amazon, and people used to live either in cities or in isolated houses built on river banks, or in small areas where they could grow vegetables and raise animals, without necessarily having land ownership. Kinship was the principal social connection within communities, and education was limited to basic literacy.

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During the 1970s Brazilian government employed economic measures to promote a development programme to populate Amazon, and launched many projects related to mineral exploitation and infrastructure (energy generation and roads), in the best interest of federal government. The projects have changed dramatically the pre-existing socio-economic and environmental dynamics.

This paper focuses the impacts of one of these projects, the Tucuruí Dam, built on Tocantins river, to generate energy to mineral industries (iron, aluminium) and to other urbanized Brazilian regions (other than Amazon). Although the Brazilian Energy Company of the North Region (Eletronorte) has officially announced and conducted a program to mitigate its negative impacts in the region, such as poverty increase, a tense and recurrent conflict atmosphere has been present in the area. From the outset there was much controversy on how sites were negotiated for relocation, including legal measures taken to enforce compensation in municipalities under influence of Tucuruí dam, built in Tocantins river. Following, over time it was made clear that priority was given to use hydro resources for energy production over democratising access of native population and relocated dwellers to safe water.

The exploratory reading offered here is based upon the belief that territorial planning could be a tool to sustainable development, able to assess the current paradigm of local governance and unveil how impacts caused by the barrier and the reservoir of Tucuruí dam have been faced. In order to do so changes in population's profile were identified (before and after the dam was built), and linked to changes in life conditions, particularly in land occupation patterns in areas under water influence upstream and downstream from the Tucuruí hydropower complex. Over years, small communities that used to live on river margins (called *ribeirinhos*) building a livelihood from fishing or from collecting forest products in small properties, became expropriated and had started a trajectory of transfers, first to new rural settlements and latter on to flood plains or other areas considered unsuitable to occupation in the nearest cities' outskirts.

Conversely, the population social conditions have been increasingly influenced by actions conducted by local authorities, following the institutional changes caused by the enforcement of municipalisation processes determined, in 1988, by the Brazilian Federal Constitution. In municipalities located along Tucuruí river, the local government lack of administrative and planning capacity has contributed to the worsening of living conditions. The point the paper aims to focus is that there is a gap between the enforcement of a national legal framework on access of water resources and the related practices by local governments, which has imposed limitations on the use of water, compromised living conditions of traditional population.

Alterations on land occupation patterns and impoverishment

Poverty has been a key issue in various aspects of how local communities have dealt with impacts in their living conditions following the construction and operation of Tucuruí dam. Assessment of living conditions in cities of Pará state (crossed by Tocantins river, and also where the dam is located) based on economic criteria (such as poverty line), or according to internationally defined standards (such as per capita income), classifies half of state's population as poor (Pochmann and Amorin, 2003).

The establishment of quantitative criteria to assess economic performance is justified by the need to compare different times, regions and countries, however such perspective does not allow an understanding of how communities that are vulnerable to poverty survive in unfavourable circumstances. In order to understand the meaning of poverty in urban Amazon, one needs also to consider qualitative and participatory definitions to poverty, incorporating the region's recent history and the patterns of territory occupation, to identify who is poor and how the poor population live (Cardoso, 2002). In this sense the observation of evolution in territory occupation, generated by traditional ways of life (dependent on collection and trade of forest originated products) and by new regional dynamics (characterised by the spreading

of large farms, wood exploitation and of agro-business initiatives), offers a starting point to an exploratory approach to the question: what is about to be poor in a urbanised (former) forest?

Initially, the region economic development cycles (seasoning, rubber, brazil-nuts exploitation) were based on the action of groups that use to control the access of workers to land and to food supply, characterising a system of white (disguised) slavery difficult to overcome. Working conditions within the forest were hardened by geographic dispersion, tropical diseases (malaria), conflicts with indigenous tribes, and by the control of means of production by land owners. It is possible to say that up to the 1950s, the Amazonian economy was similar to a feudal one (Biery-Hamilton, 1996).

During the Second World War, international agreements with North American institutions, were a first step towards the forest integration to the national territory through presence of state. The action of Especial Service of Public Health Foundation (SESP), was an example; it has introduced public health programmes in the furthest points of Brazilian Amazon, reaching small cities supported by their markets (places of trade to the production under the areas of influence). In these cities were also located basic educational and health services to the *ribeirinhos* who lived nearby. These cities' population was constituted by public workers (who had regular income and basic education, and because of that had a higher status), small business people, workers, and *ribeirinhos*. Such cities had a close relationship with the river, as means of accessibility, livelihood and cultural identity. Economic power was based in activities located in rural areas (brazil-nut and rubber exploitation, mining for gold and precious stones) (Wagley, 1957).

The following actions of national integration had privileged road accessibility and broken isolation among Brazilian regions, and in Amazonian case, have caused huge changes in existing patterns of land occupation, according to a "developmental" logic (industrial) practiced in the Southeastern and Southern regions of Brazil, that obviously were different from Amazonian existing dynamic (based in forest resources exploitation).

During the 1960s, the Plan of Amazon's Integration has aimed to articulate the Northern region to the country, however, without acknowledgement of the traditional logic of forest occupation. The river access was replaced by road access; new economic activities were introduced with mineral exploitation and infrastructure projects (federal roads and Turucui dam) that have turn the Northern region into a development frontier opened to agro-business investors, farmers (dedicated to cattle livestock), wood exploitation, in opposition to the regions' vocation as a bank of natural substances (related to aesthetic, medical, nutritional industries), unthinkable at that time. Little was thought regarding to the impact of those actions on Amazonian cities' organisation.

The region's vastness has turned people and their cities into a detail. There was no housing and urban infrastructure policies devised to follow the levels of migration generated by the huge official projects launched in the region. Far from it, only the actions related to big scales of capital, depending on qualified work force, provided settlements fully infrastructured and managed by the investor company, the called company towns. As such cities were not opened to less qualified workers, which were not directly contracted by the big company, but were necessary to support basic activities such as mining and building, they have created spontaneous cities. The same has happened in road intersections, and gold mining fields.

The tenure indefinition (due lack of information and of a traditional system based on occupation previous to land titles) plus availability of funds directed to official and private rural projects in Western Amazon, has prompted the constitution of big farms, attracting wealthy investors; besides that, rural official settlements attracted workers that not always had knowledge about agriculture, or environmental and climatic specificities (Saint-Clair and Rocha, 2002; Cardoso and Lima, 2005).

Conversely, roads and the dam's barrier have weakened river navigation (the lock has not been built up to the present), which was restricted to less dynamic areas. The new social

groups have modified enormously the population profile, broadening social distance and triggering conflicts and struggle for land; in such context the *ribeirinhos* and the poor rural workers became relatively poorer (Cardoso and Lima, 2005).

Up to this stage, occupation was the main relationship with land, due to great availability. To the extent more informed migrants about land regularization procedures and real state market, have started to require land titles and to pay for the buildings and improvements native inhabitants have made on required land, natives begun a process of transferring from countryside to cities, without the support of public policies to manage such process.

Considering this evolution, it is possible to say that traditionally, starvation circumstances were unusual in the region, differently from other developing countries, thanks to availability of food (fish and staple crops) and water. However after the Tucuruí dam was built, quantity of fish has decreased downstream Tocantins river, while fish was concentrated within the reservoir, favouring industrial fishing (rather than traditional), and water has gotten contaminated by the flooding of live trees, and lack of sanitation in urban areas along the river. In Lower Tocantins region, the river is still the main source of water to local communities, but potable water is available only in the biggest cities, as are other social and physical infrastructure, attracting migrants to the outskirts of urban areas (ranging from metropolis to a tiny village). Besides that, despite the potential for energy production of Tucuruí dam, electric power is available only in urban areas, preventing storage of fishing or fruits under refrigeration in small communities, and trapping *ribeirinhos* into poverty.

The countryside has also been occupied by crops (mono cultures such as pepper) and during the last years is under fast process of deforestation, expelling native inhabitants from their land towards cities. The new urban settlers are accommodated in precarious informal or official settlements (promoted by politicians interested in more electors), usually lacking infrastructure, but close enough to facilities present in the city centres. This process is usually accompanied by increasing in social tension and criminality, in cities and villages (UFPA/ELN/Prefeitura Municipal de Igarapé Miri, Baião, Mocajuba, Limoeiro do Ajuru (2004).

Stalemates caused by indefinite frontiers between urban and rural in Amazon

Amazon became an urbanized forest, where cities have assumed a new meaning according to specific dynamics, sometimes, through activities located in rural areas; differently from big cities (under industrial tradition) located in the Southeast and South of Brazil. For rural population to move into a city means, beforehand, access to infrastructure and services not available in the countryside or small localities, starting with a permanent house. Access to land and housing, including piped water provision, and the possibility to educate children, represents an enormous advance in relation to rural life (or life as a *ribeirinho*). After forty years, migrant workers understood that, when born in the furthest localities, education would be possible only if they move to a big city. Paradoxically, the big cities do not offer immediate opportunities (neither official support) for rural migrants, and demands the learning of the urban / metropolitan way of life.

Old inhabitants and new comers share the space within the biggest cities, but following a clear socio-spatial organization (segregation). Only the better prepared migrants or the more determined to succeed manage to be integrated to urban life over time. Meanwhile, in the small cities labour positions require less qualified workers leading to lower rates of unemployment, despite the short term perspective of typical economic activities practiced in such contexts (such as wood exploitation). The small city supports rural activities by concentrating labour force (Cardoso and Lima, 2005)

The cities that stand out in their sub-regions, even when they do not have enough population to be considered medium cities (according to Brazilian standards), become poles to rural

workers, who definitely leave rural life, or establish a house in the city to allow their children access to school and to facilitate trading of their rural production.

Up to the 1980s, rural migrants were very successful in providing housing to themselves in cities, by keeping links with rural areas. They have settled down along river banks of navigable urban rivers as a guarantee of communication and transport with their original places, where they kept crops as a guarantee of food; they have reserved backyards to practice urban agriculture, that later on proved to be a resource to housing children. Despite insufficiency of public policies and interruption of official investments in the region (that has prevented conclusion of Roads, the building of Tucuruí lock, provision of electricity power to rural areas) these migrants have managed to enhance their life chances.

However the prospects for the poor arrived in cities after the 1980s are less favourable, due to growing contest for urban soil. The first house has been feasible only in tiny plots, disclosed from a social network, in peripheral areas where social and physical infrastructure never work or arrive, limiting access to city and, overall, to citizenship. In such circumstance, compensation to money shortage, through mutual support (among neighbours) and locational exploitation, through street vending, sharing house with other activities to generate income or to produce food is limited.

The national approach to water resources management and the local level of government

The Brazilian legal framework to deal with water resources management, was enforced by the Federal law 9.433 dating from January, 1997. According to it, the planning and usage of water resources should be based on a National System of water resources management with plans to be drawn up at different levels of resolution (federal, state and municipal). There is an emphasis on adequate parameters of usage, based on the integration between water management resources and environmental management, as well as with land use. The integration would be the result of an integration of systems connecting river waters and coast zones.

As part of the management guidelines in the law, there is a certain distance between the national institutional structure and the municipal one. As part of the instruments of the national policy there should be compensation for the municipalities for the use of water resources existing in municipality. This measure has provided the municipalities with royalties in the case of hydroelectricity generated by river waters, although this issue was included, the specific chapter was excluded, transferring details to subsequent norms already enacted, which link due actions to the river characteristics and use.

Although recognised in the law, the participation of the local level in the plan of water resources usage was not actually included, due to two main reasons discussed below. The first of them is the determination that Basin Committees should be enacted at the national and state levels, according to the basin's perimeter. The second reason is that because of the lack of planning culture at the local level, the municipalities do not take part in Basin Committees. There are no policies at the local level able to cope with the issues raised at the territorial delimitation that includes portions of the municipality jurisdiction, in practice, land use control is a local issue with no relationship with water usage guidelines established at the regional and state levels.

Within the history of Tucuruí complex it is important to raise the trajectory of management practices built by Eletronorte in order to understand the emergence of the local level of government in the issues regarding water usage and the local government. The Eletronorte Environment Division was established in 1987, and later renamed the Environment Department. The following year, the Coordination Committee for Environment Activities. Power Sector (COMASE - Comitê Coordenador de Atividades do Meio Ambiente do Setor Elétrico) was set up; this is a deliberative entity consisting of 25 concessionaires, the National Water and Power Department (DNAEE, Departamento Nacional de Águas e Energias

Electrical) and Brazilian Electric Centrals S. A. (ELETROBRÁS, Centrais Elétricas Brasileiras S.A). The second Master Plan for the Protection and Improvement of the Environment (II PDMA) was drawn up within the context of this new sectoral structure, prepared by the Environment Department of ELETROBRÁS and approved by the Coordination Committee (COMASE) in 1990. Based on the principles identified in the first Master Plan, the II PDMA proposed guidelines for: (i) the resettlement of communities; (ii) relationships with indigenous groups; (iii) the conservation of plant and wildlife; and (iv) the use of coal by thermo-power plants. This Master Plan constitutes the current policy of Brazil's power sector with links to the growing importance to the local level in terms of implementing the proposed guidelines.

Regarding to the particular case of Tocantins river, the Environment Department of Eletronorte prepared the Tucuruí Dynamics Plan (PLANTUC - Plano de Dinamização da Região Geoeconômica de Tucuruí), in 1991, that redefined the territory affected by this hydropower complex. This included its stretching upstream from the dam, reaching part of Tucuruí municipality, all Itupiranga municipality and parts of Nova Jacundá, Moju and Rondon do Pará municipalities. Downstream, it included part of the Tucuruí municipality, and of Baião, Mocajuba, Cametá and Limoeiro do Ajuru municipalities. This plan outlined three basic lines of action: specific programme, definitions of sectoral policies, and actions adapting certain activities underway (La Rovere, and Mendes, 2000). It also established multi-institutional programmes seeking articulated solutions to social and environmental issues such as: i) the high incidence of aquatic macrophytes along the left bank of the reservoir; ii) alterations in the quality of water of the reservoir and the reaches of the river downstream from the dam; iii) precarious physical infrastructure in the area: access to facilities, electrification, social equipment, basic sanitation etc; iv) inadequate land use; v) influence of small-scale wild-cat mining operations in the Araguaia-Tocantins Basin; vi) disorderly exploitation of natural resources; vii) smaller catches downstream and inadequate standardisation and supervision of these fishing activities throughout the area; viii) Incomplete land ownership legalisation process; ix) loss of biodiversity.

The following table presents demographic and income dynamics found at upstream and downstream municipalities from Tucuruí dam. It is seen that upstream municipalities, formed after the construction of the complex has had a rapid population growth while the population of downstream municipalities have not increased at the same rate. In terms of per capita income, presented in Brazilian currency: real, the performance of upstream municipalities is better than the others, although below Para and Brazilian standards.

Table 1 Demographic and income dynamics upstream and downstream from the Tucuruí Hidropower complex, 1980-2000

Municipalities	Population			Per capita income	
	1980	1991	2000	1991	2000
Upstream					
Jacundá (1)	14.868	27.606	40.546	141,8	175,32
Itupiranga (1)	15.641	30.141	49.655	63,92	85,71
Tucuruí (1)	61.140	50.246	73.798	132,02	180,99
Breu Branco (2)	-	22.091	32.446	98,51	132,32
Goianésia do Pará (3)	-	15.445	22.685	101,06	144,05
Nova Ipixuna (4)	-	8.079	11.866	75,47	127,26
Novo Repartimento (5)	-	31.585	41.817	64,8	91,61
Dowstream					
Baião	16.261	20.072	21.119	58,36	81,20
Mocajuba	12.789	18.496	20.542	70,71	85,29
Carnetá	79.317	85.187	97.624	61,41	71,06
Limoeiro do Ajuru	13.752	16.475	19.564	66,62	64,41
Pará state		4.950.060	6.192.307	141,52	168,59
Brazil		146.825.475	169.799.170	230,30	297,23

Source: IBGE Demographic Census, 1980, 1991 and 2000

1 Remaining population in 2000 after transfer of the area and the population to new municipality.

2 Established on 1 January 1993, split off from Tucuruí, Moju and Rondon do Pará municipalities.

3 Established on 1 January 1993, split off from Tucuruí, Moju and Rondon do Pará municipalities.

4 Established on 1 November 1997, split off from Jacundá and Itupiranga municipalities.

5 Established on 1 January 1993, split off from Tucuruí, Jacundá and Pacajá municipalities.



Figure 1: Photographs of Novo Repartimento Municipality, one of the upstream municipalities formed after the construction of the dam in 1993. Left: overview; right: detail of occupation along a small river internal to the city.

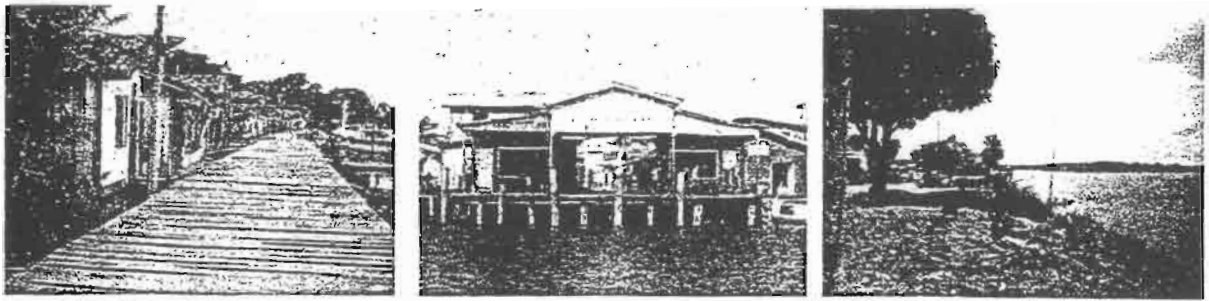


Figure 2: Photographs of rural and urban areas of downstream municipalities. From left to right: Igarapé-Miri, Limoeiro do Ajuru and Baião.

As part of these issues, the relationship between Eletronorte and the municipalities have been centred on infrastructure shortage both at upstream and downstream territories. Infrastructure shortage has been referred to urban development and subjected to central policies conducted by the Cities Ministry. It is referred as an urban policy because access to infrastructure is considered an urban issue, although in Amazon, dispersion in occupation of the territory has imposed a review of policies by present federal government, national social programmes are limited in the region both because of the focus on urban settlements and because of a lack of adequacy in terms of tackling contextual issues. It has been recognised the need of urban development policies specifically designed to the Amazon region, actually it is becoming part of an agenda established by the Cities Ministry.

Federal guidelines established by the Cities Ministry regarding the obligation of masterplans development, for all municipalities with population higher than 20.000 inhabitants has been incorporated in the demands of social movements organized around compensatory issues regarding the dam impacts. The determination to have a municipal master plan has given opportunities to bring about many questions related to deprived Amazonian circumstances, such as those imposed by infrastructure and social services shortage. The compensatory measures including masterplans have been incorporated into the electricity companies agendas, which have a more inductive responsibility in terms of economic activities and on the other hand to present a growing role in the control of local power, both in terms of the direct provision of services, as mentioned before and as a privileged intermediate agent between local and central governments. The electricity companies importance goes beyond royalties payments, becoming involved in actions related to the development of living conditions for their personnel and for inhabitants of the municipalities. It is a political arena with points of contact with state action favourable to long term entrepreneurship. In the specific case of Tucuruí dam, it was done without a more responsible role in the first phase of the project (PPDJUS, 2003). Now in the second phase of the dam construction, there is a precautionary atmosphere still related to previous impacts at the upstream region, the precautionary actions are very based on the limits of local involvement level of social movements and municipal governments. Existing tensions fostered the creation of the Council of Development of Micro Region Downstream Tucuruí Dam (CONJUS, Conselho de Desenvolvimento da Micro-Região à Jusante da Barragem de Tucuruí) in order to have a continuous forum to related issues negotiation. Depending on the forthcoming results, there is a growing need of including new multidisciplinary partners who will make policies viable and sustainable for the development of the region.

Among factors influencing policy effectiveness in Brazil, there is, on the one hand, a lack of attention to peculiarities of urban areas of the different regions of the country affecting policy formation at the central level due to lack of linkages at different levels of government. On the other hand, in urban policy at both local and non-local levels too much bureaucracy has been held responsible for dysfunction in policy implementation (Batley, 1983, 1984, 1987). The division of the regulatory system between local and central authorities without proper

coordination resulted in implementation of uncoordinated policies, especially of housing policies, defined centrally.

Alterations in living conditions of traditional population: dam impacts occurrence and mitigation actions

From the exposed above, the Amazonian traditional way of life, called *ribeirinho*, is now interpreted as a defeated system. The population that used to be more dependent on water (living along rivers) became a marginal population in the region. The big federal projects to populate and provide infrastructure to the region, have introduced new agents (migrants from other Brazilian region) and a new logic to exploit land and the environment. The native population had no means to become stockholder into the new dynamics, because they did not have neither knowledge nor enough capital to take part in the game. The replacement of the culture of occupation without land titles by land ownership, was fostered by expropriation strategies practiced by the time the reservoir of Tucuruí dam was filled and by lack of information about which areas are public or private.

Nearby this reservoir, compensations were calculated by Eletronorte without considering the land potential of production, or without offering an alternative to those who wanted to stay. Over years, social movements have advanced in broadening natives' rights to have a fair evaluation of their land, but rural inhabitants of Tucuruí dam's reservoir margins are still waiting to have access to potable water and electric power, they have built their livelihood from fishing, becoming the new *ribeirinhos*, but have no stability or infrastructure to thrive. The reservoir margins became an area of environmental protection, but as there is no sufficient surveillance, there has been deforestation (trees have been replaced by cattle), and introduction of criminal activities (crops of cannabis), worsening local population's vulnerability.

The recognition of limitations in the treatment of problems due to hydroelectricity generation in Tocantins region is expressed in the lack of references to impacts mitigation following long term changes in living conditions within the territory. CONJUS' plans and actions have been related to demand criteria on Eletronorte expenditure in the region. Although projects for fishing or electricity distribution are proposed, there is no reference to more abridged (used to avoid the so called comprehensive planning applied during the 1960s and 1970s in Brazil to designate top down planning) planning which could include the water usage issues in the agendas of local municipalities.

Nevertheless, changes in living conditions have been perceived both on the waterlogged areas and on firm land. At the waterlogged areas downstream, now subject to a different water cycle, fishers without a guaranteed production due to changes of fish species occurrence are obliged to work as collectors. Upstream, agricultors have to move to fishing without skills or technical assistance to the job. The result is that the whole region is under an economic reorganisation with more losers, and winners represented by the same groups that existed before the dam: politicians, old and new farmers and timber exploitation groups.

The municipalities depend on Eletronorte to implement all sorts of projects in the municipalities, including the construction of schools, hospitals and provision of water systems and even the acquisition of musical instruments for the local bands. The participation of CONJUS has been responsible for monitoring the relationship between mayors and Eletronorte, at the same time that has launched a more participatory arena for including the local government in the demands from the downstream region. In the upstream region, the social process of participation has been very weak, although a more activist association of those directly moved by the construction of the lake cause systematic disruption in Tucuruí town and in some facilities of Eletronorte. There is still population not supplied by electricity living at the margins of the lake.

Final remarks

Although there is well established literature on the effects of the construction of the dam, both in terms of environmental and social terms, there has been scarce discussion on how the involvement of different social actors was first associated with municipal reorganization and the management capacity of the local governments to deal with the impacts caused by the construction of Tucuruí dam. Local government initiatives, in face of water usage issues in Tocantins Basin are limited, as a result of a combination of social and environmental questions, that must be dealt with by different social agents involved in the mitigation of impacts caused by the construction of Tucuruí dam. Social organization is still particularly fragile in localities located in Lower Tocantins area (geographic distance, action of elites, lack of skills), different from other context located next door to Tucuruí dam, such as Transamazônica Road area.

The impacts of Tucuruí dam on territory occupation in Lower Tocantins region, as much as of other official projects in Pará State as a whole, was first associated to the organization of new municipalities, what has raised some localities' status. Settlements which used to be villages and became new cities, are places where the new local power is based but still with limited services and facilities. Another evidence of this reorganization is related with the expansion of existing cities along roads axes, caused by a progressive rural exodus. The connection with the dam and its impacts within the framework of compensatory measures described in the paper, was a reason to oblige the municipalities affected to develop participatory master plans to municipal territory. The movement of drawing up masterplan in the region has given opportunities to bring about many questions related to deprived Amazonian circumstances.

In the power relationship explored in the paper, it is recognised that the federal government is still a very important stakeholder to Amazonian municipalities, despite transfers of power occurred since the 1988 Brazilian Constitution. Issues in affected municipalities cannot be dealt by local power only, and agents such as Eletronorte and eletrict power companies (that distribute energy) are turned into development inductors. Extrativism has been reconfigured, assuming a larger scale following economic power of exploiters. Although not accounted for, due to its illegal character, deforestation is causing droughts, that at present are a menace to power generation and to inhabitants livelihoods. Rural issues are expelling population towards cities, and also reorganizing social movements. At present people demands infrastructure as social right, not as urban facility, and do not accept the repetition of old mistakes. But local power is still a too fragile forum to effectively manage so many conflicts (environmental, economic, socio-cultural, urban-rural), without information, financial resources, political autonomy, and technical knowledge to promote an integrated planning action, and to change long term inhabitants' prospects.

The application of a new approach to territorial planning, within the conflicts on water usage in Low Tocantins, suggested by evidences described along the paper, has raised the need to discuss what are the limits and the potential reach of local government in nowadays political process to tackle the challenges imposed by the power structure existing in the region. The need of alternative perspectives for the weaknesses found in the actions taken at the local level is still a question which needs to be addressed by the state and the population of the region.

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L'accès à l'eau et la participation à sa gestion : un double blocage pour l'amélioration de l'irrigation dans les Andes Equatoriennes. Le cas du versant de Santa Rosa – Pilahuin.

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Résumé – Le versant de Santa Rosa - Pilahuin est un bon laboratoire d'études des dynamiques actuelles de gestion de l'irrigation dans les Andes Equatoriennes. L'eau est depuis cinq siècles l'élément clef de développement de la zone, que ce fût sous la colonie pour alimenter les grandes haciendas et les manufactures lainières ou que ce soit aujourd'hui pour irriguer les nombreuses petites exploitations agricoles. Depuis les dernières décennies, le déséquilibre entre les besoins en eau et l'offre hydrique du versant ne cesse d'augmenter provoquant de nombreux conflits et mettant en péril la production agricole dans certains cas. L'analyse de l'irrigation sur ce versant au regard de la double grille d'entrée « accès à l'eau » / « participation sociale à la gestion de la ressource » permet de mettre en perspective les freins actuels au développement de la zone. D'un côté, un fort déséquilibre entre les besoins en eau et l'accès à la ressource entre le haut et le bas du versant limite l'utilisation optimale de celle-ci. D'autre part, la gestion de l'irrigation est défaillante de part la désorganisation des usagers, la faible implication de certains et la prédominance d'autres. Dans les deux cas, l'origine des problèmes se trouve dans des confrontations ethniques entre métis et indiens. Seule une gestion « sociale » de l'irrigation paraît à même de pouvoir aider les habitants à sortir de ce blocage.

Mots clefs – Irrigation – Pauvreté – Crise sociale – Droit d'eau – Métis – Indiens – Junte – Communautés – Equateur – Santa Rosa - Pilahuin

Depuis quelques années, l'eau est devenue, dans les discours des organismes internationaux de développement, un outil de lutte contre la pauvreté. Son rôle étant vital, la rareté et/ou la mauvaise gestion de la ressource en eau peuvent maintenir les pauvres en l'état. Le terme de pauvreté hydraulique est alors apparu (« water poverty »). Divers auteurs se sont attachés à définir des grilles d'analyses ou des indicateurs pour évaluer cette pauvreté liée à l'eau dont le « Water Poverty Index » est un exemple (Molle & al., 2003 ; Soussan, 2004). Cet indicateur évalue le niveau de pauvreté hydraulique à partir des critères suivants : disponibilité de ressource en quantité et qualité, possibilité d'accès des usagers à la ressource, capacité de gestion de l'eau des usagers, choix de répartition de l'eau selon les usagers, intégration de la gestion de l'eau dans la gestion environnementale. Molle & Mollinga (2003) ajoutent deux critères liés aux contextes institutionnels et politiques permettant l'organisation autour et pour la gestion de l'eau.

Si ce terme de pauvreté est le plus souvent associé à des notions monétaires, au manque de ressources financières, il recouvre également d'autres formes. La pauvreté peut également être sociologique, liée à un faible capital culturel et social ou encore psychologique, liée de mauvaises conditions de vie et de santé (Mazel, 1996). Dans le cadre de ce séminaire, nous nous intéresserons principalement à la gestion quantitative de l'eau agricole et afin d'alimenter le débat sur la contribution de celle-ci à la pauvreté, nous nous focaliserons sur deux axes d'analyse :

- (1) *Le défaut d'accès à l'eau.* Il est souvent lié à une pauvreté monétaire, l'un pouvant impliquer l'autre et inversement, mais possède également des causes multiples comme par exemple la raréfaction physique de l'eau ou sa pollution, la position géographique de l'usager par rapport à la source d'eau, l'absence de droit d'utiliser l'eau, etc.
- (2) *Le défaut d'implication dans la gestion de l'eau* pour s'assurer l'accès à la ressource et le bon fonctionnement du réseau. Il est souvent lié à une pauvreté socioculturelle, aux dysfonctionnements des groupes sociaux face à la gestion d'une ressource collective (i.e. les « crises sociales »). Le faible niveau d'éducation, les ressentiments entre usagers, la monopolisation du discours par certains sont des exemples de causes.

Cette grille de lecture de la « pauvreté hydraulique » comme définie précédemment, contribue-t-elle à expliquer les problèmes de développement maintenant la population dans un état de pauvreté ? Cette question peut se traiter à diverses échelles, de l'individu à la société locale en passant par le groupe d'usagers et les petits bassins versants agricoles andins sont de bons laboratoires d'études pour tenter d'y répondre. Leur développement depuis les cinq derniers siècles est conditionné par le contrôle de l'eau d'irrigation. Les différents groupes sociaux se sont longuement battus pour obtenir puis conserver les sources d'eau et pour maîtriser la distribution de la ressource et ces conflits perdurent aujourd'hui (Girard, 2005). Après une rapide présentation du cas d'étude, voyons quels enseignements il est possible de tirer de l'analyse de la répartition de l'accès à l'eau dans le versant puis de l'implication des usagers dans la gestion de cette ressource via les juntas d'irriguants ou d'autres formes d'organisation collective.

L'eau au centre des préoccupations du versant de Santa Rosa - Pilahuin

Les paroisses de Huachi Grande, Santa Rosa, Juan Begnino Vela et Pilahuin, objets de cette étude, sont situées sur la marge Nord du Rio Ambato et appartiennent à la province du Tungurahua dans les Andes centrales équatoriennes (Figure 1). Elles forment une entité spécifique d'environ 30.000 ha pour ce qui a trait à l'irrigation dépendant toutes des mêmes ressources en eau. Les eaux souterraines, soient absentes, soit difficilement accessibles, ne sont pas exploitées et seules les eaux des petits cours d'eaux issus des glaciers et des paramos¹ des volcans Carihuarazo et Chimborazo surplombant le versant peuvent être canalisées. La profonde vallée du Rio Ambato bloque les communications entre les marges nord et sud de la rivière. Cette disposition particulière permettant de limiter un territoire homogène quant à l'étude de l'irrigation a conduit Ruf et al. (1992) à définir le terme de ZARI (Zone d'Analyse et de Recommandations pour l'Irrigation) en ne s'intéressant pas à un bassin versant mais à un ou plusieurs interfluvies contigus. Le versant de Santa Rosa- Pilahuin, du nom de ses deux principaux centres paroissiaux, est une de ces ZARI. C'est une zone rurale densément peuplée. Le paysage présente une structure en étages où les découpages agrobioclimatiques semblent se superposer aux différenciations socio-économiques et ethniques. De bas en haut, se succède un étage tempéré (2800 – 3100 m) de fruitiers et de maraîchage à l'habitat métis, puis un étage médian (3100 – 3300 m) aux cultures variées travaillées par des métis et des indiens, puis deux étages de résidence principalement indienne, l'un froid (3300 -3600 m) de pâturage et tubercules et l'autre très froid (3600 - 4000m) de paramos (Figure 2). La ville d'Ambato, en fond de vallée, est un carrefour commercial en pleine expansion (Métais, 2003). C'est le débouché principal des productions agricoles de la zone et la source de nombreux emplois extra agricoles.

L'agriculture est l'occupation prépondérante de la population et les exploitations, majoritairement de type familial, sont de taille réduite, de 0,1 ha à 10 ha, et de 1ha en moyenne. Les revenus des familles sont globalement plus élevés dans les étages bas que dans les étages hauts mais présentent des disparités plus fortes chez les métis et une part non agricole plus marquée (Marchand, 1995). Selon une étude de Lacour (2005) sur la paroisse de Santa Rosa, les revenus agricoles se situent entre 800 \$/an/actif (soit à peine plus que le seuil de survie) et 2900 \$/an/actif agricole, soit un peu plus que le coût d'opportunité du travail en ville à Ambato. L'accès à la terre et à l'irrigation sont les principaux facteurs de différenciation entre les agriculteurs dans les étages bas, alors que l'accès à la terre est le principal facteur limitant dans les hauteurs. Depuis une décennie, la partie agricole du revenu des familles chute rapidement pour la population métis du

¹ Paramo : écosystème naturel d'altitude caractéristique de la haute montagne des Andes Septentrionales, présentant une végétation majoritairement non arborée, des sols acides et un climat froid, humide et variable. De part leurs capacités de régulation et de rétention en eau, ils jouent un rôle particulièrement important dans l'alimentation en eau des bassins versants andins (Hofstede, 2001).

bas du versant où le déficit en eau est fort (El Quinche, Huachi) et également dans certaines communautés indiennes ayant peu de terres à offrir aux jeunes (Chibuleo). La proximité de la ville d'Ambato et la faible rémunération du travail agricole par rapport au coût d'opportunité du travail en ville incite à la migration journalière ou au développement d'activités extra agricole (commerce, artisanat, transports). Quant à d'autres facettes de la pauvreté, culturelle ou sociale, nous aborderons ce sujet plus avant dans la présentation.

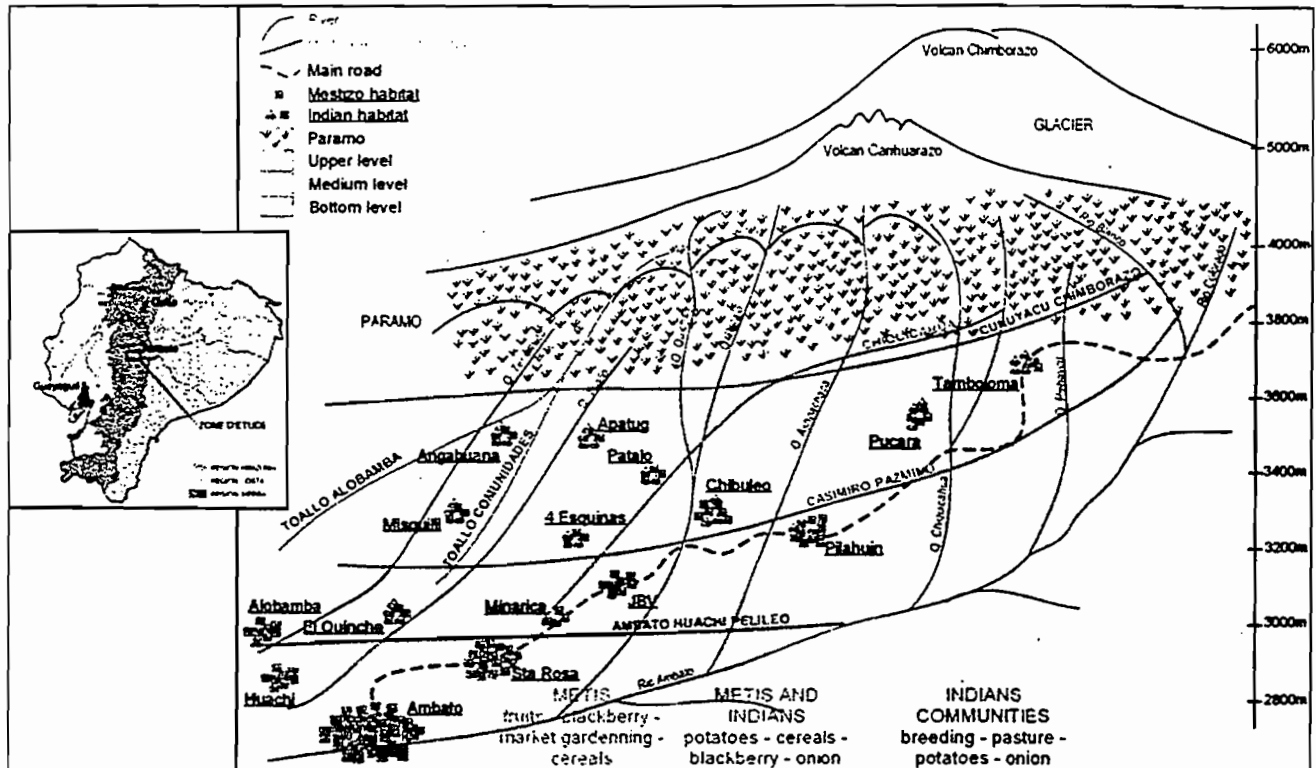


Figure 1 et 2: Situation de la zone d'étude en Equateur et schéma de présentation du versant de Santa Rosa - Pilahuin et de ses principales caractéristiques physiques et humaines

L'irrigation s'étant développée depuis des siècles sur les pentes des bassins, les nombreux réseaux de canaux qui descendent des paramos présentent une géométrie imbriquée et complexe. Vingt *acequias*, d'une longueur de quelques kilomètres à plus d'une cinquantaine kilomètres, naissent et desservent, sur le versant, d'une centaine à plusieurs milliers d'utilisateurs chacune (Figure 2). A cette complexité hydraulique, s'ajoute une complexité humaine. Différentes communautés ethniques (métis et indiens) dont les valeurs de l'eau et les modes d'organisation et de gestion de l'eau divergent, se partagent la ressource. De plus, de nombreuses institutions gouvernementales et non gouvernementales aux rôles peu explicites et redondants de gestion des ressources hydriques se superposent et juxtaposent. L'eau est aujourd'hui au centre des préoccupations des institutions de la Province; le Conseil Provincial en a fait le principal objectif de sa nouvelle politique et plusieurs ONG nationales concentrent leurs projets sur la gestion de l'irrigation (Gangotena, 2003). Selon une enquête des divers protagonistes de la gestion de l'eau dans le versant du Rio Ambato, gouvernements locaux, services déconcentrés de l'Etat, ONG, entreprises publiques, organisations indigènes (Girard, 2004), la problématique de la gestion de l'eau dans cette zone peut se résumer par les quatre points suivants :

- (1) la perte des fonctions régulatrices de l'eau du paramo résultant de la diminution de sa surface suite à l'avancée du front pionnier actif et à sa surexploitation ;
- (2) la faible efficacité hydrologique de l'irrigation due à une infrastructure défectueuse, à des techniques inappropriées d'application de l'eau dans les parcelles et à une distribution inéquitable et inadaptée avec des tours d'eau trop longs et des débits trop forts ;
- (3) la pollution domestique et industrielle de l'eau et l'érosion des terres agricoles ;

(4) l'action inefficace des institutions pour résoudre les problèmes et organiser la gestion de l'eau depuis Ambato (figure 4) (Girard, 2004).

Il en résulte une détérioration de la disponibilité et de la qualité de l'eau (déficit hydrique du sous bassin versant du Rio Ambato estimée à 40% en 2003), entraînant une faible productivité agricole, des inégalités sociales, une utilisation peu durable des ressources naturelles, générant de nombreux conflits d'usage et au final détériorant les conditions de vie de la population (Métais, 2003).

Dans ce contexte où l'eau est cruciale pour le développement de la zone, et principalement les activités agricoles irriguées jusqu'à présent, que peut nous apporter l'analyse de questions d'accès à l'eau et de participation à la gestion de la ressource pour comprendre la problématique et imaginer d'éventuelles solutions ?

Accès aux ressources en eau et déficit hydrique social

Le versant de Santa Rosa - Pilahuin est administrativement découpé en paroisses qui elles-mêmes contiennent des communautés (organisation type des indiens) ou des quartiers /secteurs (organisation type des métis). La figure 3 est une schématisation de ces communautés et secteurs dans leur organisation spatiale ainsi que de la géographie des canaux d'irrigation principaux et secondaires sur le versant également présentés en tableau 1.

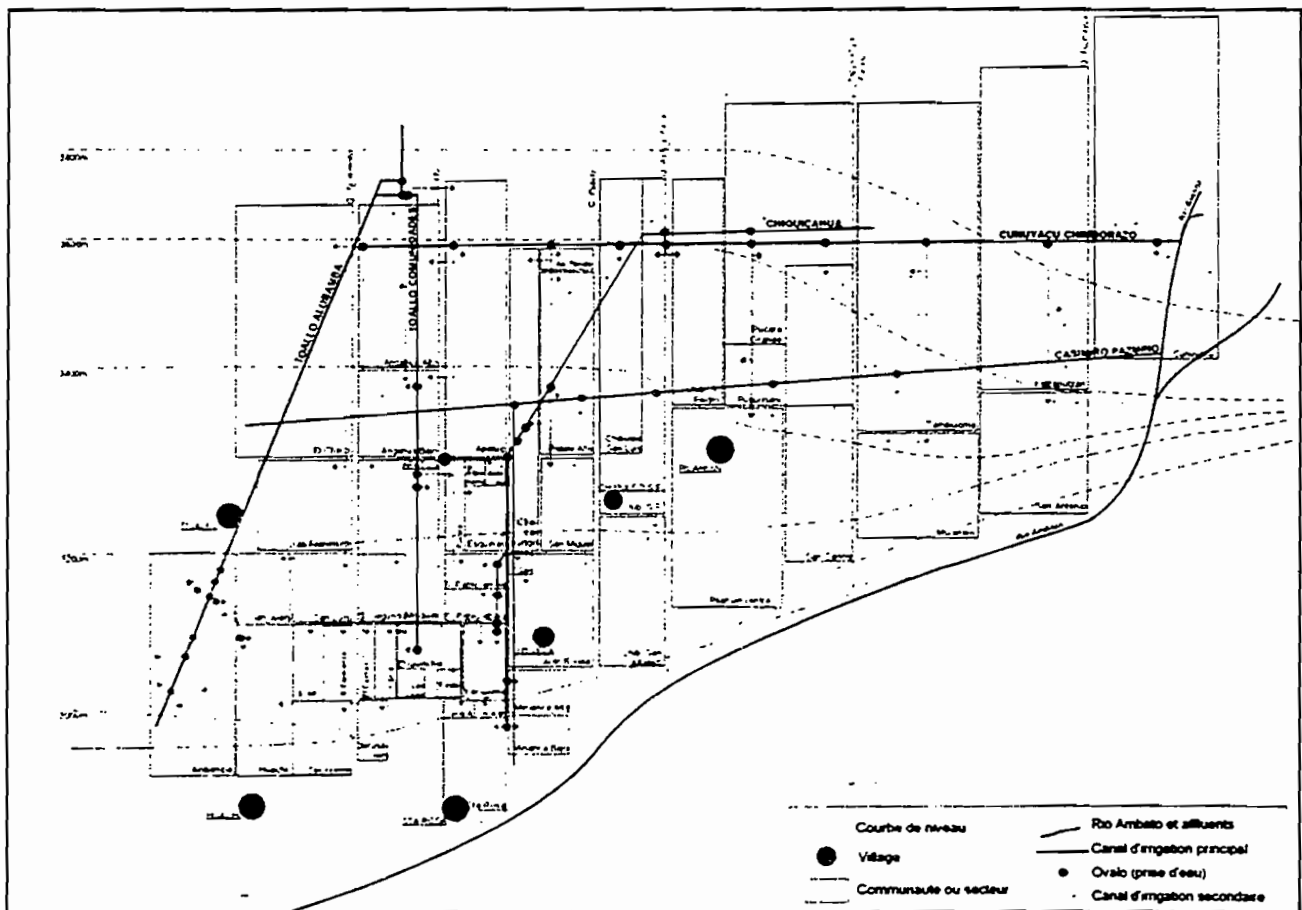


Figure 3 : Schématisation des communautés et secteurs du versant de Santa Rosa - Pilahuin et géographie des canaux d'irrigation.

	Toallo Alobamba*	Toallo Comunidades*	Chiquicahua*	Cunuyacu – Chimborazo*	Casimiro – Pazmino**
Date construction	1698	1698	1849	Fin XIX	Fin XIX
Infrastructure	11 km 1 ovalo	7 km 1 ovalo	39 km 9 ovalos	50 km 11 ovalos	60 km 10 ovalos
Débit théorique	31 l/s	46 l/s	394 l/s	172 l/s	304 l/s
Surface irriguée	440 ha	853 ha	1027 ha	6170 ha	1811 ha
Nbr usagers total	540	1864	3297	5100	1533
Nbr de communautés indiennes	-	5	7	20	5
Nbr de secteurs métis	3	1	11	12	7

Tableau 1: Caractéristiques des principaux canaux d'irrigation du versant de Santa Rosa - Pilahuin (Sources : *cadastres des juntas, **concessions de l'Agence de l'Eau). Le canal Huachi - Pelileo - Ambato n'est pas décrit car il prend source dans le versant mais ne dessert que des secteurs métis hors du versant.

Accès différencié à l'irrigation entre groupes territoriaux sur le versant

Afin d'analyser la distribution de l'accès à l'eau d'irrigation sur le versant, la lame d'eau annuelle reçue par chaque communauté ou secteur est calculée à partir des droits d'eau théoriques possédés par chaque groupe d'usagers et ramené à la surface irriguée de chaque communauté / secteur. Les données sont extraites des actes de concession octroyés aux usagers par l'Agence de l'Eau et des cadastres des associations d'irriguants (juntas) ou des communautés. Quatre classes de lame d'eau (entre <301 mm/an et >2000 mm/an) ont été définies et sont présentées sur la figure 4. Pour comparer ces accès à l'eau aux besoins en eau d'irrigation, quelques paramètres du bilan hydrique sont étudiés. La pluviométrie et l'évapotranspiration de deux stations, El Quinche en bas du versant et Tamboloma en haut du versant, sont représentés sur la figure 5. Le déficit hydrique est quasiment permanent en bas du versant (-147 mm sur l'année) sauf aux mois de avril, mai et juin où les précipitations sont abondantes, alors qu'à Tamboloma, seuls les mois de décembre et janvier présentent un léger déficit (au total +173mm sur l'année).

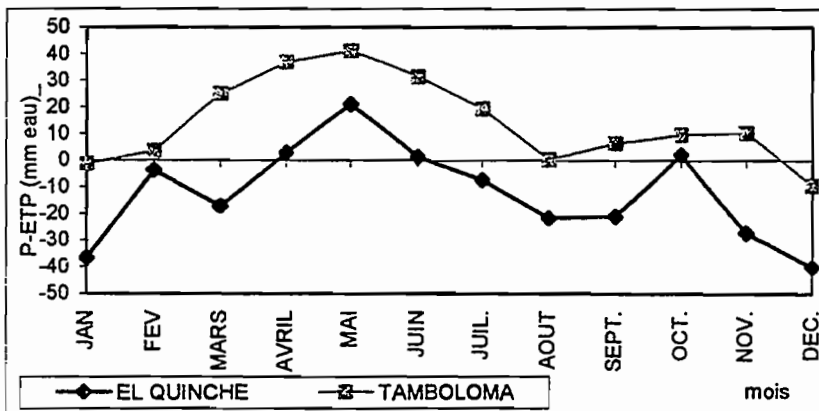


Figure 4 : Données de pluviométrie et d'évapotranspiration pour deux stations météorologiques du versant (El Quinche : 2885 m d'altitude et Tamboloma : 3320 m d'altitude).

Quatre groupes peuvent être ainsi distingués en comparant les besoins en eau et l'accès à l'irrigation de chaque communauté ou secteur :

- **Groupe 1 : Besoins en eau élevés et accès à l'irrigation limité.** Ce sont des secteurs métis en bas du versant souffrant en permanence du manque d'eau sauf quelques mois à l'année, ce qui limite fortement les possibilités de production agricole (autoconsommation uniquement, spécialisation dans l'élevage de petits animaux ou survie sans investissement grâce aux vergés plantés il y a 5 à 10 ans).
- **Groupe 2 : Besoins en eau élevés et accès relativement important à l'eau.** Il s'agit de secteurs métis où l'accès important à l'eau en moyenne cache en fait de fortes inégalités

entre usagers, comme nous le verrons par la suite. Ceux ayant accès à divers canaux ont suffisamment d'eau pour couvrir leurs besoins tout au long de l'année et se sont spécialisées dans de l'élevage bovin associé à du pâturage ou des fruitiers intensifs, alors que d'autres sont en pénurie d'eau quasi permanente et se détachent de l'activité agricole.

- **Groupe 3 : Besoins en eau limités et accès à l'irrigation limitée.** Ce sont principalement les communautés indiennes de la paroisse de Santa Rosa, qui souffrent occasionnellement de sécheresse lors de longue période sans pluie. L'accès à l'irrigation en complément de la pluviométrie leur a permis de développer d'intensives cultures de mûre, de maraîchage (carottes, tubercules) et de luzerne.
- **Groupe 4 : Besoins en eau limités et accès à l'irrigation relativement important.** Ce sont la plupart des communautés indiennes des paroisses de Juan Begnina Vela et Pilahuin, qui n'ont besoin d'irriguer qu'une partie restreinte de l'année, pour développer des pâturages intensifs et améliorés.

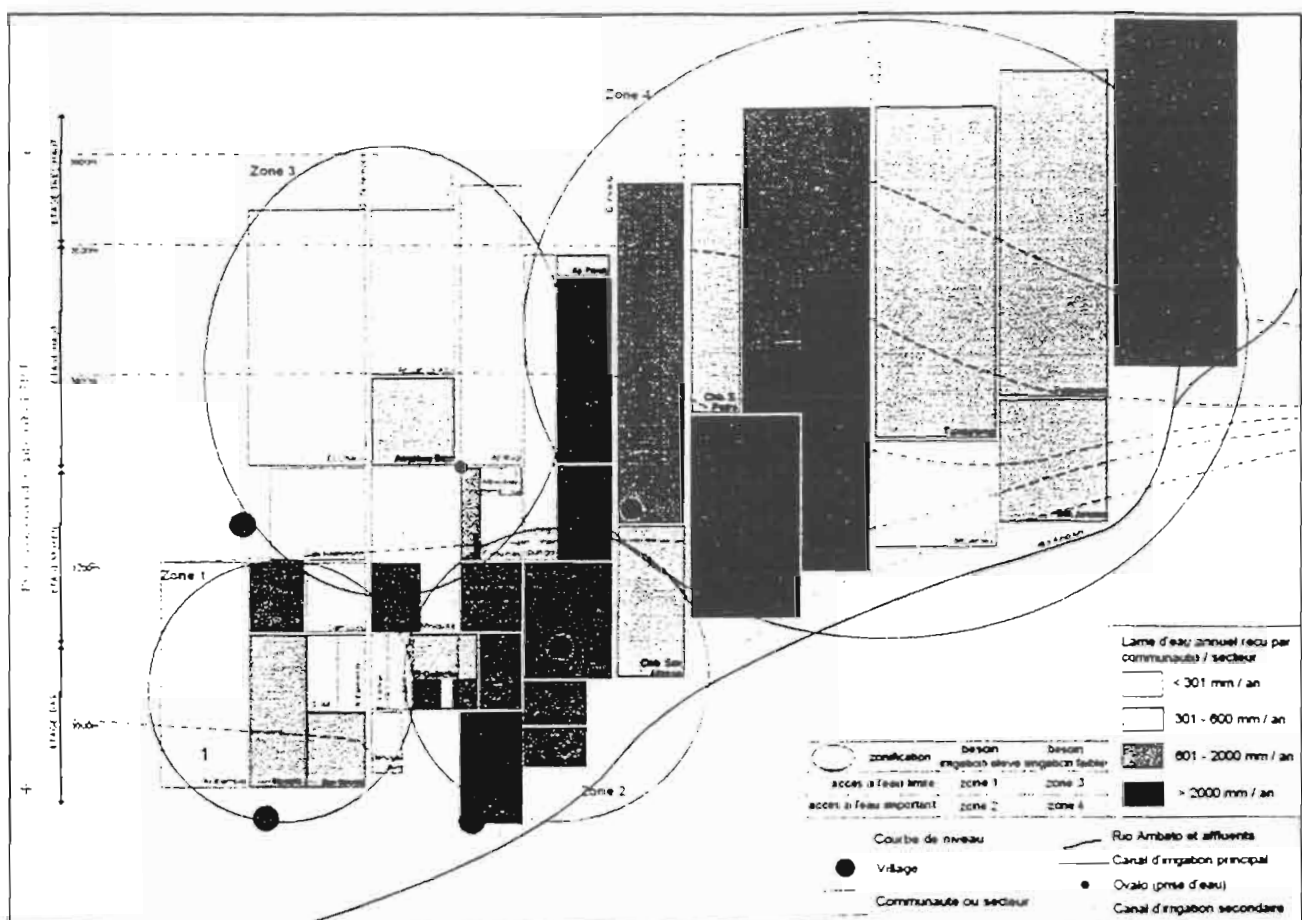


Figure 5: schématisation des lames d'eau théoriques reçues annuellement par chaque bloc hydraulique (Sources : Agence de l'Eau, cadastres de juntas des acequias Chiquicahua, Cunuyacu-Chimborazo, Toallo, Casimiro Pazmino, enquêtes des communautés indiennes pour les canaux communautaires)

Ce calcul de lame d'eau est à relativiser car il ne prend en compte que les droits théoriques sur les canaux et non les débits réels de ceux-ci et tous les canaux ne sont pas pris en compte (exclusion notamment des droits d'eau de l'acequia Casimiro Pazmino, faute de données). Néanmoins, le schéma de la Figure 4 permet de mettre en évidence le fort déséquilibre haut / bas existant sur le versant entre les besoins et l'accès à l'eau des diverses communautés ou secteurs.

Ce déséquilibre a des origines historiques. Les canaux d'irrigation, vieux de deux à quatre siècles furent initialement construits par des haciendas, des investisseurs privés et/ou des villages métis pour alimenter les zones basses du versant en eau. Ce n'est qu'à partir de la deuxième moitié du

XXe siècle que les communautés indiennes des étages moyens et hauts réclament, prennent de force puis obtiennent légalement des concessions sur l'eau d'irrigation des principaux canaux de la zone. Cette prise d'eau répond à un nouveau besoin avec la mise en place et l'intensification de nouvelles cultures (mûre, carottes et pâturage amélioré notamment) mais elle correspond également à une revendication de type identitaire pour les Indiens longtemps refoulés et exploités par les Colons puis les Métis (Girard, 2005). L'eau est devenue, outre un facteur de production, un objet de chantage. Aujourd'hui, le déséquilibre perdure pour plusieurs raisons :

- (1) Les communautés indiennes se trouvent géographiquement en position de force, en tête de réseau et revendiquent la propriété des terres d'où naissent les sources d'eau. Elles se servent prioritairement en eau, en respectant ou non les droits concessionnés.
- (2) Les associations d'irriguants qui devraient assurer la gestion de l'irrigation et le contrôle de sa répartition sont défaillantes, comme nous le verrons par la suite. Elles ne garantissent pas le respect des droits d'eau et ne permettent pas l'instauration d'un débat sur un éventuel rééquilibre de l'accès à l'eau entre blocs hydrauliques.

L'origine de ce déséquilibre entre accès et besoins en eau est donc historique et son maintien est social. Nous verrons par la suite plus en détail les dysfonctionnements des juntas d'irriguants et leurs causes.

Inégalités entre usagers d'une même unité de distribution de l'eau

Trois modes d'accès à l'eau d'irrigation coexistent dans le versant, selon le type de droit d'eau et la forme de répartition de celle-ci (Figure 6) :

- (1) *Droit communautaire avec répartition au besoin, égalitaire ou proportionnelle à la superficie.* C'est le système pratiqué par les communautés indiennes de Pilahuin et Juan Begnino Vela, qui ont acquis récemment de forme collective le droit d'eau. La répartition peut être laissée au besoin de chacun (évaluée selon la culture en place, la demande formulée par l'usager, etc.) ou se faire selon des règles plus précises et fixes : égalitaire en temps par usager (comme à Tamboloma : 2h/ usager) ou proportionnel à la superficie (comme à Misquilli, 15 min à 2h au maximum par cuadra²). La gestion de l'irrigation est à la charge du cabildo³, comme l'ensemble des tâches de la communauté et une commission spécifique est parfois désignée. Les règles de répartition changent entre les périodes pluvieuses (libre service) et les période sèches⁴ (mise en place d'un tour ou régulation par un ayguadier désigné pour l'occasion).
- (2) *Droit communautaire individualisé avec répartition au besoin, en temps fixe par usager.* C'est le cas de nombreuses communautés qui ont récemment perdu leur fonctionnement communautaire. L'écriture du droit d'eau est collective, mais au sein de la communauté chaque usager possède un droit avec une durée fixe consigné sur un cadastre, sans horaire fixe. La fréquence du tour d'eau est donc variable, selon le nombre d'usagers. Seul certains membres de la communauté ont droit à l'eau, droit qu'ils ont acquis soit par héritage, soit par contribution financière, soit en luttant pour l'acquisition du canal au nom du groupe, etc. Une association par canal (junte locale) s'occupe de la gestion de l'eau.
- (3) *Droit privé :* droit individuel, avec une durée et un horaire fixe. Il s'agit principalement du mode de fonctionnement des secteurs métis qui ont acquis depuis fort longtemps ces droits par achat ou héritage des constructeurs des canaux. Des associations d'usagers (juntas locales) s'occupent de la gestion de l'eau.

² Cuadra : mesure locale équivalente à environ ¾ d'hectare.

³ Cabildo : groupe de cinq dirigeants d'une communauté indienne, élu chaque année par les membres de la communauté et légalement reconnu par le Ministère de l'Agriculture.

⁴ La notion de saison sèche et pluvieuse est toute relative et ne correspond pas à une période précise de l'année. Pour certains, la période sèche commence après « quelques jours sans pluie », pour d'autre elle débute lorsque « les usagers se pressent autour de la prise d'eau » ; donc dans les deux cas, quand la distribution nécessite d'être régulée pour éviter les conflits.

Les principaux canaux de la zone associent des groupes d'usagers métis et indiens qui possèdent donc différents types de droits d'eau et différents modes de répartition interne de la ressource. Ces divers modes d'accès à l'eau sont liés à une conception différente de l'eau. Les métis considèrent l'eau comme un facteur de production et la gère comme un droit individuel et privé, alors que les Indiens considère l'eau comme un élément vital, centre de l'identité communautaire et la gère comme un bien collectif.

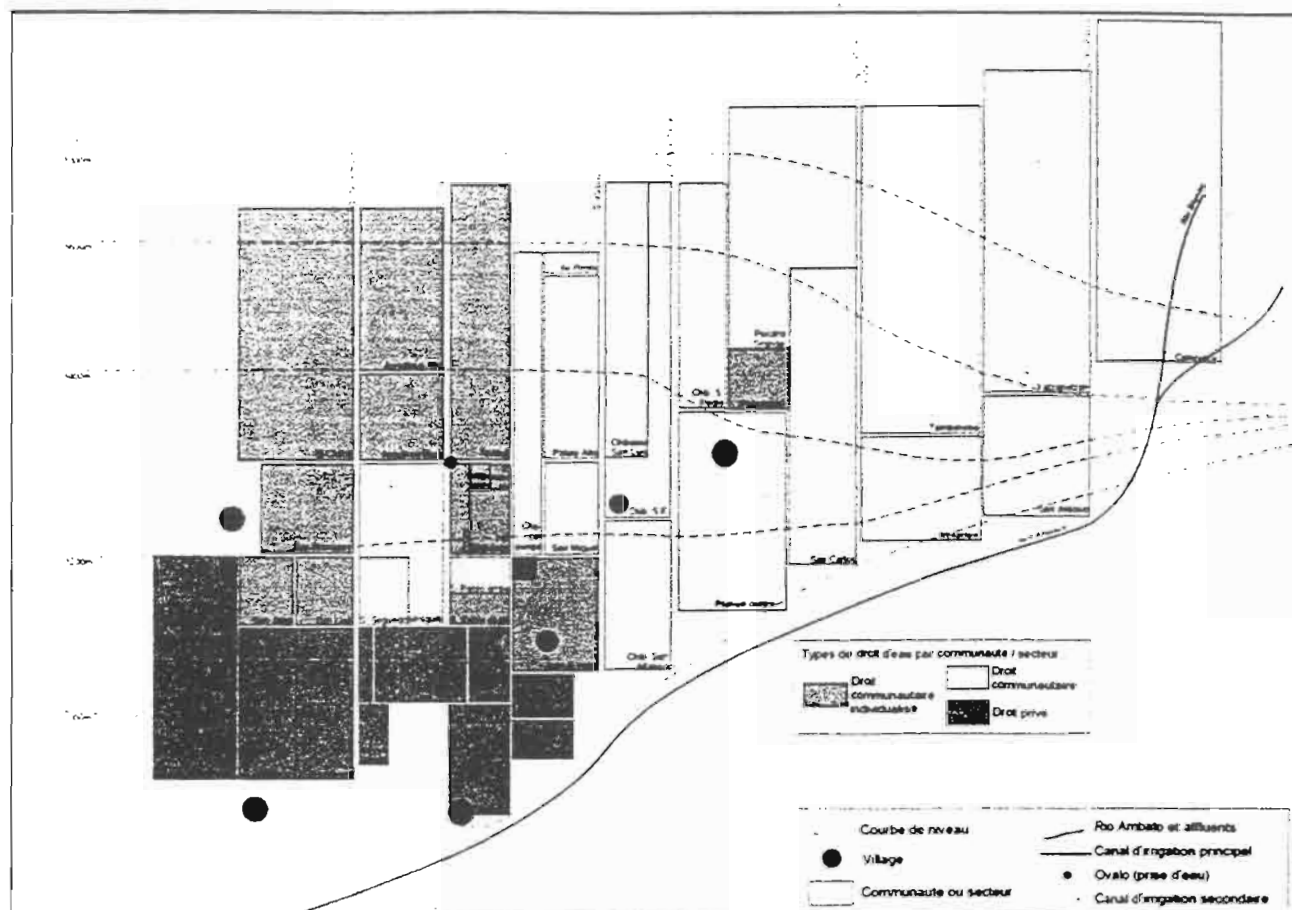


Figure 6: Représentation spatiale des divers types de droits d'eau sur le versant de Santa Rosa - Pilahuin

Dans les communautés indiennes de Juan Begnino Vela et Pilahuin, l'eau des différents canaux d'irrigation est en général mélangé en entrée de la communauté et acheminée par un seul et même réseau de canaux secondaires. Le droit communautaire est à priori le plus égalitaire car tous les membres de la communauté ont accès à l'eau, mais selon les règles de répartition interne, des inégalités peuvent apparaître. Dans le cas de la répartition « au besoin », notion toute relative, c'est en fait les relations de pouvoirs qui s'expriment et parfois le critère financier (celui qui peut payer). Dans le cas de la répartition égalitaire en temps/ usagers, les inégalités peuvent venir des variations de longueur de tour d'eau selon les secteurs où le nombre d'usager dans le tour est variable (comme à San Carlos ou Tamboloma). Les personnes influentes peuvent jouer un grand rôle car les règles ne sont que des accords reconduits oralement et sans bases juridiques. Le droit d'utilisation de l'eau n'est pas directement liée à la participation (en travail, aux réunions, en cotisations) mais celle ci est socialement imposée par le fonctionnement collectif.

Dans les communautés avec des droits d'eau individualisés, chaque usager a accès à un ou plusieurs canaux d'irrigation, ce qui est la principale source d'inégalités entre irriguants. Ces canaux sont soit « communautaires » dans le sens où initialement chaque membre de la communauté avait accès à son eau à condition de contribuer à la gestion et à la maintenance du canal, soit « privé » dans le sens où seuls ceux ayant hérité d'un droit initialement acheté ont

accès à l'eau. Ainsi, quelques usagers privilégiés ont accès à de grandes quantités d'eau du canal Casimiro Pazmino ou d'une des branches du canal Chiquicahua (nommé Terceria). De plus, le cadastre n'est que partiellement respecté, et comme dans le mode de gestion précédente, les règles de répartition varient entre la saison pluvieuse (chacun est libre de se servir au besoin) et la saison sèche ou un ayguadier est nommé pour faire respecter un tour d'eau ou distribuer l'eau en fonction des contributions financières.

C'est dans les communautés métis du bas du versant que les inégalités sont les plus fortes entre usagers, car elles sont définitivement fixées depuis la loi sur l'Eau de 1972 qui, en déclarant le droit d'eau indissociable de la terre, a fixé les inégalités d'accès à la ressource. Dans certains secteurs, l'ensemble des usagers n'a accès qu'à un canal et a de faibles droits (comme à Jérusalem ou El Carmen alimentés seulement par le canal Cunuyacu Chimborazo a raison de 15 l/s pendant 15H toutes les 4 semaines en moyenne pour plus de 50 usagers chacun). Dans d'autres secteurs, quelques usagers monopolisent la plus grandes parties des droits (comme par exemple à Alobamba où 3% des usagers possèdent 25% des droits du secteur). Les usagers avec de faibles droits d'eau n'ont aucun moyen légal de se procurer plus de ressource en eau. De petits marchés informels de vente d'eau se développent entre ces plus défavorisés et quelques actionnaires nantis de canaux privés (Casimiro Pazmino notamment) ou même quelques dirigeants de communautés en excédent d'eau à certaines périodes de l'année. Mais seuls ceux ayant certaines capacités financières peuvent se le permettre, car l'eau acquise de cette manière est chère. A Alobamba et Huachi, où la fruticulture fut prospère il y a quelques décennies, certains usagers ont pu investir dans des systèmes de stockage individuel de l'eau et de gouttes à gouttes. Seuls quelques rares agriculteurs dans des filières bien précises (fraise par exemple) peuvent encore aujourd'hui investir dans de tels systèmes leur permettant d'économiser et valoriser au mieux l'eau d'irrigation qu'ils reçoivent.

Entre usagers d'une même unité de distribution de l'eau (communauté, secteur), l'accès à l'eau d'irrigation est donc conditionné par (tableau 2):

- (1) *La capacité financière de l'usager*, que ce soit pour participer à la défense ou à l'acquisition légale de droits d'eau, pour acheter l'eau sur des marchés informels entre usagers ou pour investir dans des systèmes d'économie de l'eau (distribution ou stockage).
- (2) *L'histoire personnelle de l'usager* : vu la pression démographique de la zone, il ne peut se créer de nouveaux droits d'eau et le marché de la terre est restreint, l'usager dépend donc de l'héritage en terre et en droit d'eau des ses aïeux.
- (3) *Le « pouvoir » de l'usager et sa position dans le groupe* : niveau d'éducation permettant les démarches légales, capacité d'imposer son point de vue dans le groupe ou sur le terrain, degré de lutte pour la défense ou l'acquisition de droits d'eau.
- (4) *La participation de l'usager à l'ensemble du processus de gestion de la ressource* : participation aux réunions de la junte d'irriguants, aux travaux de maintenance et de réparation de l'infrastructure, aux cotisations financières ; mais cette participation est elle-même liée à la position sociale de l'usager dans le groupe, à la sécurité de l'accès à l'eau, ainsi qu'à la part de l'agriculture irriguée dans le revenu économique familial.

Type de droit et de répartition de l'eau d'irrigation	COMMUNAUTAIRE		INDIVIDUALISE		PRIVE
	Au besoin	Egalitaire	Au besoin	Temps fixe	Temps et horaire fixe
Capacité financière	x		x	x	x
Histoire personnelle				x	x
Pouvoir et position sociale	x		x		
Participation (réunion, travail, cotisation)	x	x	x	x	x

Tableau 2: Récapitulatif des contraintes d'accès à l'eau dans le cas du versant de Santa Rosa - Pilahuin pour chaque mode de répartition de l'eau / type de droit d'eau

Déstructuration sociale et crise de gestion de l'irrigation

En Equateur, depuis 1994, dans le courant néolibéral qui affecte l'ensemble du sous continent, la gestion des ressources hydriques est décentralisée (Ruf, 2001). Le principal institut d'Etat en charge de la gestion de l'eau est démantelé, aucune législation ne vient définir clairement les nouvelles attributions et devoirs de chacun, et aucune politique n'accompagne le transfert de compétences aux gouvernements locaux et aux usagers (Arias, 2001). Devant l'absence de cadre et de politique nationale dans le domaine de la gestion de l'eau, les gouvernements locaux de la Province du Tungurahua (le Conseil Provincial et les Municipalités) doivent, en collaboration ou en cohabitation avec de nombreuses autres institutions (ONG notamment), développer leur propre modèle de gestion de l'eau alors qu'ils ne possèdent ni les outils légaux ni les compétences techniques et financières pour ce faire (Girard, 2004).

Au niveau du versant de Santa Rosa - Pilahuin, les cabildos des communautés indiennes et les juntas d'irriguants sont les principaux acteurs collectifs du monde agricole et rural et sont sollicités pour cela par les institutions provinciales de gestion de l'eau. Un de leur rôle devrait être de permettre les débats et les négociations entre usagers et entre groupes d'usagers métis et indiens pour améliorer de la gestion collective de la ressource en eau, mais elles connaissent de graves crises d'organisation et de fonctionnement, les empêchant même de remplir leurs tâches courantes. Voyons plus en détail.

Les dysfonctionnements des juntas centrales et le clivage haut / bas du versant

Comme nous l'avons déjà mentionné, la répartition de l'eau des grands canaux d'irrigation du versant de Santa Rosa - Pilahuin a changé au cours du XX^{ème} siècle, lorsque les communautés indiennes ont accédé, par la force puis légalement, à des droits d'eau jusqu'alors uniquement réservés aux groupes métis du bas du versant (Girard, 2005). Les métis en ressentent une grande frustration alors que les Indiens jouissent d'une position de pouvoir inédite. De plus, l'Etat dans les années 1980-1990, lors de sa forte politique interventionniste dans le domaine de l'eau, a imposé aux organisations d'usagers de se regrouper dans une même association pour un même canal avec une unique concession, alors qu'avant chaque groupe d'usagers pouvait avoir sa propre organisation et concession (Ruf, 2001 ?). Il en résulte que les juntas se retrouvent avec plus de vingt groupes d'usagers différents à gérer. Métis et indiens doivent collaborer, malgré leurs rancunes réciproques et malgré leur mode de gestion et de répartition de l'eau fort divers. Enfin, dans le milieu des années 1990, lors du désengagement de l'Etat, les juntas se retrouvent brutalement en charge complète des réseaux d'irrigation, sans plus aucune aide technique ou financière.

Ces quelques éléments historiques expliquent en partie les difficultés auxquelles sont aujourd'hui confrontées les juntas centrales des grands canaux d'irrigation (*acequias* Toallo, Cunuyacu-Chimborazo, Chiquicahua et Casimiro-Pazmino). Des enquêtes auprès des dirigeants et des participants des juntas ainsi que l'analyse du déroulement de leurs réunions mensuelles permet de faire un point sur leur fonctionnement.

Toutes ont beaucoup de mal à assurer les tâches courantes d'association d'irrigation : maintenance de l'infrastructure et règlements des conflits d'usagers, et font appel à des organismes extérieurs pour une aide technique et/ou financière : Conseil provincial, institut étatique ou bien souvent ONG. Les usagers du canal Toallo sont, depuis la création du canal (1698), séparés en deux juntas. La première, correspondant à la branche Alobambá, existe depuis plusieurs siècles et ne regroupe que des usagers métis. N'ayant pas subi de profonds changements dans les dernières décennies, elle fonctionne relativement bien. La deuxième, correspondant à la branche Comunidades, n'existe formellement que depuis quelques décennies et est constituée majoritairement de communautés indiennes. Elle ne fonctionne encore que

partiellement. Les juntas des canaux Chiquicahua et Cunuyacu-Chimborazo, regroupant depuis peu le plus grand nombre de secteurs et de communautés métis sur tous les étages du versant, ont le plus de difficultés. Enfin, la junta du canal Casimiro- Pazmino n'a pas intégré réellement les nouveaux usagers indiens dans son fonctionnement, ni pour les réunions, ni pour les cotisations et est donc uniquement gérée par les usagers métis (Tableau 3).

	<i>Toallo Alobamba</i>	<i>Toallo Comunidades</i>	<i>Chiquicahua</i>	<i>Cunuyacu-Chimborazo</i>	<i>Casimiro Pazmino</i>
<i>Nombre sect. /com</i>	3 Métis 0 Indiens	1 Métis 5 Indiens	11 Métis 7 Indiens	12 Métis 20 Indiens	7 Métis 5 Indiens
<i>Aspects financiers</i>	Peu de morosité	Morosité et dettes importantes pour tous	Morosité et dettes importantes pour tous	Morosité et dettes importantes pour tous	Faible morosité chez les métis ; importante chez les indiens
<i>Participation</i>	Importante de tous	Très faible participation, retard et absence	Assez forte chez les métis, faible et inégale chez les indiens	Assez forte chez les métis, faible et inégale chez les indiens	Forte chez les métis, nulle chez les indiens
<i>Aspects de gouvernance</i>	- Direction métis - Faible rigueur dans application des règlements - Réelle confiance dans la gestion de la junta	- Mixité métis /indien de la directive imposée - Remise en question permanente des accords signés et non-respect - Arrangements individuels hors junta fréquents	- Direction et débats monopolisés par les métis - Domination par certaines fortes personnalités - Faible rigueur d'application des règles - Favoritisme	- Direction et débat monopolisé par les métis - Corruption des anciens dirigeants - Pas de moyen de pression de la directive	- Direction et débat animé uniquement par les métis - Méconnaissance et critique ouverte des indiens

Tableau 3 : Présentation synthétique des principales caractéristiques et difficultés des cinq juntas centrales des grands canaux du versant Santa Rosa - Pilahuin.

D'une manière générale, voici les principaux problèmes auxquelles sont confrontées ces juntas. Tout d'abord les juntas ont d'importantes difficultés financières qui les empêchent de payer le personnel (ayguadiers, secrétaire) et d'opérer la maintenance de l'infrastructure. Les morosités sont très importantes et certains usagers ne paient jamais. Chez les Indiens, la culture de la cotisation est le principal frein, tout comme la réticence à financer une organisation dont la gestion n'est pas claire et qu'ils ne dominent pas. De plus, étant en position stratégique géographiquement, l'eau ne leur manque que rarement, ce qui ne les incite pas à mettre un prix sur l'eau. Les métis ont des réticences à payer également par manque de confiance dans la gestion de l'argent mais également parce que l'eau n'est pas « sûre » et n'arrive pas toujours. De plus ils ne veulent pas « payer pour les autres » (i.e. les indiens). La directive n'a pas (et ne semble pas vouloir se donner) de moyens de pression pour faire payer les usagers (impossibilité physique de contrôler toutes les prises d'eau pour couper l'approvisionnement, inefficacité du système d'amende faute d'application, réticence des dirigeants à faire la police).

De plus, les juntas souffrent d'un déficit de participation des usagers aux réunions et à l'animation de l'organisation. D'un côté les jeunes métis se désintéressent de l'agriculture et donc de l'irrigation et seuls quelques gros propriétaires d'un certain âge s'impliquent dans la junta. De l'autre, les Indiens participent peu ou pas, et lorsqu'ils assistent aux réunions, ils ne font souvent qu'acte de présence sans émettre d'opinion, soit qu'ils n'osent pas (pas le même niveau d'éloquence, peur du ridicule, etc.), soit qu'ils ne le souhaitent pas, ayant d'autres moyens de pression que la négociation en réunion. Ils peuvent en effet jouer de leur position en amont par chantage sur la circulation de l'eau pour infléchir les décisions de la junta plutôt que de négocier en réunion. En outre, les réunions de juntas sont exigeantes en temps (7 ou 8h tous les mois avec beaucoup de retards et de longueurs) ce qui décourage les participants, qui doivent parfois faire plus de 2 heures de transports pour venir.

Enfin, les juntas ont d'importants problèmes de gouvernance. La direction des juntas comme les discours et les décisions sont monopolisés par les métis. Ce sont en outre souvent des personnalités éloquentes et influentes dans la sphère politique locale qui monopolisent les discussions, les débats et les décisions au sein de la junta selon leurs propres intérêts. L'espace de négociation et débat que devraient constituer les réunions de juntas entre métis et indiens sur les dysfonctionnements de la gestion de l'irrigation est ainsi fermé. Les règles décidées en réunions ne sont que rarement appliquées et toujours renégociées au cas par cas. Personne n'ose s'imposer. Les directives ne tranchent jamais, ne s'imposent pas, cela impliquant trop de conséquences sociales pour un poste tenu une seule année et non rémunéré. La « concession » est la règle, ce qui au lieu de résoudre les problèmes ne fait souvent que les retarder. De l'autre côté, les Indiens ne s'approprient pas l'institution, la laissant être dirigée par des usagers métis âgés. Soit par manque de compréhension (nécessité de cotisation pour faire fonctionner la junta et le canal par exemple), soit par choix politique (désaccord sur les décisions de la junta).

Toutes ces difficultés sont liées à la forte opposition existante entre métis et indiens encore incapables de communiquer entre eux. D'une part, ils ont de forts ressentiments réciproques liés à l'histoire ancienne et récente. Les Indiens reprochent aux métis la longue exploitation par leurs pères de leurs aïeux et craignent un racisme rémanent. Les métis reprochent aux indiens la prise par la force de droits d'eaux chèrement acquis par le passé et d'en faire encore aujourd'hui un objet de chantage. D'autre part, les deux groupes ethniques n'accordent pas les mêmes valeurs à l'eau et ne la répartissent pas selon les mêmes critères. Pour les indiens, une répartition juste et acceptée de tous est être celle qui donne autant à chacun ou qui donne à chacun selon ce qu'il demande, mais après une négociation entre tous pour se mettre d'accord sur la règle. Pour les métis, une répartition juste est soit celle qui respecte les droits d'eau existants, soit celle qui alloue l'eau selon des critères techniques comme le besoin des plantes. Cette conception multiple des principes d'équité et de justice rend difficile les négociations sur une éventuelle redistribution de l'eau au sein du versant.

Eclatement des cellules sociales de base : communautés et/ou juntas locales

Dans les parties hautes du versant, l'organisation principale est la communauté. Dans les années 1970 et jusque dans les années 1990, le fonctionnement communautaire est à son apogée, renforcé par la réforme agraire (qui pousse à l'organisation pour l'obtention de terre) et fortement aidé par les ONG (création d'écoles, de dispensaires, de coopératives de production ou de transformation dans les communautés indiennes). L'identité et l'unité indienne se développent lors des différentes luttes pour l'accès à la terre puis à l'eau et avec la formation des mouvements indiens nationaux. Mais au milieu des années 1990, ce système commence à périr, d'abord comme la conséquence d'une mauvaise gestion interne des communautés. La production et la transformation collective montrent leurs limites (principalement en terme d'inégalité et de non-flexibilité pour chaque individu) et les dirigeants échouent dans la gestion financière créant une méfiance parmi les membres de la communauté. Une série de facteurs poussent les communautés à individualiser leurs terres (politique de l'INDA, vide législatif, activité lucrative des avocats). Les cabildos des communautés s'en trouvent fortement affaiblis, car après les principales réalisations pour les besoins de base (écoles, routes, électricité), leur pouvoir est principalement basé sur le contrôle du foncier et de la production collective. Dans le domaine même de l'irrigation, son pouvoir de gestion devient contesté, comme à Tamboloma par exemple ou les sous-secteurs de la communauté réclament l'auto-gestion de l'irrigation. De plus, la création d'associations suite aux rachats d'haciendas fragmente la communauté en différenciant les usagers sur les droits d'accès à la terre et parfois à l'eau (comme à Apatug ou à Angahuana). Enfin, la migration des jeunes dans certaines communautés les détournent de l'investissement dans l'organisation communautaire (comme à Chibuleo), tout comme les habitudes vestimentaires traditionnelles se perdent également avec le « métissage » des modes de vie.

Dans la partie médiane du versant, la forme d'organisation communautaire persiste. Les habitants ne se revendiquent ni indiens ni métis, mais souvent comme « naturels ». Poussés par leurs parents ou grands-parents à abandonner les vêtements et la langue indienne, ils ont peu à peu adopté le mode de vie métis. Ils ont accédé au début du siècle à des titres individuels de propriété et commencent dès les années 1950 à établir des listes d'usagers pour l'accès et la répartition de l'eau des canaux, lorsque la ressource commence à se faire rare. Des juntas d'usagers par canal sont alors créées et celles-ci contribuent aujourd'hui à affaiblir l'organisation communautaire. Ces juntas entrent en compétition de pouvoir avec le cabildo et entre elles-mêmes, divisant les usagers et créant des « eaux » au lieu d'une « eau », ressource commune à gérer. De plus, ces juntas connaissent d'importants problèmes de participation et de gouvernance. Par exemple, à San Pablo, deux juntas coexistent, l'une pour le canal Chiquicahua et l'autre pour le canal Cunuyacu-Chimborazo mais elles regroupent quasiment les mêmes usagers. Ces derniers passent un temps considérable dans la gestion de l'irrigation, entre les réunions mensuelles et les journées de minga⁵ de chaque canal et commencent à questionner la rentabilité de cet investissement par rapport au bénéfice tiré. C'est ainsi qu'un groupe d'usager du canal Toallo Comunidades a récemment abandonné son droit d'eau sur ce canal en ne participant plus à sa gestion. Les juntas ont de plus en plus de mal à élire une direction, personne ne souhaitant assumer ce rôle avec trop d'obligations et de travail sans rémunération. Dans le cas de la junta du canal Cunuyacu-Chimborazo de San Pablo, les postes de direction sont ainsi attribués rotativement entre tous les usagers. Cela explique le laxisme quant à l'application des règles de fonctionnement de la junta et le traitement au cas par cas des problèmes et conflit. La part de l'activité agricole dans les revenus de ces communautés chute, de part le contexte économique peu favorable à la production agricole, les opportunités de travail extra-agricoles et les difficultés d'accès aux moyens de production que sont l'eau et la terre. Il en résulte un investissement moindre dans les instances de gestion de l'irrigation, ce qui risque de compromettre l'accès à l'irrigation et par la même la production agricole. Un cercle vicieux s'enclenche alors, qui est schématisé en figure 7.

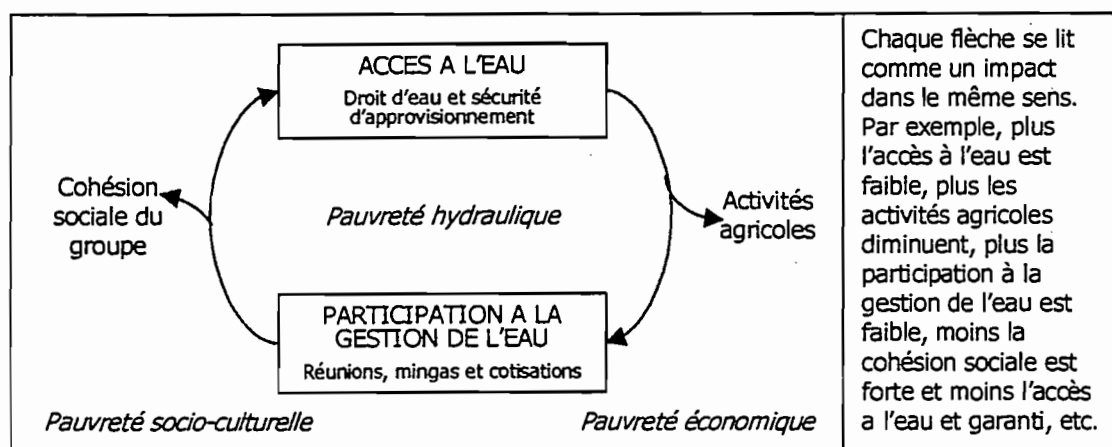


Figure 7 : essai de schématisation du cercle vicieux de la pauvreté hydraulique dans les communautés andines.

Dans la partie basse du versant, les métis ne sont pas regroupés au sein d'une communauté mais au sein de quartiers de paroisse. La junta d'irrigants est la principale (et souvent la seule) forme d'organisation paysanne. Son espace est d'ailleurs souvent utilisé pour le règlement de conflits ou de tensions entre agriculteurs dépassant le domaine de l'irrigation (litiges fonciers notamment). Dans certains cas, ces juntas sont bien organisées, puissantes, ont de bons taux de participation et une bonne gestion financière. C'est le cas par exemple des juntas de Alobamba ou de Huachi. Néanmoins, ces juntas souffrent d'un grand vieillissement de leurs membres, les jeunes se détournant de l'activité agricole. Dans d'autres secteurs, comme à Minarica, les juntas ont

⁵ Minga : travail collectif traditionnel des Andes

quasiment disparues et ne s'occupent plus du maintien des infrastructures ou de la répartition de l'eau. Faute d'un accès sûr à l'irrigation et avec un fort détournement de l'activité agricole, l'eau n'intéresse plus grand monde, et comme personne ne lutte pour elle, son accès en devient d'autant moins sûr. C'est le cercle vicieux de la figure 7 enclenché.

Double blocage sur le versant de Santa Rosa - Pilahuin

En conclusion, le versant de Santa Rosa – Pilahuin est marqué par une forte inadéquation entre les besoins en eau d'irrigation d'une part et l'accès à la ressource d'autre part. Dans la partie haute du versant, essentiellement composée de communautés indiennes, les besoins en eau sont limités et bien couverts par un accès important et sûr à l'eau, alors que dans la partie basse, formée de secteurs métis principalement, l'accès à l'eau est moins important, plus inégal entre usagers et peu sûr de part la position en bout de réseau, et ne couvrent pas les forts besoins en eau. Le risque est que ce déséquilibre freine le développement agricole de la zone. Déjà dans les zones métis du bas du versant, le cercle vicieux de la figure 7 est enclenché et l'activité agricole décline. Les inégalités de revenus croissent, la migration s'accroît.

En parallèle, le capital social des organisations collectives de la gestion de l'eau est au bord de l'effondrement. Métis et Indiens ne sont pas capables de gérer en commun la ressource en eau. Les métis monopolisent encore les instances de gestion alors que les Indiens ne s'impliquent pas dans celles-ci et ne se les approprient pas non plus. Les risques sont importants pour le développement du bassin. Le déficit hydrique de la zone risque de s'accroître sans gestion concertée pour la protection des sources d'eau que sont les paramos et sur lesquels vivent les communautés indiennes et sans remise en état et entretien des réseaux de canaux d'irrigation. De plus, les conflits risquent d'augmenter et d'autres risquent de voir le jour avec d'autres types d'usagers comme la ville d'Ambato pour son alimentation en eau potable depuis les mêmes sources d'eau sur les paramos.

Les communautés hautes du bassin versant sont dans une position de force pour contrôler les accès à l'eau alors que les secteurs métis dominant et monopolisent l'administration des juntas en charge de la gestion des canaux. La pauvreté hydraulique se maintient donc, à travers cette inadéquation besoin / accès en eau et à travers la défaillance des organisations locales de gestion de l'irrigation. Ses deux leviers de lutte sont bloqués : renégociation de l'accès à l'eau et amélioration de la participation des usagers à la gestion de l'eau. Un regard historique permet d'éclairer ce blocage. Dans le haut du versant, la récente reconquête des droits d'eau est vu comme la reconnaissance des anciens tords fait par les colons puis les métis et marque la fin de la domination métis sur les indiens. Les communautés ont encore un faible intérêt pour la participation à la gestion globale de l'eau. Ce sont les premières à se servir, leurs besoins sont limités et elles préfèrent entrer dans un rapport de force que dans le dialogue avec les métis. Dans le bas du versant, les faibles débits d'eau et leur grande insécurité ont commencé à détourner la population de l'activité agricole. Les inégalités d'accès à la ressource se sont renforcées par un mode de fonctionnement de plus en plus individuels (loi du plus fort ou du plus riche), les organisations politiques territoriales comme d'irrigation ont perdu du pouvoir et la justification d'investissement en main d'œuvre ou en argent dans les systèmes irrigués s'est amoindrie.

Conscientes de ce déséquilibre, les institutions d'Ambato adoptent diverses stratégies pour tenter de réaliser un transfert de ressources en eau du haut vers le bas du versant. L'une d'entre elle est d'enclencher une relation marchande entre l'amont et l'aval, de type paiement de services environnementaux. Ceux du bas paieraient les communautés d'altitude pour conserver les sources d'eau et ainsi sécuriser leur accès à l'eau, mais ce système risque de renforcer l'opposition vendeurs / acheteurs d'eau et le clivage haut /bas. L'ONG ledeca axe sa stratégie sur l'amélioration des relations au sein du versant et le renforcement de la coordination entre métis et indiens au sein d'une même junta et entre juntas sur le versant. Ces actions se traduisent par

exemple par la création d'espaces d'échanges et de concertation entre groupes amont et aval et entre juntas d'irriguants, par la contribution en main d'oeuvre des usagers du bas au maintien des sources d'eau situées dans les communautés d'altitude ou encore par la renégociation des droits d'eau avec l'établissement de listes communes de critères pondérés, etc (Iedeca, 2002). Cette stratégie de gestion « sociale » des questions d'irrigation, qui actionne des leviers sociaux plutôt que purement économiques, est probablement la seule qui ait des chances de succès dans un versant où l'eau n'est pas gérée sur des critères techniques mais sur d'autres critères et où la législation extérieure est faiblement respectée par rapports aux règles informelles.

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The political economy of providing efficient water supply and sanitation services to the poor: the case of Colombia

Matthias Krause¹

1 Introduction and abstract

Adequate domestic water supply and sanitation (WS&S) services are a crucial element for escaping poverty. Lacking access to these services is one important factor causing infectious diseases and decreasing productivity and economic possibilities of the household. The provision of equitable and efficient WS&S services presupposes effective policies in order to (i) implement affordable solutions for the poor who lack access as well as to tackle (ii) the significant health and environmental externalities and (iii) the natural monopoly characteristics associated with these services. This is a complex issue because expanding services and improving their quality typically cannot be reached without improving efficiency and financial sustainability of service providers. Moreover, neglecting environmental sustainability will put in danger the availability of safe water which in its turn will hurt especially the poor.

In chapter 2 of this paper the main elements of a “good” WS&S policy are outlined based on a discussion of the equity and efficiency characteristics of WS&S services. Subsequently and using an institutionalist political economy approach, the relation between WS&S policy weaknesses and failures in political and administrative governance is described. During the last decade the academic and political debate has focused too narrowly on the polemic privatization issue. It is argued that a broader governance perspective is better suited to analyze policy weaknesses and further develop research on WS&S sector reform.

Chapter 3 presents preliminary empirical evidence from Colombia based on an ongoing research project.² The focus is on finding evidence for the hypothesis that weaknesses in WS&S policies are related to weaknesses in political and administrative governance. The Colombian WS&S sector is very suited to explore this hypothesis. Starting in the late 1980s it has been deeply transformed with the goal of improving achievements in equity and efficiency. The reform included the promotion of private sector participation (PSP) which allows assessing how governance weaknesses influence both public service providers and providers with PSP. Preliminary evidence indicates that reluctance of politicians to grant full independence to the regulator and to service providers is detrimental to efficiency, that there is a discrimination of the rural poor in subsidy policy that may be related to their political voicelessness and that inefficiencies in the use of publicly funded grants are related to a weak administrative governance. In chapter 4 some general conclusions are drawn.

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² In the context of this research project carried out by the German Development Institute, the author of this paper recently returned from a research stay in Colombia during which quantitative and qualitative data was collected.

2 Conceptual approach

2.1 The relation between poverty and WS&S services

Poverty can be broadly defined as a multiple and pronounced deprivation in well-being.³ Poverty manifests itself in different dimensions of well-being: (i) material deprivation, (ii) low achievements in education, (iii) ill health, (iv) vulnerability, (v) political voicelessness and powerlessness. Having this broad poverty concept in mind, it can be argued in the first place that lacking access to improved⁴ WS&S services itself is a symptom of poverty as it is a kind of material deprivation. At the same time, lacking access to these services is one important factor causing deprivations in other dimensions. It increases the risk of falling ill with the consequence of decreasing productivity and economic possibilities of the household.⁵ Productivity and economic possibilities do not only decrease due to the consequences of ill health but also due to time and money spent in getting safe water, e.g. from a dug well two miles away or from an expensive source like water vendors. Finally, lacking adequate WS&S services is often also a consequence of other poverty dimensions: From a conceptual point of view, there are two exemplary institutional settings (out of a continuum combinations) for allocating WS&S services: (i) free markets that allocate services according to the price mechanism and (ii) State organizations that allocate services according to a political logic. In general the poor are handicapped with respect to both allocation mechanisms (i) because of their low purchasing power and (ii) because of their political voicelessness and powerlessness.⁶

2.2 Social goals and implications for WS&S policy

The academic and public debate on the organisation of domestic WS&S services centres around three social goals: equity, efficiency and environmental sustainability. In what follows the former two are going to be discussed (environmental aspects are treated under the heading "efficiency").⁷

³ According to a widespread consensus in development literature the term poverty should not be limited to income or monetary wealth. The following concept is based on World Bank (2001), chapter 1.

⁴ For a discussion of definitions and characteristics of improved (or adequate or safe) WS&S services see WHO / UNICEF (2000), annex A; UN-HABITAT (2003), pp. 2-5.

⁵ The health and economic benefits of WS&S services to households are well documented. See UN-HABITAT (2003), ch. 2; WHO / UNICEF (2000), pp. 1-3; Hutton / Haller (2004); Fuest / Laube (2004), ch. 3.2. For an in-depth empirical analysis and discussion of health benefits from WS&S services see e.g. Jalan / Ravallion (2001), Esrey (1996).

⁶ For an in-depth analysis of the disadvantage of poor people to influence government decisions on general pro-poor policies and to obtain benefits from such policies see Johnson / Start (2001).

⁷ This is a rather limited perspective on environmental sustainability. In the literature that centres on sustainable water resource management, environmental aspects are treated in a much more elaborated manner. See Neubert et al. (2005) for a in-depth discussion of theoretical and practical aspects of the Integrated Water Resource Management concept that integrates environmental, economic and social goals from a resource management perspective.

Equity

The main argument for why WS&S services matter from an equity perspective has been given above: their close interrelation with and impact on poverty.⁸ The implications are that WS&S policies should promote access of the poor to adequate services and make sure that these services are affordable for low-income household. This can be achieved e.g. by subsidizing access to (and possibly consumption of) WS&S services of the poor. A free market allocation based on the price mechanism alone that is not complemented by any specific poverty-oriented policies or subsidies will not achieve the equity goal in the WS&S sector.

Efficiency I: Market failure

An important strand of (economic) literature is concerned primarily with efficiency.⁹ Urban WS&S show two important characteristics that prevent markets from working efficiently, i.e. from serving the greatest number of consumers according to their preferences at the lowest possible cost.¹⁰

- Natural monopoly¹¹ – in a free market setting this phenomenon means that consumers are faced with a single supplier that can charge high prices for a low quality service because he has not to fear any competition due to the cost characteristics of the supply technology. This leads to losses in consumer welfare.
- Environmental and health externalities¹² – in a free market setting these phenomena lead to situations where too much water is extracted from a water source as compared to its capacity to replenish, too few sanitation facilities are installed or the water body is polluted too much because the environmental and health costs associated with these activities are not reflected in the market price and are thus not accounted for by the individual households or firms.

Both market failures are good reasons for the State taking an active role in designing specific policies and regulations for promoting a low cost and good quality service as well as for in-

⁸ An argument closely related to this is to highlight the human rights character of WS&S services. The right to water has been recently included in the International Covenant on Economic, Cultural and Social Rights of the United Nations Economic and Social Council. Cf. Budds / McGranahan (2003), p. 94.

⁹ It can be distinguished between the narrow concept of (i) operational efficiency which means that a given output (here quantity and quality of WS&S services) is produced at the lowest possible cost and the encompassing concept of (ii) allocative efficiency which (expressed in a oversimplifying way) means that the maximum number of consumers are provided with goods and services according to their preferences at the lowest possible cost. Cf. e.g. Rosen (1992), ch. 4.

¹⁰ Cf. e.g. Noll (2002).

¹¹ A market is a natural monopoly when – due to economies of scale and/ or scope – the lowest cost alternative to satisfy a given demand is supply by one single firm. For a technical discussion of the natural monopoly see Braeutigam (1989).

¹² According to Rosen (1992), p. 66, "externality" can be defined as an "... activity of one person affecting the welfare of another in a way that is outside the market ...". For an in-depth theoretical (and technical) analysis of externalities and public goods see Comes / Sandler (1996).

temalising external effects. It does, however, not necessarily imply State ownership of service providers.

Efficiency II: State failure

The traditional model for organising WS&S services in most developing countries until the 1990s has been public provision by State-owned monopolies with politically set tariffs that in most cases contained some sort of cross-subsidies between consumer classes. The choice of this model has often been justified on equity and efficiency grounds. Unfortunately, in many cities in developing countries this traditional model has been associated with disappointing achievements both with respect to the equity and the efficiency goal.¹³ According to an important strand in literature,¹⁴ the main reasons for the bad performance lie in the negative consequences of (i) State ownership and (ii) absence of competition on the operational efficiency¹⁵ of service providers. As there are no private share holders that press the management to use inputs in the most efficient way to maximize profits, and as customers cannot sanction bad service by switching the supplier, managerial slack occurs. Moreover, management decisions are not taken according to a business logic but according to a political logic with the consequence of a low-level equilibrium.¹⁶

Inspired by this State failure argumentation, International Finance Institutions and important donor countries during the 1990s promoted private sector participation¹⁷ (PSP) in developing countries, usually combined with the building up of regulatory agencies for monopoly regulation. Assessing the success of this strategy has been a matter of controversy. As far as the academic debate is concerned, the picture is inconclusive.^{18, 19} Most analysts acknowledge improvements in operational efficiency but underline that overall success has been dimin-

¹³ Low coverage especially among low-income households, intermittent and bad service, high water losses, failure of the subsidies to reach the poor, average tariffs below average costs of service (which means that the resulting financial losses have to be covered by State transfers), unnecessarily high costs of service provision (e.g. due to overstaffing). Cf. Kessides (2004), pp. 2-3, 220; World Bank (1994), pp. 25-36.

¹⁴ Cf. Shirley / Walsh (2000) and the overview of literature given there. Applied to the case of the WS&S sector, see Foster (1996), pp. 1-5.

¹⁵ See footnote 9.

¹⁶ As far as the author knows, the term "low-level equilibrium" in the context of WS&S has been coined by Pablo Spiller. See Spiller / Savedoff (1999).

¹⁷ The term "private sector participation" (PSP) is used to describe a range of different ways of involving the private sector in the provision of WS&S services: service contract, management contract, lease, concession, build-own-transfer schemes (BOT), joint venture, divestiture = pure privatization). These different models imply different types of articulation between private and public actors with differing divisions of responsibilities, risks and rights. For a description of different forms of PSP, cf. Shirley (2000), p. 150; Budds / McGranahan (2003), pp. 89-90; Foster (1996), p. 12.

¹⁸ Most of the empirical studies use data from Latin America because market-oriented reforms have been concentrated in this region.

¹⁹ Whereas several case studies show improvements in coverage, operational efficiency and water losses following PSP - cf. e.g. Shirley / Ménard (2002) - a recent analysis using a quantitative approach finds no significant difference in coverage improvements between PSP and public provision - cf. Clarke / Kosec / Wallsten (2004).

ished by ineffective regulation and insufficient poverty orientation. An undisputed result is that private investments in the WS&S sector in developing countries have materialised only to a small fraction and have lagged far behind the expectations.²⁰ In the political arena, PSP in WS&S has been highly controversial from the beginning and it has in several cases encountered strong political opposition, not only in Latin America.²¹ Typically it is claimed that PSP is inequitable and worsens the situation of the poor.

Elements of a "good" WS&S policy

There is no such thing as a "unique state-of-art blueprint" for equity and efficiency enhancing WS&S policy. With respect to the polemic question of PSP recent proposals are less dogmatic.²² In what follows the main lines of an encompassing WS&S reform are sketched that probably many analysts would endorse.

- i. Organizational separation of the functions policy-making, regulation and service provision aiming at making harmful political influence on regulation and management of WS&S services more difficult and at encouraging actors to concentrate on their core functions: politicians and policy makers²³ on policy-making, regulators on tariff and quality regulation, and service providers on management of WS&S services.
- ii. Poverty orientation: To assure that the poor gain access to safe WS&S services and that the use of these services is affordable to them is a fundamental task of policy-making. Measures include subsidising²⁴ the connection costs (and possibly the current tariffs) of low-income households, defining and monitoring connection targets in low-income neighbourhoods, empowering the poor for participating in regulation and planning of WS&S in order to enable them to exercise their consumer rights.
- iii. Economic regulation: This element aims at protecting WS&S service users from the abuse of monopolistic power and consists basically in defining (and controlling) efficient tariff and quality levels that have to be met by service providers and in promoting competition for the market (e.g. competitive bidding of concessions) to substitute for the absent competition in the market.²⁵

²⁰ Cf. Izaguirre (2004).

²¹ Cf. Kessides (2004), p. 6. Generally, we can observe that the global political debate on water issues is marked by ideological polarization. See Urquhart / Moore (2004) and Budds / McGranahan (2003) for a survey of the different positions and arguments in this debate.

²² Cf. World Bank (2004); Kessides (2004), ch. 5.

²³ See World Bank (2003), p. 48, for the differentiation between politicians and policy makers.

²⁴ The question of how to design WS&S subsidies schemes in order to effectively reach the poor without compromising (too much) overall efficiency of WS&S service provision is a complex issue on which quite a lot of theoretical and empirical research has been done. Cf. Yepes (1999), (2003); Estache/ Foster/ Wodon (2002), ch. 3-4.

²⁵ For the terms „competition in the market“ and „for the market“, see World Bank (1994), ch. 3.

- iv. Tariff reform: This element basically is about aligning the tariff level with the level of efficient²⁶ costs and aims at improving allocative efficiency as well as financial sustainability of service providers. This (together with PSP) typically is the most conflictive measure because in the very most cases it means that tariffs have to be increased.
- v. Corporatization of service providers which comprises both options commercialisation²⁷ under public ownership and PSP in one of its various forms (see above): This bundle of measures aims at improving operational efficiency and at insulating management from harmful political influence. Minimum requirements for improvements to occur under public ownership are that service providers are transformed into incorporated enterprises with an own budget and autonomy of the management to decide on manpower and budget allocation.
- vi. Environmental regulation: Protecting water bodies from pollution and assuring long-term availability of fresh water resources internalises negative external effects on downstream users and on the environment and is a condition for the sustainability of WS&S service provision. Typical measures include quantitative limits and/ or fees for the abstraction from and the pollution of the water bodies, subsidisation of sewerage treatment plants as well as the building up of monitoring systems for water quality and quantity.

2.3 Governance matters

Here it is argued that unsatisfactory achievements in both the traditional and the market oriented model may be related to weaknesses in governance.²⁸ As has been discussed above, equity and efficiency achievements in the WS&S sector are threatened by both State failure and market failure. Even when relying exclusively on private utilities for service provision, the State is necessary for economic and environmental regulation and for poverty orientation. If under the traditional model the State failed to achieve equity and efficiency being responsible

²⁶ It is the main task of regulation to assure that tariffs do not rise above the level of efficient costs. See above.

²⁷ On commercialization and corporatization see World Bank (1994), ch. 2.

²⁸ In a very general way governance can be perceived as *'the sum of the many ways individuals and [...] organizations, public and private, manage their common affairs'*; definition of the Commission on Global Governance as cited in Weiss (2000), p. 796. For the purpose of this article WS&S governance can be defined as those principles that shape the decisions and actions of all actors relevant for the WS&S sector, i.e. basically of politicians, policy makers, regulators, (private and public) service providers, and users. From an institutionalist political economy perspective, these principles derive from the structure (in the following: governance structure) of the space of interaction between actors. The governance structure – basically (i) institutions (e.g. water laws, tariff regulations), (ii) (self-centred) actors with their preferences and their specific economic, political and cognitive resources and (iii) actor constellations (e.g. many vs. few actors etc.) – shapes the course of decisions and actions in the WS&S sector (e.g. policies, regulations, management decisions, water consumption). The institutionalist approach is inspired by Scharpf's actor-centred institutionalism; cf. Scharpf (1997). The term "political economy" is used to describe a theoretical approach that, above all, looks at the economic and the political system of a society in an integrated manner: *"[P]olitical economy emphasizes both 'economic' behaviour in the political process and 'political behaviour' in the marketplace"*; Alt / Alesina (1996), pp. 645-646.

for policy-making, regulation and service provision, why should the overall result improve with the State being necessarily still responsible for the former two functions, unless the underlying reasons for the State failure are explicitly and effectively addressed in WS&S sector reform? What market failure and State failure theories have in common is that they describe conditions under which self-centred behaviour of individual actors does not lead to a maximization of the social goals equity and efficiency, i.e. conditions under which self-centred behaviour can be detrimental to social welfare.²⁹

From a normative point of view the main function of a good governance structure is helping to reduce detrimental forms of self-centred behaviour and, in general, to shape the behaviour of the main actors in the WS&S sector (basically politicians, policy makers, regulators, private and public service providers, and users) in such a way that it is conducive to the equity and efficiency goals. Weaknesses in governance can have a negative effect on WS&S policies and thus on service performance by two different ways: (i) Policies do not point at the right direction because of failures during the process of policy formulation and political decision making. This is related to weaknesses in political governance. Example: subsidies are only available for those who are already connected to the WS&S system leaving all the low-income households that lack a WS&S connection without any assistance because the non-connected poor have a weak political voice and thus are not taken into account by politicians and policy-makers when drafting subsidy rules. (ii) Policies point at the right direction but they are not implemented effectively because actors use the rooms for manoeuvre policies leave open for pursuing particularistic goals to the detriment of social goals, i.e. because of failures during the process of policy implementation. This is related to weaknesses in administrative governance. Example: subsidies do not reach the poor because the public administration exercises its discretionary power to use the money for the pursue of particularistic interests which in its turn is facilitated by a low transparency of budget processes, a weak accountability of the public administration and a lack of effective sanctioning mechanisms.

In what follows the Colombian WS&S policy is analyzed. The focus is on finding evidence for the hypothesis that weaknesses in WS&S policies are related to weaknesses in political and administrative governance.

3 Case study: Colombia

Starting in the late 1980s the Colombian WS&S sector has been transformed with the goal of improving achievements in equity and efficiency. Two major reforms have shaped the governance structure of the Colombian WS&S sector: Decentralization and public utilities reform.³⁰ Through the decentralization process (started in 1986) the responsibility for service provision and infrastructure assets were transferred from the national level to municipalities. Before, there had been a mixed responsibility with the major cities having been served typi-

²⁹ This is not to say that self-centred behaviour is generally detrimental to social welfare (self-centredness of human behaviour is a basic assumption of the theoretical approach chosen here). On the contrary: under the conditions of perfect markets the interaction of self-centred individuals leads to an efficient allocation of resources (which however might be considered as inequitable).

³⁰ Cf. Maldonado / Vargas Forero (2001); Fernández (2004); SSPD (2002).

cally by municipal corporations and the remaining urban and rural areas by national-government-owned providers managed by the Instituto Nacional de Fomento Municipal (INSFOPAL). The public utilities reform (started in 1994) introduced major institutional changes in the WS&S sector. The most important changes were (i) the establishment of regulatory agencies at the national level with the mandate to regulate tariffs and enhance competition, (ii) the introduction of the principle of cost covering tariffs, (iii) corporatization of service providers and promotion of PSP, as well as (iv) the creation of institutions for user participation. The public utilities law (no. 142, 1994) confirmed (v) the principle of solidarity prescribing cross-subsidies between socio-economic groups and declaring the covering of unmet WS&S needs as a priority.

The remainder of this paper is organized as follows. First a short overview of the WS&S service situation in Colombia is given (3.1). The subsequent analysis concentrates on policy weaknesses (not so much on achievements) and potential connections to governance failures. It is limited to two WS&S policy elements: organization of policy-making, regulation and service provision (3.2) and poverty orientation (3.3). Finally some general conclusions are presented (4).

3.1 Overview of the WS&S service situation

Table 1: Coverage with improved water supply and sanitation services (% of population)

Service	1993 (1)	2003 (2)	Variation 2 / 1
<i>Urban</i>			
Water	94.6	97.4	1.03
Sewerage	81.8	90.2	1.10
<i>Rural</i>			
Water	41.1	53.1	1.29
Sanitation	51	57.9	1.14
- Sewerage	14.6	15.2	1.04
- Other	36.4	42.7	1.17
<i>Total</i>			
Water	79.7	86.1	1.08
Sewerage	63	71	1.13
Sanitation	73.2	82	1.12

Source: DNP (2004), p. 5 (modified by the author)

Between 1993 and 2003 overall coverage has increased from 79.7% to 86.1% (improved water services) respectively from 73.2% to 82% (improved sanitation services) of total population (see table 1). Coverage in rural areas is much lower than in urban areas (more or less half). Access to WS&S services in Colombia varies according to the wealth of households.³¹ By 1997 only 57.5% of the households belonging to the decile with the lowest per capita consumption spending had an in-house water connection whereas among the decile with the highest per capita consumption spending the same share amounted to 98.3%. Again rural areas differ markedly from urban. Differences between poor and rich are much bigger on the

³¹ Cf. OPS / OMS (2001), pp. 11-12; 79.

countryside (poorest decile: 29.2%, richest decile: 54.9%)³² than in the city (poorest decile: 91.5%, richest decile: 99.1%). Differences between poor and rich as well as between rural and urban areas are less pronounced when in addition to in-house connections other improved WS services (wells, public standpipes) are taken into consideration.³³

Table 2: Performance of urban WS&S services (excluding four major capitals) with and without PSP; 1998-2003

Indicator	Providers with PSP	Providers without PSP	Total
<i>Coverage water connections</i>			
Average 1998-2003 (%)	90.8	92.4	91.9
Change 1998-2003 (03/98)	1.089	1.029	1.049
<i>Coverage sewer connections</i>			
Average 1998-2003 (%)	75.7	88	83.7
Change 1998-2003 (03/98)	1.025	1.028	1.027
<i>Unaccounted for water</i>			
Average 1998-2003 (%)	45.8	45.2	45.4
Change 1998-2003 (03/98)	0.919	1.183	1.088
<i>Collection rate</i>			
Average 1998-2003 (%)	84.4	81.6	82.5
Change 1998-2003 (03/98)	1.145	0.995	1.043

Source: Author's calculations based on data provided by SSPD and CRA; non-representative sample of 26 cities (excluding Bogotá, Medellín, Cali, Barranquilla); 9 cases with PSP, 17 cases without PSP

Table 2 presents some indicators for coverage as well as for operational efficiency³⁴ distinguishing between providers with PSP and without PSP. Figures for the total sample of 26 service providers have developed into the desired direction (change 1998-2003) except for unaccounted for water that has increased by 8.8% on a unsatisfactorily high average level (45.4%). Except for coverage with sewer connections, providers with PSP show more significant improvements than those without PSP (the latter actually have worsened with respect to unaccounted for water and collection rate). When looking at average levels of the indicators however, providers with PSP perform worse except for the collection rate.³⁵

In the course of the WS&S sector reform tariffs have been increasing significantly. E.g. between 1998 and 2001 the sector specific price index rose by 42.7% (i.e. 12.6% per year) in real terms.³⁶ Real tariff increases have coincided with some improvements in coverage and

³² These figures relate to the area „rural 2“ as classified by DANE; cf. OPS / OMS (2001), p. 79.

³³ Cf. Meléndez (2004), p. 49 ff.

³⁴ Unaccounted for water: Percentage of potable water that is produced (m³) but not billed. Collection rate: Percentage of the amount billed to customers (\$) that is collected.

³⁵ This picture for providers with PSP (clear improvements but unsatisfactory average levels) may be related to the fact that PSP in Colombia – in most cases – was initiated when service performance and financial situation of the public provider had become alarming and consequently the pressure on politicians to remedy the situation very high. This means that PSP typically was started in situations where indicators were very bad.

³⁶ Cf. SSPD (2002), pp. 30-32.

operational efficiency (see above) but also with higher proportional spending of low-income households. The share of household income spent on WS&S services of the poorest quintile amounts to 6.8% (2003) which lies slightly above the internationally recommended 5%.³⁷

3.2 Organization of policy-making, regulation and service provision³⁸

Table 3 shows the organizational structure of the functions policy-making, regulation and service provision which is strongly influenced by the fact that Colombia is a decentralized State (functionally, fiscally and politically). Despite municipalities being fully responsible for service provision in their territories and consequently mayors for local WS&S policy-making (definition of coverage targets/ urban planning, decisions on corporatization of service providers, allocation of public funds), the national government retains crucial responsibilities in the realm of WS&S policy-making like sectoral planning (including national coverage targets and allocation of public funds) and capacity-building. Colombia is a special case as compared to international practice because responsibility for economic regulation is split. The task of defining tariff and quality of service levels is done by CRA, control is accomplished by SSPD and monitoring is a shared responsibility of both agencies. The 1,091 municipalities existing on Colombian territory accomplish their task of service provision by a variety of organizational forms: incorporated enterprises (with or without PSP); directly by the municipal administration or, especially in rural contexts, by different forms of community organizations. The main resources to finance service provision come from tariffs paid by users and publicly funded subsidies (see below).

Table 3: Distribution of responsibilities according to territorial levels of government

Function	National	Departmental	Municipal
Policy-making	National Ministry of Environment, Housing and Development – MAVDT	–	Mayor
Regulation	Regulatory Commission for Water and Basic Sanitation Services – CRA (<i>economic regulation</i>)	Autonomous Regional Bodies (<i>environmental regulation</i>)	–
Control	Superintendency for Public Utility Services – SSPD (<i>economic control</i>)	Autonomous Regional Bodies (<i>environmental control</i>)	–
Service provision	–	–	Municipal administration; Public enterprise; Private enterprise

Source: Based on Fernández (2004), p. 28, modified by the author.

In what follows two potential weaknesses of this governance structure are briefly discussed that are both related to the risk of detrimental political influence: (i) independence of the regulatory agency CRA and (ii) independence of service providers.

³⁷ Cf. Meléndez (2004), pp. 23, 53.

³⁸ This section is based on Fernández (2004).

There is a strong consensus that in order to accomplish their tasks of protecting consumers from monopolistic market power as well as of promoting efficiency and investments in the WS&S service sector, regulatory agencies shall be independent (i.e. be insulated from the influence of politically or economically powerful groups and possess an adequate technical expertise).³⁹ In the case of CRA independence can be questioned because of several features contradicting typical formal safeguards that would support independence:⁴⁰ A) Ministries are directly involved in the decisions of the regulatory commission: 3 out of 7 members are ministers – the remaining 4 are technical experts. B) Technical experts are appointed exclusively by the executive (President) – the legislative branch is not involved. C) Appointment of technical experts is not based on a transparent and competitive selection that would assure technical expertise. These weaknesses in the independence of CRA may have contributed to the delay in the revision of the outdated methodology for tariff regulation that should have been completed by 2001 but actually was still not fully implemented by July 2005, increasing this way the uncertainty in the WS&S service industry.⁴¹ The revision of the old methodology is very necessary because it contained hardly any incentives for efficiency what means that tariff increases may partially reflect rents and inefficient costs (especially in big and intermediate cities where tariff increases have been substantial).

The management of a service provider should be independent from detrimental political influence on management decisions (e.g. concerning staff selection, technology choice, investment) in order to concentrate on operational efficiency within the given policy and regulatory framework that should be conducive to equity and efficiency. Formal safeguards that prevent detrimental influence of the municipal government are strong in case of a private incorporated enterprise, average in case of a public incorporated enterprise and more or less absent in case services are provided by the municipal administration. There is some empirical evidence indicating that detrimental political influence may be a bigger problem in the case of public provision: A) One indicator for political interference is the frequency of change of the general manager. Unfortunately this indicator is only available for a small non-representative sample of 4 service providers (2 public incorporated enterprises; 2 private incorporated enterprises) for which it was collected during this investigation. Whereas both public enterprises have had 6 general managers between 1998 and 2005, one private enterprise had 4 and the other 1 during the same period. B) As has been already discussed above (see table 2), providers with PSP on average showed improvements in both indicators for operational efficiency (unaccounted for water and collection rate) between 1998 and 2003 whereas providers without PSP on average worsened with respect to these indicators. C) Many public providers (especially in intermediate and small cities) did not implement tariff increases that would have been necessary to approximate cost covering levels because tariff increases were blocked by municipal governments.⁴²

³⁹ Cf. Smith (1997), especially p. 11 (formal safeguards).

⁴⁰ What follows is based on information gained in interviews with experts and representatives of organizations of the Colombian WS&S sector.

⁴¹ Cf. also Fernández (2004), pp. 81-83.

⁴² Cf. Fernández (2004), p. 81.

3.3 Poverty orientation

The analysis of the poverty orientation of Colombian WS&S policy is limited to the issue of subsidies. With respect to their principal objective, it can be distinguished between subsidies (i) aiming at lowering the cost of connecting to the service for low-income households who lack access and those (ii) aiming at lowering the cost of using the service for low-income households who already have access (in order to guarantee affordability and to prevent withdrawal from the service).⁴³ In the academic debate the first objective is considered as more relevant, especially in countries where access is low and lack of access correlates negatively with income.⁴⁴ Access in Colombia (see table 1) cannot be considered as very low: as compared to 20 other Latin American countries, in 2000 Colombia ranked on position 5 (water) and 6 (sanitation).⁴⁵ Lack of access to both services is much more common in rural areas where approximately 86.5% of all households without improved WS&S services live. In rural areas there is a clear negative correlation with income whereas in urban areas this negative correlation holds only for sanitation services.⁴⁶

With respect to the way of delivering subsidies to the target population, one can distinguish between cross-subsidies that are delivered through the tariff scheme (the principle being that some consumer classes pay more than the cost of service whereas other consumer classes pay less) and direct subsidies that can either be delivered through the supply side (e.g. by financing a network extension to a poor part of the town with public grants and thus without extra costs for low-income dwellers) or through the demand side (e.g. by granting cash or vouchers to low-income households so that they can pay for their connection costs).⁴⁷

There are at least three important criteria to assess subsidy schemes: (i) Their targeting quality (i.e. the extent to which subsidies reach those households that are or should be eligible), (ii) the cost of administrating the targeting system and (iii) the extent to which subsidies harm allocative efficiency.⁴⁸ Direct subsidies to the demand side are typically the most preferred instrument among economists because (contrary to cross-subsidies) they do not distort the price signal and are thus less harmful for allocative efficiency.⁴⁹ In Colombia, subsidies in the WS&S sector take two forms: Public grants to the supply side and cross-subsidies.

Public grants to the supply side

Important amounts of public grants are allocated to the WS&S sector by the national government (a smaller fraction) and by municipalities (the vast majority) that, in principle, could be used to pursue the objective of expanding access among low-income households. The

⁴³ Cf. Estache/ Foster/ Wodon (2002), pp. 14-21, who make this distinction and, in addition to subsidies, discuss further instruments aiming at these two objectives.

⁴⁴ Cf. Foster (1996), pp. 14-16.

⁴⁵ According to data from WHO / UNICEF (2000).

⁴⁶ Cf. Meléndez (2004), p. 53.

⁴⁷ On these issues cf. Estache/ Foster/ Wodon (2002), ch. 3-4; Yepes (2003); Krause et al. (2003), pp. 24-25.

⁴⁸ Cf. e.g. Foster / Gómez-Lobo / Halpern (2000).

⁴⁹ Cf. Yepes (1999), pp. 4-7.

bulk of these resources come from the national budget. Table 4 shows subsidies stemming from the national budget that have been allocated to the whole environmental services sector (WS&S services, waste water treatment, solid waste disposal). It can be seen that earmarked transfers⁵⁰ to municipalities within the framework of the decentralization law no. 715 (2001) are by far the most important source with a share of 86%. Transfers are earmarked to be used for the environmental services sector but the administration of these funds and the spending decision is made by municipal governments. These transfers are not only the most important source of subsidies, they are important even when compared to the GNP of the whole sector: 33.5% on average as measured in current prices for the years 1994-2003.⁵¹

Table 4: National fiscal spending for WS&S, waste water treatment and solid waste disposal, 1998-2002

Source	Thousands US\$ 2003		Proportion (%)
	Total amount 5 years	Average per year	
Transfers to municipalities (decentralization law 715, 2001)	1195716	239143	86
National Royalties Fund	56234	11247	4
Ministry for Economic Development	84410	16882	6
Other	54220	10843	4
<i>Total</i>	<i>1390579</i>	<i>278116</i>	<i>100</i>

Source: Fernández (2004), p. 62

With respect to the important portion of transfers that are used for WS&S services, there is no general procedure on the micro level that is designed for targeting expenditures so as to expanding access among low-income households (however, the formula for distributing transfers among the 1,091 municipalities considers poverty as one important criterion which means that in practice poorer and smaller municipalities receive higher transfers per habitant than richer and bigger municipalities⁵²). The targeting of local spending depends exclusively on the priorities and decisions of the municipal government which in turn are influenced by local political governance. There are some indications that, on average, municipal governments do not target public grants to low-income households lacking access to improved WS&S services: As has been said above, 86.5% of these households live in rural areas. However, just 46% of earmarked transfers (1996-2001) have gone to rural areas.⁵³ This spending pattern could be related to the political voicelessness of the rural poor.

One could argue that a sort of indirect targeting would be achieved if public grants were efficiently used for expanding general access to WS&S services (because of the negative correlation between lack of access and income – see above). However, there are some concerns

⁵⁰ DNP (2004) provide a description of the fiscal transfer system from national to municipal governments with a focus on the WS&S sector.

⁵¹ Own calculation with the data reported by DNP (2004), p. 8.

⁵² Cf. DNP (2004), p. 6; Fernández (2004), pp. 71-72.

⁵³ Cf. DNP (2004), p. 12.

with respect to the efficient use of transfers.⁵⁴ According to a recent calculus of the National Planning Department,⁵⁵ national coverage rates in 2003 could have been 100% (piped water) and 95% (sewerage), if transfers to municipalities (1996-2003) would have been executed efficiently in infrastructure expansion projects (in contrast to 88% and 74%, respectively, that were actually measured in 2003). Some observed problems related to administrative governance features are: A) An important portion of transfers earmarked for WS&S are not executed for that purpose.⁵⁶ B) Fiscal control and auditing procedures related to transfers are weak. C) Funds are used for items that have no direct impact on coverage expansion (e.g. for covering deficits generated by the cross-subsidy-scheme, see below). D) Due to lacking technical expertise and lacking articulation between the planning activities of the municipal administration and the service provider, funds are used for infrastructure projects that are unsuitable or unworkable. E) Corruption related to the use of public grants for construction activities in the WS&S sector is a common phenomenon in Colombia and compounds the before mentioned problems.

Cross-subsidies

The Colombian cross-subsidy-scheme is organized as follows. All consumers are divided into four classes: Industrial, commercial, official and residential (the latter is by far the most important class by number and consumption). Residential consumers are again subdivided into 6 socio-economic strata (1 being the poorest and 6 the richest). Up to of 20m³/connection/ month (defined as basic consumption level by CRA) residential consumer classes 1, 2, 3 pay a subsidized tariff that lies below the cost of service (50%, 40%, 15%, respectively) as regulated by CRA whereas residential consumers 5 and 6, industrial and commercial classes pay a surcharge (20% respectively).⁵⁷ Classification of residential consumers is a responsibility of mayors and is done based on a standardized methodology provided by the National Department of Statistics which considers basically the characteristics of the housing unit.⁵⁸

Apart from the well known negative effects on allocative efficiency which in some cases can be of considerably magnitude,⁵⁹ the Colombian cross-subsidy-scheme shows the following weaknesses:⁶⁰ A) Targeting quality is low because the error of inclusion is high: 51% of consumers that receive a subsidy through the tariff have an income that lies above the national poverty line (the positive thing about this is that the error of exclusion is extremely low: only 0.7% of connected households with an income below poverty line do not receive a subsidy). Moreover, cross-subsidies do not redistribute from rich to poor but are slightly regressive. B) The share of consumers that are eligible for receiving cross-subsidies is constantly increas-

⁵⁴ Cf. DNP (2004); Fernández (2004), pp. 63, 70-72; information gained in interviews with experts and representatives of organizations of the Colombian WS&S sector.

⁵⁵ Cf. DNP (2004), p. 17.

⁵⁶ Municipalities with PSP execute a higher proportion of funds than those without PSP. Cf. DNP (2004), p. 16.

⁵⁷ Cf. Fernández (2004), pp. 54-57; residential class 4 and official consumers neither receive a subsidy nor pay a surcharge.

⁵⁸ Cf. Meléndez (2004), pp. 25-26.

⁵⁹ See e.g. Yepes (2003), p. 7.

⁶⁰ Cf. Meléndez (2004), pp. 22-23, 63.

ing. Whereas in 1993 residential classes 1, 2 and 3 represented 75% of total residential consumers, by 2003 this figure had increased to 88%. C) The cross-subsidy-scheme is not operational in smaller and poorer cities and localities because there exist no consumer classes that pay a surcharge. This means that deficits between the cost of service as regulated by CRA and tariff revenues have to either be covered by the municipal government (that can use earmarked transfers for that purpose) or by the service provider (which means that necessary expenditures may have to be postponed and service quality may decrease). These three characteristics indicate that – apart from urban low-income households that already have access to WS&S services – urban middle classes benefit most from the cross-subsidy-scheme. The losers of the Colombian subsidy policy seem to be the rural poor. This result supports the hypothesis that politicians and policy-makers allocate subsidies to benefit (urban) constituencies that have relatively more political power and are better organized. This pattern of behaviour is related to weaknesses in the political governance.

4 Conclusions

Based on the comments so far, the following general conclusions can be drawn:

Achieving the equity goal is interrelated with achieving the efficiency goal. Providers that are managed efficiently and are financially sustainable are able to effectively expand services to the non-connected poor and to provide a good quality service; the more efficient a subsidy scheme is managed the more resources can potentially reach the poor.

Achieving equity and efficiency in WS&S services presupposes a complex policy mix the quality of which depends on the quality of the political and administrative governance of the country.

There is some empirical evidence supporting that several of the weaknesses observed for Colombian WS&S policy are related to governance weaknesses:

- Politicians seem to be reluctant to grant full independence to the regulator and to service providers because they would lose means to influence tariffs and allocation of funds which in turn are important to win elections and maintain clientelistic networks. On average, PSP seems to be more effective in insulating management from detrimental influence than corporatization under public ownership.
- Because of their political voicelessness those who are most in need (the (rural) poor who lack access to improved WS&S services) are disadvantaged with respect to subsidy policy.
- A weak administrative governance gives rise to an inefficient use of public grants and eases corruption.

When designing WS&S sector reforms, special attention should be given to the political and administrative governance of the respective country in order to adapt policies to governance features.

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COLLOQUE INTERNATIONAL : « PAUVRETE HYDRAULIQUE ET CRISES
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**« Gestion des eaux du bassin du Kou : état des lieux
et perspectives de gestion équitable et durable »**

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Le Burkina Faso pays essentiellement agricole doit sa recherche de sécurité alimentaire à la disponibilité de la ressource eau. Pour ce faire la problématique de l'eau est au cœur des préoccupations aussi bien pour les décideurs politiques que pour les usagers. Plusieurs rencontres a caractère nationale, sous régionale et internationale dans le pays témoignent de l'importance de cette problématique.

L'Ouest du Burkina situé dans une zone agro climatique favorable à l'agriculture à travers des cultures diversifiées comparativement aux autres zones agro climatiques du pays constitue une zone d'attraction pour les paysans d'autres régions. Cette situation doublée du faible peuplement et des aménagements hydro agricoles qui y ont été réalisés a fait de cette zone pendant une longue période un front pionnier agricole et un bassin d'accueil de migrants venant d'autres régions du pays. Nous nous intéressons dans le cadre de cette communication à une zone stratégique de l'Ouest qu'est le bassin du Kou. Ce caractère stratégique est essentiellement lié à la disponibilité de l'eau et des usages qui en découlent. Le bassin permet l'approvisionnement de la deuxième ville du pays (Bobo – Dioulasso) en eau potable, l'irrigation d'une plaine rizicole de 1100 ha, la couverture des besoins en eau domestique de 10 villages ainsi que la couverture des besoins en eau d'usagers individuels de la petite irrigation villageoise (2500ha).

Aujourd'hui la ressource eau connaît par endroit un début d'insuffisance quant à la satisfaction des besoins hydriques du fait de l'évolution démographique, des facteurs liés aux activités de l'homme et aux modes de gestion. L'émergence de tensions souvent vives avec l'incrimination des pratiques de certains acteurs mérite réflexion. La communication que nous proposons à ce sujet, essaie de rendre compte de la situation dans les limites du cadre d'une communication même si elle s'inscrit dans le cadre d'une recherche plus globale.

Il s'agit pour nous d'approcher un problème d'actualité dans l'Ouest du pays à travers une approche historique de la gestion de cette ressource. *Nous tentons de comprendre en quoi la gestion de l'eau dans le bassin du Kou favorise l'installation de tensions sociales.* Les tensions sociales naissent des relations entre des acteurs ou des groupes d'acteurs qui pour des intérêts différents mettent place des stratégies qui sont fonction de leur position, leurs statuts, leurs valeurs et leurs représentations. Pour répondre à cette question, nous faisons les hypothèses suivantes : *la prédominance de certains d'acteurs sur d'autres contribue à l'installation des tensions sociales. Et le niveau de pauvreté des populations contribue à l'ampleur de ces tensions sociales.*

Nous avons dans le cadre de nos investigations sur le terrain dans le cadre de la rédaction de cette communication, privilégié l'approche empirique afin de partir de données factuelles qui permettent de bien rendre compte de la position des acteurs que nous avons pu rencontrer. La littérature consultée se résume aux procès verbaux des réunions du comité Provisoire de Gestion des eaux du Bassins du Kou.

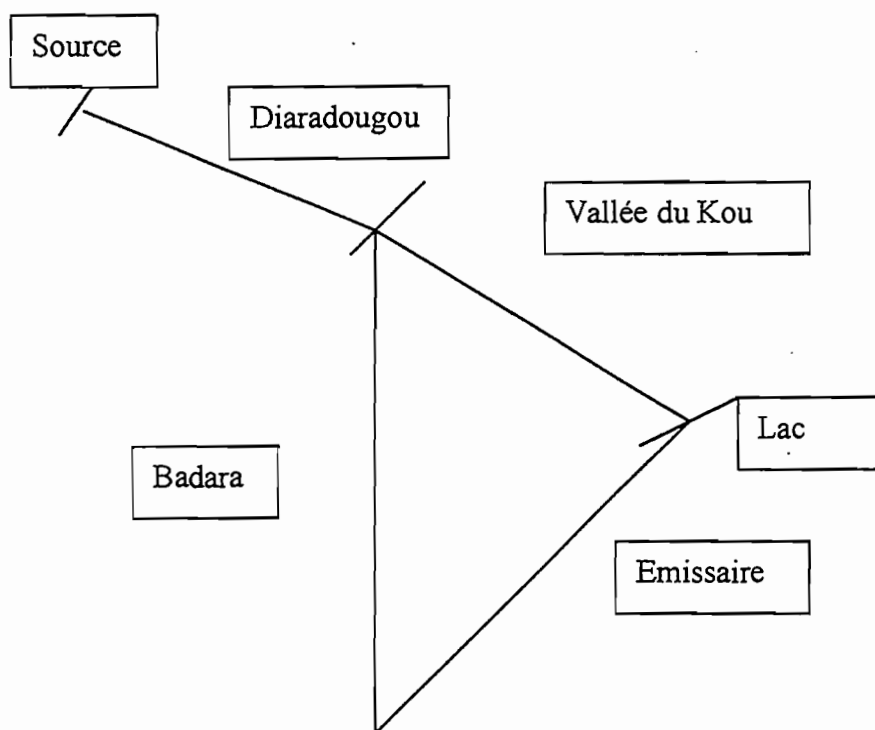
Notre communication informe tout d'abord sur le contexte qu'est le bassin du Kou, il renseigne sur les acteurs en présence et leurs stratégies, il présente l'initiative du comité provisoire de gestion du bassin du Kou et tire les enseignements de cette réflexion. La conclusion ouvre le débat dans une mise en perspective plus large de la réflexion.

II : PRESENTATION DU CONTEXTE

Principalement alimenté par les sources de Nasso, le bassin du Kou est un sous bassin du fleuve le Mouhoun (ancienne Volta Noire). Il couvre une superficie de 1800km² avec une ressource en eau abondante. En année moyenne, l'eau de surface représente 160 millions de m³. Le bassin couvre les départements de Bobo Dioulasso, Bama et Péri. Il satisfait aux besoins en eau de boisson, en eau pour les activités de production agricole d'une population estimée aujourd'hui à plus d'un million. La population de la deuxième ville du pays Bobo Dioulasso (plus de 500 000 hab) et celle des départements estimée à 435 000 hab selon le recensement de 1996. Selon l'importance des activités en lien avec les usages de l'eau et pour centrer notre analyse sur un espace géographique circonscrit, nous empruntons le découpage proposé par le comité provisoire de gestion du bassin du Kou que nous enrichirons avec nos données de terrain. Le bassin du Kou se décompose en 4 secteurs :

- le secteur I Diaradougou situé en amont de la prise d'eau
- le secteur II Badara situé sur la rive droite de la rivière le Kou
- le secteur III la Vallée du Kou situé de part et d'autre du canal principal
- le secteur IV situé de part et d'autre du canal émissaire

Schéma 1 : Schéma des secteurs



Pour mieux cerner l'objet de cette communication, allons à la découverte de la vallée du Kou.

II - 1 : L'aménagement hydro agricole de la Vallée du Kou

Après les grandes sécheresses d'avant 1972, l'une des options fortes de l'Etat était de développer des stratégies pour assurer aux populations la sécurité alimentaire. Plusieurs études ont donné ainsi naissance grâce à la coopération avec la Chine à mettre ainsi en place les travaux d'aménagement de la plaine rizicole de la Vallée du Kou. En 1969, une prise

d'eau est construite sur la rivière du Kou. Les travaux de construction des canalisations et de parcellement sont partiellement achevés en 1970 année à laquelle arrivent les futurs riziculteurs de la plaine. Ces travaux ont permis d'aménager 1100 ha pour la production du riz.

Les futurs riziculteurs sont venus de Bama, village où l'aménagement a été réalisé et des villages riverains. Mais une grande partie des riziculteurs sont venus du plateau central où les sécheresses ont été durement ressenties. C'est la zone située dans la seconde zone climatique du pays où les précipitations sont moyennement faible et la dégradation des ressources est déjà fort présente ainsi qu'une pression démographique forte sur les ressources. L'un de nos interviewé nous fait le récit de sa venue à la Vallée du Kou : « *L'encadreur nous a dit qu'il y avait une plaine aménagée vers Bobo et qu'il fallait s'inscrire sur des listes. Il faut des personnes mariées, travailleuses et ayant 2 enfants en âge de travailler. Nous nous sommes inscrits et après nous avons été convoqués à la préfecture à Kalsaka où des camions nous ont transportés jusqu'à Bobo puis à la Vallée du Kou. Voici comment je suis venu ici* » Selon le même récit, à leur arrivée, ils ont été installés sous de grands hangars. Les responsables de la plaine ont fait lire un document qui contenait les clauses et le règlement de la plaine et après quoi chaque chef de famille devait apposer sa signature sur le document. Ce qui traduit son accord avec les textes en vigueur. C'est après cela que la famille bénéficiait d'un numéro et de matériel de travail (pic, pelle, brouette etc...) chaque famille a procédé ensuite à la construction de son habitat et des travaux de finition de l'aménagement des planches de production du riz. Ces travaux ont été réalisés sous forme d'entraide communautaire et à tour de rôle. Ainsi chaque famille a été attributaire d'une superficie d'un hectare (1ha) et d'une parcelle d'habitation.

Cette description à ce niveau – ci montre bien la diversité des acteurs présent sur la plaine rizicole (les responsables du projet, les autochtones de Bama, les allochtones des villages riverains et les allochtones venus du plateau central). Elle montre aussi l'accroissement de la population avec l'arrivée en une fois d'un nombre important d'allochtones. L'eau est au centre de ce mouvement de population. Ceux qui viennent du plateau central sont supposés n'avoir pas suffisamment d'eau, ceux qui viennent des villages riverains supposés ne pas avoir de l'eau disponible à proximité et pour tous à la vallée du Kou, l'eau est disponible et permet de produire du riz.

II – 2 : Le périmètre maraîcher

La création du périmètre maraîcher (environ 60ha) quelques années après la mise en culture de la plaine rizicole, répondait à un souci de diversification des productions mais aussi à rentabiliser l'usage de l'eau. Avec la création du canal émissaire, c'était l'opportunité d'une eau disponible pour d'autres activités. Des canalisations ont été réalisées permettant ainsi à desservir le périmètre à partir d'un seul point de prélèvement de l'eau. Ce périmètre au départ s'est spécialisé dans la production de haricots verts et de tomates. La production du haricot vert était initialement destinée à l'exportation puisque le marché était florissant. La tomate elle était achetée par la SAVANA (unité agro - industrielle qui faisait de la transformation de fruits et légumes : entre autres de la purée de tomate). Avec le périmètre maraîcher s'est implanté le groupement des maraîchers. Dans ce groupement qui regroupe près d'une centaine de personnes, il y a des autochtones de Bama, des paysans venant des villages riverains Souroukoudougou, Banarodougou, Badara. Mis en place en 1975 le périmètre a un besoin important en eau de nos jours car le profil des maraîchers a beaucoup évolué. Ce qui a conduit les maraîchers à créer un second point de prélèvement de l'eau. De la spécialisation dans la culture du haricot vert, les maraîchers produisent aujourd'hui des fruits et légumes et par endroit du riz. Ceci se justifie par le fait que le marché du haricot vert s'est écroulé et que

depuis plusieurs années, cette activité n'est plus concurrentielle sur le marché international comme nous le confie le président du groupement des maraîchers. *« Le changement n'a pas été imposé par une quelconque personne. Ce sont les exploitants eux-mêmes qui ont constaté les difficultés. On n'achète plus le haricot vert, on nous a dit qu'il y a des concurrents : le Kenya, le Maroc et autres... et que le haricot burkinabè n'est pas concurrentiel qu'est ce qu'il faut faire ? La tomate, c'est la SAVANA qui l'achetait et qui est fermé maintenant, du reste la tomate même ne réussit plus ici, donc les gens se sont concertés pour voir s'ils peuvent faire de la papaye, de la banane etc... pendant un certain nombre d'années puisque ça aussi, il y a un nombre d'année pour le faire ainsi le sol se retrouvera restauré et alors on pourra revoir autre chose. »*

La situation du périmètre maraîcher pointe une des causes majeures de relation conflictuelle autour de l'eau, à savoir la création du deuxième point de prélèvement de l'eau à partir du canal principal. En saison sèche, quand le niveau de l'eau baisse et que la plaine rizicole n'arrive pas à couvrir ses besoins, les tensions sont vives entre ces deux groupes de producteurs. Les maraîchers sont pointés du doigt par les riziculteurs

II - 3 : Le lac

Le lac naturel de Bama situé en aval de la plaine rizicole relève de la propriété du chef coutumier de l'eau. Cette mare faisait l'objet d'une exploitation coutumière en saison sèche. Sur l'ordre du chef coutumier, la population autochtone de Bama allait à une pêche collective 3 fois avant la saison des pluies. Les produits de la pêche étaient repartis ainsi qu'il suit : les gros sujets au chef de l'eau et au chef de terre, le reste pour la famille qui a été à la pêche. Seuls les autochtones de Bama étaient autorisés à pêcher. Selon un des pêcheurs professionnels actuels, installé depuis 1972, les Bozo (ethnie de pêcheurs) du Mali après les grandes pêches au Mali, venaient nuitamment faire des prélèvements dans le lac pendant un certain temps avant de repartir dans leurs pays. Petit à petit ils se sont installés à la Vallée du Kou entre 1970 et 1980. Le lac initialement avait une petite superficie (environ 50ha), avec l'installation de la Vallée du Kou et surtout les eaux de vidange de la plaine, la superficie a considérablement augmenté. La production piscicole a également augmentée puisque le milieu était plus favorable. Cette situation a également favorisé l'installation de plusieurs pêcheurs d'origines diverses. C'est ainsi que l'on y rencontrait des maliens, des ghanéens, des sénégalais et des burkinabè. Aujourd'hui seulement une quinzaine de famille vivent au bord du lac, ils ne vivent plus simplement des produits de la pêche mais ils ont de petites exploitations où ils font du maïs et parfois des fruits comme la papaye et la banane. En 1982 - 1983, un projet hollandais s'est fixé pour objectif de récupérer des terres occupées par l'eau du fait de l'agrandissement du lac sous l'effet des eaux de vidanges de la rizière. Ils ont donc réalisé un drain qui a permis le déversement de l'eau du lac dans le Kou. Ce qui a considérablement diminué la superficie du lac. Par conséquent plusieurs espèces de poisson ont disparu. Selon l'un des pêcheurs professionnels que nous avons rencontré, le projet Hollandais a contribué fortement au départ des pêcheurs ainsi qu'à la diversification de leurs activités : *« le projet avait prévu de réserver 200 ha d'eau dans le lac et entre celui - ci et le Kou, 100 ha d'eau pour la pêche. On ne sait pas comment ils ont calculé, mais le lac s'est vidé dans le Kou par le drain qu'ils ont réalisé laissant une petite superficie. Tous les gros sujets, les gros reproducteurs et toutes les zones de reproduction ont été mis à sec. Cela a eu une incidence négative sur la production piscicole par an. Alors que beaucoup de pêcheurs se sont installés à cause de cette activité. Elles vivaient de la pêche mais avec cette nouvelle situation, nous sommes obligés, pour améliorer nos conditions de vie, de trouver des superficies pour faire de la petite irrigation villageoise mais c'est trop tard car avec la population qui a beaucoup augmenté, il n'y a plus beaucoup de terre disponible. C'est ainsi que plusieurs familles de pêcheurs se sont déplacées vers d'autres plans d'eau. »*

La situation du lac traduit une forme d'exclusion des pêcheurs en lien avec les différents changements intervenus avec les travaux d'aménagement. Une première période où ils n'avaient pas accès à cause de leur statut d'allochtone, une seconde période où ils s'installent grâce au caractère productif du lac du fait de l'augmentation de la superficie du lac ainsi que son enrichissement par les eaux de vidange de la rizière et enfin une troisième période où ils n'ont que deux choix : partir ou se reconvertir à d'autres activités.

Cette partie met en évidence trois grands groupes d'acteurs du bassin et plus particulièrement ceux présents sur l'aménagement hydro agricole de la Vallée du Kou. L'eau est la principale ressource à la base de leurs activités. Ce qui fait naître des tensions entre eux. Mais ils ne sont pas les seuls acteurs en présence. Voyons à présent les autres acteurs et surtout les stratégies de chacun d'eux à la base des tensions sociales.

III : DES ACTEURS DIVERSIFIES ET DES STRATEGIES EN TENSION

III – 1 La localisation géographique comme source de tension ?

Une première entrée peut être celle qui géographiquement situe deux zones en concurrence autour de la ressource eau. La ville de Bobo Dioulasso avec ses besoins en eau potable et ses besoins en eau pour les activités industrielles. La vallée du Kou avec ses besoins en eau d'irrigation pour les activités agricoles et en eau de boisson. De fait, les acteurs situés en amont sont responsables des problèmes que connaissent ceux qui sont en aval. Cette situation se traduit par des accusations mutuelles dans le bassin du Kou. La croissance rapide de la population de Bobo va de pair avec la croissance des besoins en eau de cette ville. La station de pompage et de traitement des eaux pour l'adduction en eau potable de la ville, représente pour les acteurs en aval la cause du faible débit de l'eau et donc de son insuffisance en saison sèche. Les villages situés le long du cours d'eau avec le développement de l'agriculture et particulièrement la petite irrigation villageoise est également la source du problème d'eau pour la vallée du Kou. Le périmètre maraîcher du fait de sa localisation doublé de la réalisation d'un second point de prise d'eau constitue pour les riziculteurs la source du problème. Cette situation donne l'image de ce qui à priori est à la base des relations conflictuelles entre les acteurs en fonction de leurs positions géographiques en lien avec leurs activités.

III – 2 : Les pratiques comme source de tensions ?

L'activité industrielle de la ville de Bobo produit des déchets qui parfois sans traitement préalable sont déversés dans le réseau via des affluents de la rivière le Kou. Cette situation constitue une menace permanente pour la santé des usagers. Des pollutions accidentelles dont la dernière en date est du 4/10/1997 interviennent à différentes parties du système d'eau du bassin. Elles se traduisent souvent par la mort de poissons. Les pêcheurs incriminent particulièrement l'activité industrielle de la ville de Bobo car directement concernés par ce problème. La qualité de l'eau est remise en question ici par les pratiques industrielles.

L'émergence d'opérateurs privés (nouveaux acteurs) est également à questionner. Ce sont des acteurs qui disposent d'un minimum de confort financier et matériel. Ils font de l'activité agricole une activité qui fonctionne sur les règles de l'entreprise moderne. L'acquisition des terres se fait souvent par achat ou par location. Ce sont souvent de riches paysans, de riches commerçants, des fonctionnaires en activité ou à la retraite ou encore plus récemment des burkinabè de retour de la Côte d'Ivoire suite aux événements récents. Ils disposent de main

d'œuvre installé dans l'exploitation et de matériel moderne (motopompes). Leur pratique consiste à prélever de l'eau directement du de la rivière ou encore du canal principal. Seulement très souvent les manœuvres sur l'exploitation réalise des ouvrages de déviation de l'eau au profit des parcelles et parfois même endommagent le canal en procédant à des ouvertures de celui – ci. Ils sont réellement pris à parti par les riziculteurs de la plaine comme étant les véritables responsables des problèmes d'eau en saison sèche. Du reste ils ont baptiser ce type d'opération : « le siphonage sauvage »

III – 3 : La revendication de la paternité de l'aménagement comme source de tension ?

De tous les entretiens que nous avons réalisés sur le terrain, tous sont unanimes que la plaine rizicole est l'activité première et la raison d'être de l'aménagement hydro agricole de la vallée du Kou. Cette position est fortement défendue par les riziculteurs comme le témoigne cette déclaration d'un des responsables de gestion de l'eau de la coopérative : « *C'est à cause de nous que la Vallée du Kou a été créée. Toutes les autres activités sont venues après, que ce soit le périmètre maraîcher ou encore la petite irrigation villageoise. Si maintenant nous nous n'avons plus suffisamment d'eau pour notre activité, ça ne va pas !* » Cela traduit une certaine hiérarchisation des activités et partant des groupes d'acteurs. Il est donc question également du statut des acteurs quant à l'usage de l'eau. L'on pourrait le traduire par une prépondérance des riziculteurs sur les autres acteurs ce que nous lions à une forme de paternité de l'aménagement. L'antériorité dans un milieu confère toujours un certains nombres de droits souvent liés à la mémoire des lieux. Les allochtones arrivés en 1970 connaissent bien le village et ont des rapports étroits avec les autochtones. Cette donnée a également une incidence. Les nouvelles exploitations de types modernes sont l'œuvre d'acteurs nouvellement installés à la Vallée du Kou et ceux – ci du fait de leur localisation en amont de la plaine sont considérés comme la source du problème d'eau. Les autochtones comme les migrants de la première génération ne manquent pas l'occasion d'affirmer leur antériorité (jours de marché, réunions et autres occasions de sociabilité).

III – 4 : La ruse comme source de tension ?

La location et la vente de terre sont depuis quelques années implantés à la vallée du Kou. En ce qui concerne la location, les langues se délient qui pour condamner, qui pour justifier. Ces pratiques concernent et les parcelles dans la plaine, le périmètre maraîcher ainsi que les hautes terres. Les ordres de grandeurs de prix qui sont donnés semblent être fonction de la localisation et de la disponibilité de l'eau : « *Ce n'est pas le même prix partout. Par exemple quand il y a de l'eau à côté, ce sera plus cher, 125 000fcfa /ha par exemple, puisque le propriétaire sait que l'on peut mener plusieurs activités là – bas, la banane, la papaye etc...* » Pour ceux qui condamne ces pratiques, l'on peut résumer leur position comme suit : « du propriétaire de terre à l'acheteur ou au locataire, qui est le plus rusé ? » En effet sur la plaine rizicole ou la pratique de location est la plus présente, nous sommes en présence d'une exploitation minière de la ressource terre et eau. Celui qui loue est conscient du temps d'exploitation limité. Il doit rentabiliser son activité et pour cela il développera un ensemble de stratégies pour atteindre ses fins. Ceci pouvant aller jusqu'à la tentative de corruption de ceux chargés de la distribution d'eau. Il laisse au propriétaire de la parcelle, une terre appauvrie et souvent mal entretenue. Pour l'exploitant temporaire, il ignore les pratiques dans la plaine et prends des risques. Le propriétaire de la parcelle demande souvent un paiement en nature : de l'engrais qu'il utilise souvent sur des terres situées en amont, au bord du canal principal ; des sacs de riz à la récolte. Il gagne ainsi doublement puisqu'il a du riz sans avoir été dans la plaine et il a d'autres récoltes grâce à l'engrais acquis. Cette pratique est

condamnée par plusieurs personnes à la Vallée du Kou parce que considérée comme pratique d'usure mais surtout parce qu'elle est à la base de beaucoup de tensions.

Pour ceux qui le justifie, ils incriminent le fait que depuis la création de la Vallée du Kou l'on n'a pas pu anticipé la croissance démographique. Car si certains acteurs procèdent ainsi, c'est pour pouvoir couvrir les besoins de la famille. *« 1ha pour une famille en 1970, ça peut faire face aux besoins mais en 10 ans le nombre de membres de la famille peut doubler et en trente ans ça peut tripler. À ce moment 1 ha ne suffit plus et il faut se débrouiller. »*

III – 5 : L'émergence de nouveaux acteurs sur la plaine comme source de tension ?

L'approche présente sur la plaine de la Vallée du Kou s'est fondée sur l'exploitation familiale comme élément de base de la coopérative. Avec l'accroissement démographique et les nouveaux besoins engendrés, les femmes comme les jeunes qui jadis travaillaient dans l'exploitation familiale ont commencé petit à petit à exprimer le besoin d'avoir également leurs unités de production. La crise intervenue dans la coopérative a donné naissance à plusieurs coopératives de plus petite taille. Cette situation doublée du contexte politique favorable a permis la création de groupements de jeunes et de femmes. Ce processus a petit à petit fait prendre conscience de l'exclusion des femmes et des jeunes des activités de production agricole. C'est ainsi que le projet hollandais avec la récupération des terres a pu mettre 12ha à la disposition des femmes et 30ha aux jeunes. Mais cela est intervenu à une période peu favorable quant à la disponibilité de la ressource eau. Situé en aval de la plaine, ces deux groupes d'acteurs ne bénéficient pas comme ils l'auront souhaité de l'eau nécessaire à leurs activités en saison sèche comme nous le confie la représentante des femmes que nous avons interviewée : *« C'est parce que nous sommes des femmes que nous avons toutes les difficultés. Quand ils distribuent l'eau, les hommes reçoivent les mêmes quantités mais nous les femmes ce n'est pas la même quantité. Cette année par exemple nous avons semé du maïs en culture de contre saison, quand le maïs a commencé à faire des épis, le problème d'eau s'est posé. Nous nous sommes tiraillés et après nous avons cherché à trouver une solution. Vous savez notre superficie est de 12 ha et il y a 4 points d'approvisionnement en eau. Nous avons été obligés de faire servir par jour 2 vannes. Celles – ci prennent le matin et les autres le soir, au prochain tour, celles qui sont du côté des 2 autres vannes prennent. Nous nous sommes tiraillés avec les hommes (nos maris) parce qu'ils ont dit que notre exploitation est une exploitation supplémentaire ! »* Pour les jeunes comme pour les femmes, la gestion de l'eau pose un réel problème et cela est dû au nombre élevé des usagers de l'eau. Selon eux leur salut ne pourra venir que de la réalisation du projet hollandais par d'autres partenaires à savoir une motopompe qui prendrait l'eau du lac pour l'irrigation des 42 ha qu'ils exploitent en ce moment. La question que l'on pourrait se poser est celle de savoir pourquoi le projet n'est pas arrivé à son terme ? pour ces « exclus » de l'eau, les hommes présents sur la plaine sont en partie responsable du problème d'eau qu'ils connaissent ce qui n'est pas de nature à favoriser les rapports entre eux et pourtant ce sont des rapports maris et femmes ou père et fils.

L'analyse de l'ensemble de ces situations permet d'identifier l'ensemble des acteurs présent dans l'arène de l'eau du bassin du Kou. Ils sont diversifiés, ils ont des visions différentes qui sont à la base de stratégies qui entrent souvent en conflit. Cette situation n'est certes pas favorable aux objectifs d'exploitation durable des ressources dans un contexte de paix social. Aussi nous allons examiner une initiative de gestion de ces tensions.

IV : LES INITIATIVES POUR UNE GESTION DURABLE DE LA RESSOURCE EAU

IV – 1 : La gestion de l'eau, problème principal du bassin du Kou ?

Le constat de terrain pose bien la problématique de l'eau de la Vallée du Kou. il y a insuffisance d'eau en saison sèche car, le niveau de l'eau baisse et ne permet pas de satisfaire les besoins en eau de la plaine rizicole et plus particulièrement les parcelles situées en aval telles celles des jeunes et des femmes. Mais il serait hasardeux d'aborder la problématique de l'eau dans la plaine sans étendre le champ d'analyse, puisque la plaine rizicole ne constitue qu'un élément du bassin du Kou.

La station de pompage pour l'adduction de la ville de Bobo en eau potable, l'installation d'opérateurs privés le long du Kou, la petite irrigation villageoise à Diaradougou, le périmètre maraîcher sont autant de points de prélèvement de l'eau et les quantités sont importantes.

Le lac constitue également un élément du système d'eau du bassin du Kou. Il joue un rôle important dans le maintien du niveau des nappes phréatiques. Ce qui a pour incidence de diminuer les besoins en eau dans les parcelles de la plaine rizicole du moins celles qui sont proches. Nous pensons que cela a été compris par les responsables du premier projet pour qui, le lac constituait un bassin collecteur. Si le canal émissaire qui avait pour fonction d'évacuer l'eau du lac vers le Kou par un de ses affluents en permettant de stabiliser le niveau du lac et récupérer des terres, il a tout de même eu une incidence sur le maintien du niveau des nappes ainsi que sur l'activité piscicole.

Les installations de l'aménagement datent de 1970 et depuis le retrait du projet, la gestion a été confiée aux acteurs locaux. Nous avons pu constater sur le terrain, la vétusté des installations et les pertes en eau que cela occasionne.

Enfin la déforestation, les pratiques agricoles peu respectueuses des normes de protection et de préservation de l'environnement, favorisent considérablement l'ensablement du cours d'eau et de la prise d'eau.

D'un mode de vie paysan au départ, les innovations techniques introduites à Bama, la proximité de la ville de Bobo et le brassage des populations a considérablement changé celui-ci. La monétarisation des échanges aidant, les acteurs locaux nous font remarquer une tendance beaucoup plus forte vers un mode de vie plus privé que communautaire : « le problème de la Vallée du Kou aujourd'hui c'est que chacun cherche pour lui-même ! »

IV – 2 : le Comité Provisoire de Gestion du bassin du Kou (CPGK)

La baisse du débit de l'eau, les pollutions accidentelles, la concurrence voire l'exclusion de certains acteurs, sont à la base de tensions sociales qui ont à certains moments donné naissance à des conflits. Cette situation n'a pas laissé les acteurs locaux indifférents. Ils ont pris conscience du caractère stratégique du bassin du Kou et de la nécessité de sa protection à travers la définition de stratégies d'exploitation durable de la ressource eau sur l'ère géographique du bassin.

Sur la base des travaux, des orientations et de l'action soutenue du Comité Provincial de l'Aménagement du Territoire (CPAT) du Houet (province dans laquelle se trouve le bassin du Kou) depuis 1990, le CPGK a été créé par arrêté promulgué par le haut commissariat après autorisation de son Ministère de tutelle. Un autre arrêté pris par le Ministère de l'Environnement et de l'Eau est également pris pour la délimitation d'un périmètre de sécurité et la protection des sources de Nasso. Ce comité s'est fixé comme objectif, d'établir une gestion concertée des ressources du bassin, de définir les modalités d'exploitation de celles-ci et d'élaborer un schéma directeur d'aménagement et de gestion des ressources du bassin du Kou. L'information, la sensibilisation et la formation fondent les bases de sa méthodologie. Le comité s'est constitué tout d'abord avec les représentants des différents

groupes d'acteurs et les intervenants du bassin. Mais il est resté ouvert à toutes compétences jugées utiles. En 1999, le comité s'est doté d'un Programme Quinquennal d'Actions Prioritaires (PQAP) 1999 – 2003. Ce programme devait à termes permettre de :

- préparer et mettre en œuvre un programme d'économie de l'eau
- lutter contre les pollutions accidentelles
- délimiter et gérer des périmètres de protection
- préparer et mettre en œuvre un plan d'action pour le développement de la filière fruits et légumes

L'évaluation de ce programme réalisée en 2004 donne les résultats suivants :

- en ce qui concerne le programme d'économie de l'eau, une baisse sensible des fuites d'eau a permis à l'Office National de l'Eau et de l'Assainissement (ONEA) de passer de 71% à 86% de rendement de son réseau. Un cahier de charge pour la gestion de l'eau sur le périmètre rizicole a été élaboré et discuté. Plusieurs partenariats sont annoncés sur plusieurs plans entre le CPGK et les projets / programmes intervenants dans le bassin.
- Pour les pollutions accidentelles, l'adoption par le Gouvernement burkinabè d'un plan stratégique d'assainissement et le décret sur le fonds de dépollution industrielle instaure un contexte favorable au travail du comité. Une requête de financement pour la collecte, le traitement et l'évacuation des eaux usées industrielle est en cours auprès de la République Fédérale d'Allemagne et de la Banque Africaine de Développement.
- En ce qui concerne la délimitation et la gestion des périmètres de protection des sources, le projet d'aménagement de la forêt classée de Dinderesso est en cours et des formations sont prévues à cet effet.
- Pour le développement de la filière fruits et légumes, le conseil des ministres a retenue l'idée d'explorer la création d'une structure d'économie mixte sous l'impulsion de l'Etat. La création du terminal fruitier de Bobo est considérée comme un acquis important dans ce domaine.

L'évaluation relève que la non stabilité des acteurs surtout les intervenants (agents de l'Etat) a eu un impact sur les résultats de ce premier programme. Elle relève également un problème foncier qui inquiète une partie des acteurs locaux de la Vallée du Kou. Ce point a été mis au grand jour par l'une des clauses du cahier de charge pour la professionnalisation de la gestion de l'eau. Cette situation selon nos entretiens sur le terrain a été à la base de l'échec d'une rencontre avec les acteurs locaux. Cette situation semble aujourd'hui stabilisée. L'évaluation a beaucoup insisté sur la question du financement du comité. Au regard de l'importance de la question pour la réalisation des activités du comité, il a été retenu une souscription volontaire des membres du comité afin de constituer un fonds autonome pour le comité. Le second plan fera l'objet d'un budget qui sera soumis au comité. Après adoption, des taux de contribution seront décidés pour les acteurs membres du comité en réunion du comité.

Ce que nous retenons de cette initiative encore à ses débuts, c'est l'originalité. L'émergence successive des difficultés a constitué un processus de prise de conscience par les premiers acteurs du bassin. Cette prise de conscience s'est traduite par un ensemble d'échange qui a permis de soumettre l'idée d'un comité à une structure à même de porter la préoccupation à une instance de décision. Une fois le comité créé, l'on note une représentation des acteurs locaux. Nous traduisons cela ainsi qu'il suit : « d'une initiative locale à la formalisation d'une structure de coordination et de gestion.

V LES ENSEIGNEMENTS TIRES

Notre communication attire tout d'abord l'attention sur la démographie du bassin du Kou. La réalisation de l'aménagement hydro agricole bien que répondant à un souci en partage entre pouvoir public et acteurs locaux, à savoir la sécurité alimentaire, elle a donné lieu à la migration. Plusieurs familles ont quitté leur terroir d'origine pour s'installer à la vallée du Kou. Ce mouvement pour un village peu peuplé a été perçu comme très important du point de vue du nombre de personnes qui sont arrivées en une seule fois. La population de Bama a donc augmentée de manière très sensible même si du point de vue du foncier, cela ne présentait pour l'instant aucune situation de concurrence réelle. Le mouvement s'est poursuivi tout au long des années. Les familles installées sur la plaine se sont agrandies avec le croît démographique naturel. La création du périmètre maraîcher a également favorisé l'installation de nouvelles familles ainsi que l'arrivée des nouveaux acteurs. Il y a eu donc accroissement de la population et donc une pression sur les ressources. Mais il y a également l'hétérogénéité de la population qui est à mettre en lien avec les identités. Les représentations, les valeurs et les pratiques de ces populations d'origines diverses et pratiquants des activités diverses sont sans nul doute différentes. Cette situation ne serait – elle pas à la base des tensions sociales autour de l'eau malgré la vulgarisation de nouvelles pratiques à travers des modèles diffusés par le projet ?

L'innovation technique autour de la production et la commercialisation du riz, du haricot vers via la coopérative a eu pour incidences de développer des techniques de production agricole mais aussi d'ouvrir sur l'économie de marché. Il y a donc eu un développement de l'agriculture et une monétarisation des échanges ce qui était l'un des objectifs du projet. Mais cette situation a eu pour effet de donner un modèle qui a été emprunté par d'autres acteurs (opérateurs privés, acteurs de la petite irrigation villageoise etc.) qui se sont installés au bord du cours d'eau mais aussi du canal. Ainsi donc les acteurs autour de l'eau s'accroissent et se diversifient. Cette situation n'est elle pas à la base de l'insuffisance de l'eau ?

De l'insuffisance de l'eau naissent des stratégies qui ont tendance à donner prédominance à des activités sur d'autres ou à exclure, en fonction de l'antériorité ou encore du statut de certains usagers.

La concurrence voire la compétition va naître de l'ensemble de ces situations, se traduisant par des tensions sociales voir des conflits. Mais est – ce réellement des conflits autour de l'eau ou plutôt des conflits d'un autre ordre ? Il serait difficile d'y répondre dans le cadre de cette communication mais des pistes de réflexions existent.

L'initiative du CPGBK est originale comme nous l'avons signalé précédemment surtout dans sa dynamique processus. Une idée à l'échelle locale qui finalement est reconnue et formalisée. Mais tout de même des questions subsistent par rapport à l'institution que par rapport à la finalité qui est visée. Le niveau d'implication et de participation réelle des acteurs locaux nous semble être un des éléments qui donnera tout son sens à l'institution et valorisera tout le processus antérieur. C'est de cela que pourra naître les bases de renforcement de l'institution ainsi que les chances d'atteindre ses finalités.

La problématique de l'eau dans le bassin du Kou et plus particulièrement dans la plaine de la Vallée du Kou semble s'inscrire dans une problématique plus globale qui est celle des interactions entre les dynamiques sociales et territoriales d'une part et les dynamiques foncières de l'autre. La ressource eau prend de la valeur à partir de l'usage qui en est faite et dans notre cas, il s'agit bien de la production agricole dont l'élément de base qui contribue à la diversification des acteurs aussi bien qu'à l'émergence des conflits est la terre. L'accès

différencié à cette terre ou à sa mise en valeur constitue le réel enjeu dans la plaine. En somme pour nous l'eau n'est qu'un élément apparent du problème foncier né de la pression démographique sur les ressources du à la migration en interaction avec des problèmes identitaires nés de la recomposition sociale suite à l'accroissement de la population et de son hétérogénéité.

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Changes and challenges along the northern edge of the Sahara. A comparative approach

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The region of the pre-Saharan oases of Morocco, Algeria and Tunisia shows some relatively homogeneous physical and human features that can facilitate a comparative study on the relationship between people and natural resources. Some important elements of differentiation, though, must always be taken into account in a comparative approach that aims at analysing an area that is almost 3,000 km wide:

- 1) the different stocks of water resources (perennial rivers, wadian, springs, groundwater, deep aquifers);
- 2) the different socio-economic and environmental policies adopted by Morocco, Algeria and Tunisia after their independence.

The combination of different resources and policies has produced interesting results and a geographical reflection on sustainable development in arid and semi-arid environments is highly topical and useful.

This reflection will be carried on through a comparison between three case studies that present considerable bioclimatic variety but also some significant common features.

The main criterion that led to the choice of the three areas is that of their physical size and their socio-economic weight within the three Countries and within the whole of the pre-desert belt.

In Morocco the region of **Tafilalt** and the upper Ziz valley (Province of Errachidia, South-Eastern Morocco), the largest system of oases in the whole Country and the legendary magnificence of the town of Sijilmasa proves the antiquity of its agricultural and commercial traditions.

In Algeria the region of the **Ziban** (Wilaya of Biskra, central Algeria), rich in streams, springs and groundwater resources, includes a large number of oases whose demographic and economic weight has lately turned it into the most important agricultural area of the whole pre-desert region of the Maghreb.

In Tunisia the oasis of **Nefzaoua** (Governorate of Kebili, South-Western Tunisia) was chosen thanks to the spectacular agricultural development that recently outshined the ancient fame of the Djerid. The Nefzaoua system is fed by springs and aquifers and, in spite of its relatively small size, is often held up as an example of economic success.

As a whole, the pre-Saharan oases of Morocco, Algeria and Tunisia appear to be located along an evolutionary path leading from pre-colonial systems to modern agriculture but they are situated in different phases. The transformation of these old agricultural and trade powers into isolated communities oriented towards self-sufficiency, a process that occurred at different times in the three Countries, was followed, between the 1930s and the 1980s, by a phase of different policies. Morocco's conservatism, Algeria's experimental socialism and Tunisia's moderate laissez-faire have produced various and controversial results. Starting from the 1980s, as a consequence of the world's economic climate and because of the relative success of the policies experimented by Tunisia, the model of small-scale agricultural capitalism has quickly spread. The use of the term "capitalism" is justified by the final consolidation of monetary economy and by the importance of migrants' remittances and investments.

The growing disengagement by the State, which occurred in the three countries, happened in different forms.

In the oases of Morocco the traditional socio-economic and cultural system, which managed to survive till recent times in the rural areas thanks to the support of the monarchy, started to collapse. The gradual opening of the Country to the outside world has freed social and economic forces that, in spite of somewhat contradictory policies, have largely overshadowed the old local potentates as interlocutors for the political authorities.

In Algeria the abandonment of the ambitious and costly plans of collectivization and industrialization supported by State funds was sharp and traumatic, but it was also softened, in its most negative effects, by the strong support given to small capitalistic production, which is probably going to play a more and more important role in international trade. The agricultural development was not accompanied, though, by a parallel industrial development, hampered by the political instability of the Country.

In Tunisia the end of the early socialist policies was rewarded by a spectacular economic development, which, in the pre-desert areas, benefited large-scale commercial agriculture and tourism. The State investments, unlike Algeria, were not dramatically cut. The creation of new oases, a territorial experimentation that is going on in several areas, tends, nevertheless, to strengthen capitalist production.

As a whole, we can distinguish three evolutionary stages that characterized the 20th Century in the area:

- 1) between 1900 and 1950 the pre-colonial economic system, based on traditional water management, agriculture and caravan trade, went through a final crisis. It is the "age of changes" (military defeat of the nomads, abolition of slavery, foundation of towns and modern administration, development of communications, sedentarization, education, demographic growth, etc) which destroys a century-old balance;
- 2) between 1950 and 1980 the demographic growth had a negative impact on a stagnant economic system; as a result, emigration became a mass phenomenon and started to threaten the future of these human communities. It is the "age of crisis", mainly faced with State interventions concentrated on large-scale hydraulics;
- 3) after 1980 State intervention started to recede, leaving room to a spectacular agricultural and urban development. It is the "age of revival", characterized by the success of agrarian capitalism, by the spread of small-scale private water management and by the irruption of tourism.

This apparently optimistic picture hides environmental problems and challenges that cause widespread concern but are still rather underestimated by the public authorities and often deliberately neglected.

These themes become clearer and more concrete when taken down to the local scale:

1) The **Tafilalt** region (Morocco) is still characterized by the considerable political influence of local notables, religious authorities and village assemblies. Capitalist development, desired by the younger generations, is hampered by the lack of a real agrarian reform, by smallholding and by the predominance of traditional water management. Due to the lack of policies able to answer the social expectations, water use tends to be uncontrolled and causes serious environmental problems, even though the availability of renewable water resources (perennial rivers) can guarantee, as a perspective, a relatively well-balanced economic development. Because of the increasing water exploitation in the upper valley, though, desertification in the southernmost oases seems to be worsening. Population growth is still strong but the most interesting element is its largely spontaneous redistribution, which is advantaging urban centres and road axes. The economic and demographic barycentre has brusquely moved northwards and tends to coincide with Errachidia, the only properly urban centre in the region. The Saharan border, characterized by a poor and declining agriculture, tends to become a mere tourist attraction;

2) The **Ziban** area (Algeria) has experienced socialist socio-economic experiments that largely eradicated the traditional organization, but the most relevant transformations occurred over the past 20 years, when agrarian capitalism, strongly supported by the Government, reshaped the region turning it into the main agricultural producer in the whole Sahara, fully integrated in the national food trade. Water resources are abundant and renewable, infrastructures are relatively modern. The geographic position facilitates its role as a link between the Mediterranean and the Sahara. Environmental problems locally show serious dimensions, also because of the high consumption volume in the agricultural and urban sectors, but there are solid bases to guarantee a sustainable development. Demographic growth is still intense and economic development revolves around the main town, Biskra, which keeps an absolutely dominant role. The minor urban centres basically work as trade markets for the rich agricultural productions of the region;

3) The **Nefzaoua** region (Tunisia) represents a successful model of economy founded on agrarian capitalism and commercial plantations. The Government policies turned it into the main economic pole in South-western Tunisia, ideal scenery for experimental territorial systems like the new oases created to host high-quality food production. Nefzaoua dates dominate the European market and local vegetables are conquering the national one, also through the success of greenhousing. The traditional socio-economic system has almost disappeared, infrastructures are largely modern and tourism, unlike Tafilalt and Ziban, plays a major role, even though its real impact is relatively modest. The spectacular economic development of Nefzaoua, however, is based on non-renewable water resources, which threatens the future of the region. Land planning, even if relatively advanced, is not fully able to restrain uncontrolled water use, yet. Demographic growth is quickly decreasing. Since there is not a single dominant pole, the economy revolves around the three centres of Kebili, Douz and Souk Lahad, creating a dynamic system of great interest.

These three case studies are traditionally affected by a development delay when compared to the respective national averages, but this delay has quickly decreased over the past 20 years.

Small-scale agrarian capitalism seems to be the way towards success for the pre-Saharan regions. The pre-desert belt of the Maghreb is now a dynamic and active space, which never hosted such a large population in the past. The changes, compared to a pre-colonial age characterized by subsistence economy and demographic stagnation, are very impressive. Population grows but distributes differently concentrating in those areas (towns and main roads) that facilitate an ideal escape from the deprivation experimented during most of the 20th Century. Physical isolation diminishes, migrations and cultural exchanges multiply, and towns grow spreading new lifestyles and new consumption habits. New professions arise together with new relationships between social groups. Agriculture, benefiting from important private investments mostly deriving from migrants' remittances, is currently the most flourishing economic branch, followed at long distance by the tourist sector. Agricultural production is growing and specializing, showing a clear tendency towards the integration in national and international markets. High-quality date production is increasing following to the international demand, new cultivations are taking place (olive trees, vegetables, hard wheat, and fodder), making the agricultural landscape more and more similar to the Mediterranean one, milk cow breeding is expanding. The traditional varieties of dates and cereals are declining, as well as extensive breeding. Following the growing food demand coming from urban population, traditional and agricultural methods are quickly being replaced by modern techniques. This process is particularly advanced in Tunisia, less in Algeria and Morocco.

Tourism, linked with the spectacular development of transportation, is emerging as an economic alternative able to employ the young people who abandon the agricultural world, even though its impact is still currently limited to a few Moroccan and Tunisian oases. It is mainly an itinerant kind of tourism, based on large hotels managed by external entrepreneurs, with relatively little benefits for the local economic fabric. It is also interesting to notice, however, that "alternative" tourism, with all of its different faces (sport, ecology, architecture, folklore, gastronomy, spas, etc), is clearly spreading, even with very little support from the Governments, and is already a significant reality in several communities. Alternative tourism, thanks to a more direct relationship with local population, is able to start virtuous circles that can lead to interesting examples of auto-centred development, especially through the contribution of migrants' remittances.

These mainly positive elements, however, must not hide the fact that this development model is hardly sustainable by the natural environment. Water shortage, which, during the 20th Century, emerged as the most serious menace to the future of the north-Saharan oases and steppes, is a difficult problem. It is clear, in fact, that the perception of scarcity is relative. In regions located at the edge of the largest desert in the world, it is obvious that local people have always had to face periods of extreme and often dramatic drought. The shifting of sand dunes, the formation of salt deserts, soil erosion and bio-climatic oscillations, are all natural phenomena, which can be locally worsened by human actions but show their worst effects only where anthropic communities settled in marginal lands. The population increase that occurred during the 20th Century, associated with the impressive growth of consumptions, was accompanied by a considerable improvement in the

standard of living and by a spectacular agricultural development. As a consequence, the offer of water had to be augmented at very fast pace on the initiative of both public and private sectors.

The policies for the control of water demand, such as the fixing of a higher water price and sanctions for illegal and excessive water exploitation, are generally neglected in order to avoid protests by the population. Measures for productive and allocative efficiency are being implemented, instead. In the new agricultural areas new techniques like waterproofed irrigation canals, drop irrigation and greenhouses able to reduce evaporation are quickly spreading. Tunisia and Morocco, especially along the coast, are experimenting techniques for water re-use that lead to considerable water saving. In case of sectoral conflicts, where it is not possible to indefinitely augment water offer, some measures for allocative efficiency have been implemented, favouring urban, industrial and tourist use while sacrificing the agricultural sector (especially in Ouarzazate and Tozeur).

Measures aiming at expanding the offer of water keep attracting much more attention than those aiming at reducing its demand. Both Governmental policies, with their medium-lived investments and infrastructures, and the small-scale household-based capitalism, whose investments have immediate but short-lived results, present high risks of environmental unsustainability caused by a chronic lack of balance between a steady or decreasing water availability and an ever-growing water demand, pushed by a quick improvement in the standard of living and by the growing economic activism of the population. The authorities do not seem fully able or willing to intervene in order to control the semi-spontaneous economic development that is taking place.

The growth of water consumption, which reflects the improvement in the standard of living, derives from the spread of western lifestyles that originated in physical environments that are very different from the steppe, which creates a difficultly manageable human pressure.

On the long term, it is necessary to evaluate if it is profitable to exploit all the available resources in order to keep marginal regions alive, or if it would be better to concentrate human activities in more favourable areas, like coastal regions. These are different geographical models that are being debated and studied all over the world. The example of the Libyan Great Man-Made River, which is transferring Sahara's water resources from the desert to the coast, instead of using them on the spot, shows how difficult these choices are.

Is pre-desert agriculture sustainable over the long term? The answer is not sure, because water resources are heavily exploited and consumption keeps growing, but modern technologies and rigorous land planning, together with bold and wilful allocative choices, can lead to a positive answer. The case of the Ziban area, where economic success is based on relatively abundant water resources, shows on one hand that productive agriculture in arid and semi-arid lands is possible, but on the other hand it seems like an exceptional case. Tafilalt, in fact, shows higher risks due to the irregularity of a dying hydrographical system, while Nefzaoua, an extreme case, bases its current fortune on the use of substantially non-renewable aquifers. The other oases of the region, of smaller size and importance, show the same tendencies and uncertainties.

A comparative approach, with a multidisciplinary and systemic vision of the problems and tendencies occurring in the oases and steppes of the pre-desert belt of the three countries, is thus necessary. The historical perspective, which compares the pre-colonial socio-economic systems and the present-day realities, and the geographical method, which combines the analysis of physical and human factors, makes it possible to fully understand the processes of desertification and the current transformations. Besides a temporary differentiation of economic policies that occurred during the 20th Century, the model of modern household-based enterprise, and, partly, that of commercial plantation, can easily fit the renewed socio-economic activism of the population.

This conclusion partly clashes with some beliefs that are deep-rooted in common opinion, according to which the different political history of the three Countries would have moulded three kinds of society with different economic and cultural ambitions and expectations. The lifestyles that are spreading in this area, with their complex environmental and economic impacts, show the deep unity of the northern rim of the Sahara. Another myth that should be avoided is the conservatism of the oases dwellers. Young families, in fact, appear to be very open and often willing to reject traditional knowledge in order to guarantee themselves a better future, along with the outside world's tendencies.

This evolution, though, implies serious environmental problems and challenges and can compromise the tourist appeal of the region. Tourism, which is currently the only sector able to guarantee a certain diversification of the economy, would push towards the opposite direction, the conservation of the traditional socio-economic system.

In no case, as we could see, the use of water resources corresponds to the principles of sustainable and durable development, which, in the past, were assured with very heavy human costs. It is also necessary to evaluate the risks of the loss of the historical and cultural heritage that is currently accompanying the fast modernization of northern-Saharan society.

Even with the different characteristics and possible different future perspectives (good in the Ziban area, more risky in the Tafilalt and Nefzaoua oases), the same evolutionary tendencies can be observed in a very wide area that, even if divided into three Countries, still shows the signs of a millenary shared history and requires a common reflection on sustainable development along the Northern edge of the Sahara.

Tanga Pierre Zoungrana
Jacques Bethemont
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**De l'échec d'un projet à l'émergence d'un territoire :
La vallée du Sourou (Burkina Faso)**

Résumé : Petite région marginale mais apte à de vastes aménagements hydrauliques, la vallée du Sourou (Burkina Faso) a été le cadre d'un projet grandiose mais peu réaliste dans le cadre d'une économie socialiste. Le passage au libéralisme s'est accompagné d'une réévaluation critique du projet et d'un retrait progressif de l'Etat qui incite les coopératives à la recherche d'une autonomie financière assez improbable dans le contexte actuel. Pourtant, les aménagements hydrauliques portant sur près de 4000 hectares, ont suscité de multiples initiatives inspirées de modèles capitalistes ou relevant de la petite hydraulique. La dynamique ainsi amorcée a permis l'émergence de structures territoriales viables qui soutiennent maintenant le maintien et le développement de l'agriculture hydraulique.

Mots clés : Irrigation, territorialisation, Sourou, Burkina Faso, Zone soudano-sahélienne.

Abstract: Small marginal region, though suitable for large irrigation development, the Sourou valley (Burkina Faso) has been the spot of a development project, huge but unrealistic, within a socialist framework. The transition to a market economy was accompanied by a critical evaluation of the project itself and a progressive withdrawal of the State, which pushes the cooperatives towards an economic autonomy, in fact unrealistic in the situation. However, the hydraulic schemes amounting about to 4000 ha, have excited several initiatives, referring both to an agrobusiness model and to a small-hydraulic one. This increasing process is giving rise to local territorial structures (sustainable ones?) which are supporting the irrigated agriculture production.

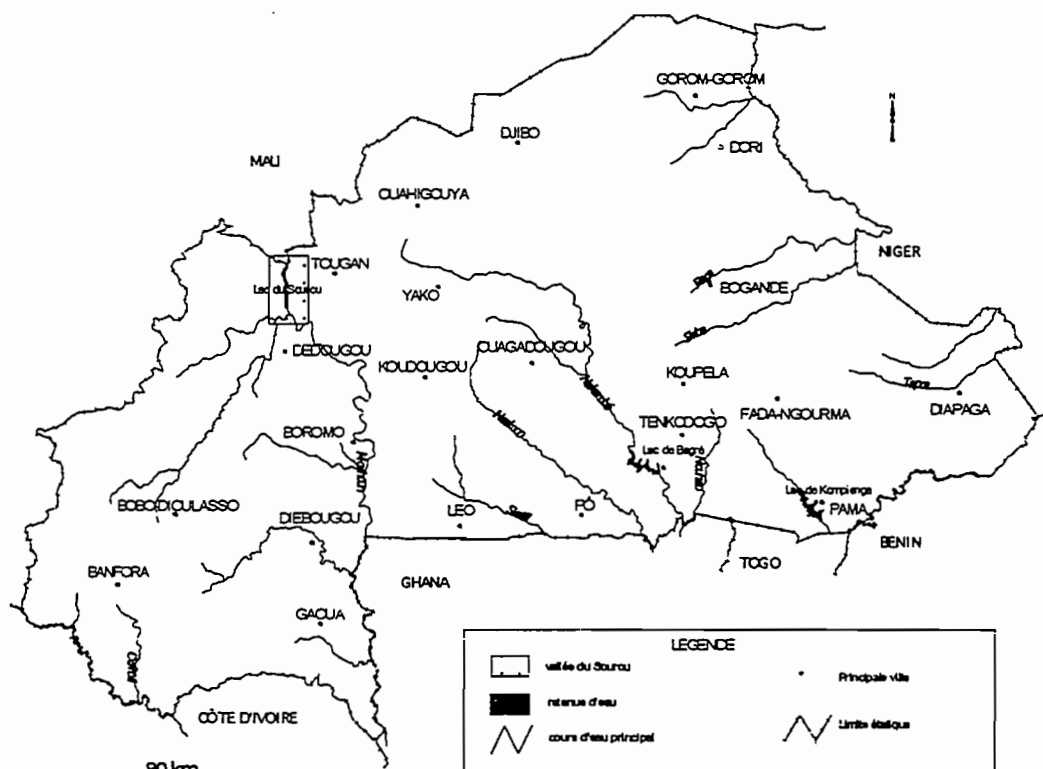
Key words : Irrigation, territoriality, Sourou, Burkina Faso,

Il y a de cela bien longtemps, les anciens Grecs pensaient que les essaims d'abeilles se formaient dans la gueule des lions morts. La formulation moderne de ce mythe voudrait que d'un échec grandiose, surgisse une réalisation plus modeste mais à la fois concrète et positive. Tel est le cas de la Vallée du Sourou¹, petite région dynamique, territoire né de l'échec d'un grand projet socialiste². Mais au-delà de ce cas particulier, se pose la question d'une possible transposition de ce qu'on peut appeler le « modèle Sourou ».

DE LA DYNAMIQUE REVOLUTIONNAIRE A L'ECHEC D'UN PROJET

Le Sourou est un très modeste cours d'eau occupant sur plus de 120 kilomètres dans la partie occidentale du Burkina Faso, une vaste vallée, en fait l'ancien cours du Mouhoun (autrefois dénommé Volta noire) avant que celui-ci ne passe à la suite d'une capture, d'un tracé sud-nord à un tracé nord-sud en décrivant un coude accentué au niveau de Dédougou. Lors de la saison des pluies, les eaux grossies du fleuve tendent à reprendre momentanément leur ancien cours, de sorte que les eaux circulent d'aval en amont dans la vallée du Sourou (Fig. 1). Dans ce contexte, il a suffi d'un barrage-écluse de petites dimensions et de quelques travaux annexes pour retenir en année moyenne, sans investissement coûteux et à toutes fins utiles un demi kilomètre cube d'eau.

Figure 1: Le Sourou dans l'espace national



¹ Les éléments de cette communication sont le résultat d'une série d'enquêtes entreprises conjointement de 1999 à 2002 par l'Institut de Géographie de l'Université de Padoue et par le Département de Géographie de l'Université de Ouagadougou, sous la direction conjointe de Pierpaolo Faggi et de Tanga Pierre Zoungrana, avec le concours occasionnel de Jacques Bethemont. Sara Bin a poursuivi les recherches sur le terrain jusqu'en 2004.

² Dans le cadre de cette communication, nous opposons le « projet » issu des plans réalisés par l'Etat, au « territoire » qui reste une constante quels que soient les avatars du « projet ».

Le cadre du projet

Dans son état originel, la vallée du Sourou n'était qu'une région marginale, située dans une zone soudano-sahélienne ne recevant que de 400 à 800 mm de pluies concentrées sur quatre à cinq mois de l'année. Une terre du mil donc, mais également une zone de pâturages de décrue fort appréciée des éleveurs peuls. C'était également une région peu accessible à partir des grands axes de peuplement, ce qui en avait fait une sorte de zone-refuge où s'étaient établies au fil des siècles des ethnies refoulées ou rétives à l'emprise coloniale.

Parmi ces tard venus figuraient dans les années qui suivirent la fin de la seconde guerre mondiale, des groupes de Mossi, expulsés du Mali une fois terminés les grands aménagements réalisés par l'Office du Niger. Bons agriculteurs et riziculteurs, ces pionniers sans terre s'établirent sur les rives du Sourou et réalisèrent dès 1966, avec de faibles moyens quelques petits périmètres irrigués en cultures de décrue. Simultanément, et dans le cadre du statut colonial, divers plans furent élaborés et aboutirent à la définition d'un projet simple : retenir les eaux de crue et les relever par pompage afin d'aménager des périmètres irrigués. Dans un contexte politique marqué tant par une suite de changement de frontières que par le rejet de toute entreprise coloniale par une population qui avait connu les conditions de l'économie de traite et de concessions, ces projets restèrent dans les cartons³ en dépit de leur réalisme puisqu'il s'agissait non pas d'installer de grandes exploitations de type colonial mais de développer une économie associant agriculture et élevage, donc assez proche des pratiques traditionnelles. Toujours est-il qu'au terme de la phase coloniale, le jeune Etat héritait d'études de faisabilité plus que de réalisations qui, en fait, se limitaient au maintien d'une station expérimentale à Di.

Un contexte révolutionnaire

Survint en 1983, la Révolution nationale entraînée par le capitaine Thomas Sankara. Ce leader charismatique connaissait bien la région et avait connaissance des projets d'aménagements hydrauliques. Il était également partisan des grands travaux, entrepris sur un modèle socialiste et plus précisément albanais, travaux qui devaient susciter l'enthousiasme des masses dans un grand élan qui permettrait de substituer aux pratiques coutumières, la nationalisation des terres, tout en mobilisant une masse de jeunes gens qui, faute d'être employés sur un grand chantier, eussent été voués dans les villes à une inactivité dangereuse. La convergence de l'enthousiasme révolutionnaire et de la demande de travail devait trouver sa finalité dans la mise en œuvre du projet Sourou.

De fait, entre le début de la période révolutionnaire en 1983 et la disparition de Thomas Sankara en 1987, le barrage du Sourou et le petit canal de dérivation facilitant l'intrusion des eaux de crue avec un débit de 220 m³/s ont été édifiés, et des périmètres d'irrigation cumulant 1 000 hectares ont été aménagés. Ces résultats ne sont pas négligeables mais ils doivent être rapportés aux objectifs d'un *Programme Populaire de Développement* (PPD) qui portait sur 40 000 ha devant produire 120 000 tonnes de céréales. Observateur à la fois sympathique et critique, René Dumont s'était étonné à l'époque de l'hiatus existant entre les objectifs du PPD et la réalité observable sur le terrain⁴ : beaucoup d'acteurs peu et mal occupés face à la préférence accordée à de gros

³ Il s'agit notamment des travaux du BCOM effectués entre 1951 et 1956.

⁴ Dumont, R. (1986), *Pour l'Afrique, j'accuse*, Paris, Plon, collection Terre humaine. Voir en particulier les pages 55 à 85.

engins de terrassement, ce qui faisait dire à René Dumont qu'« *aucun projet ne pouvait être plus gigantesque que le Sourou* ». Il n'empêche qu'à l'époque des slogans affichés dans les rues de Ouagadougou proclamaient, tableaux idylliques à l'appui, que « *le Sourou est l'avenir du pays* », cependant que de grandes manifestations célébraient « *la victoire du Sourou* ».

Pour autant, l'effet de propagande ne suffisait pas à masquer le malentendu fondamental qui opposait les attentes des aménageurs à celles des aménagés.

Pour l'Etat, qu'il soit révolutionnaire ou non, un double objectif portait d'une part sur le recasement de réfugiés ou sur le transfert des populations excédentaires du Yatenga voisin, vers une région sous-peuplée, d'autre part sur la recherche de l'autosuffisance céréalière assortie de la réduction des importations de riz qui grevaient lourdement la balance des échanges. Cette politique était tympanisée par un slogan simple : « *produisons burkinabé, consommons burkinabé* ». Dans le contexte révolutionnaire, ce programme aussi simple qu'ambitieux passait par le transfert du domaine foncier, des collectivités locales à l'Etat, de la coutume à la rationalisation étatique. Ce transfert délicat devait être encadré par des *Comités de Défense de la Révolution* (CDR) supervisés par un *Conseil National de la Révolution* (CNR). Autrement dit, un activisme soutenu avec plus ou moins d'enthousiasme par des groupes d'étudiants et de colons cantonnés sur des périmètres modèles. Restait à organiser la mise en œuvre de ce programme et l'implantation des périmètres échelonnés tout au long de la rive orientale du Sourou. Ce fut d'abord le rôle des ORD⁵ puis, à partir de 1985, de l'*Autorité de Mise en Valeur de la vallée du Sourou* (AMVS). Cet organisme dépendant du Ministère de l'Eau mais financièrement autonome, fut chargé dès l'origine d'une mission englobant aussi bien la recherche que la mise en place et la gestion des périmètres irrigués à travers un réseau de coopératives. En fait, et dans les premiers temps, la création de cet organisme qui devait survivre à la Révolution, avait pour objectif la justification par l'action et le succès, du gouvernement révolutionnaire.

Les riverains du Sourou, qu'ils soient autochtones ou issus de mouvements migratoires, avaient en commun une vision utilitaire et simpliste d'un programme d'aménagement qui devait assurer leur autonomie vivrière. Dire qu'ils ont été surpris par l'ampleur du programme d'aménagement relève de l'euphémisme. Cependant leurs réactions ont rapidement divergé sur certains points tout en restant unanimes sur d'autres. Pour les allochtones, les grands travaux et la gestion des casiers irrigués a mis fin aux traditionnelles migrations de travail vers la Côte d'Ivoire et le Sourou a été perçu comme une terre d'accueil particulièrement offerte aux riziculteurs mossi. De leur côté les autochtones, submergés par l'afflux des migrants et dépossédés de leurs terres par la loi de nationalisation de 1984, se sont posés en victimes bien qu'ils détiennent de sérieux atouts, ne fut-ce que leur qualité de « *maîtres de la terre* » qui leur assurait une certaine priorité dans la répartition des parcelles mises en coopératives. Ils conservaient également le monopole de la récolte du riz flottant, ainsi que celui de l'élevage du bétail. Enfin, le processus de nationalisation ne s'étant pas étendu aux terres de culture pluviale, ils restaient maîtres de la gestion de celles-ci.

A travers ces positions respectives, on perçoit le jeu des tensions et conflits dont la Vallée⁶ est actuellement le cadre : les uns excipent du nombre, de leur cohésion et de leurs savoir-faire ; les autres de leurs droits coutumiers et de leur mainmise sur certaines activités ou certains terroirs. Maîtres de la terre et techniciens s'affrontent notamment au niveau du contrôle des coopératives. Toutefois, les uns et les autres sont unanimes à

⁵ ORD : Organisme Régional de Développement.

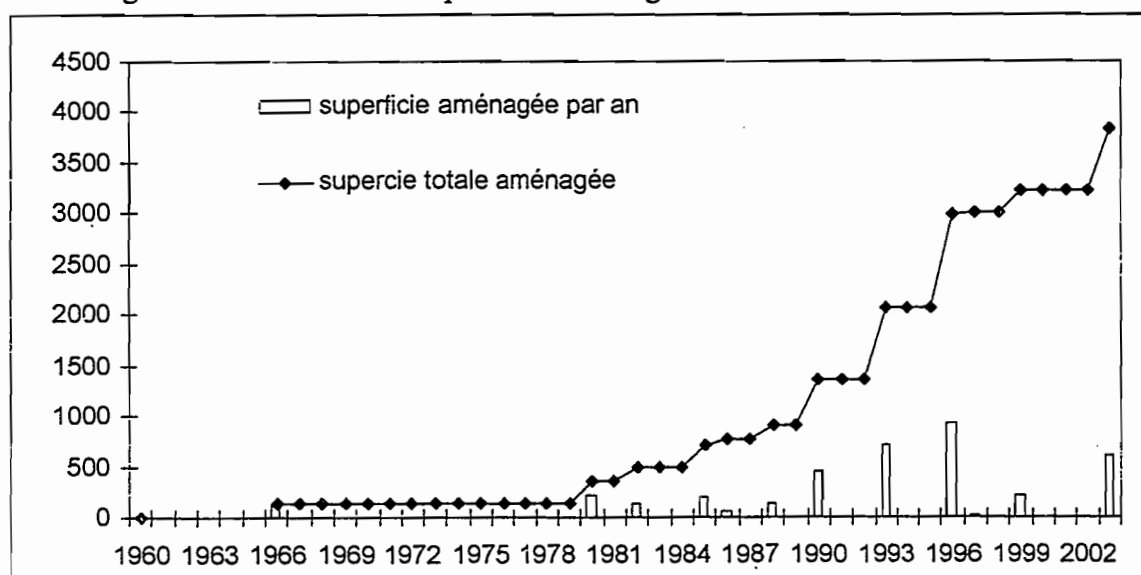
⁶ Nous écrivons vallée ou Vallée, selon qu'il s'agit du cours d'eau et de problèmes hydrologiques ou du territoire aménagé par le projet.

dénoncer les pesanteurs du système coopératif : des unités trop petites sont encadrées et subordonnées de fait, tant aux services centraux basés dans la capitale, qu'aux gestionnaires de terrain, techniciens, secrétaires, comptables et autres qui perçoivent des salaires fixes gagés par le travail des coopérateurs. Une fois ces salaires et charges financés, il ne reste que peu de chose aux coopérateurs, à supposer qu'ils ne soient pas endettés. D'où un désir de simplification et d'autogestion difficile ou impossible à assumer pour cause d'illettrisme et de manque d'expérience. Le relais par les générations scolarisées permettra sans doute de satisfaire ce besoin d'autonomie dans un futur proche.

La difficile transition vers une économie libérale

La disparition de Thomas Sankara en 1987, n'a pas eu d'incidence immédiate sur le programme d'équipement, puisque les superficies aménagées sont passées depuis cette date de 1 000 à près de 4 000 ha (Fig. 2). Cependant, dès 1991 et à l'instigation de la Banque mondiale et du Fonds monétaire international, le gouvernement burkinabé a initié un premier *Plan d'Ajustement Structurel* visant à l'assainissement des finances et à la recherche d'une meilleure efficacité économique. S'en est suivi, à l'échelle nationale un *Programme d'Ajustement Structurel* (PAS) qui s'est traduit, avec naturellement des résistances et un long période de transition, par la fin de la fixation autoritaire des prix et l'instauration d'un régime libéral tant pour les intrants que pour les produits agricoles mis en concurrence avec les offres du commerce international. Ce programme qui mettait fin aux pratiques d'un Etat-providence amorçait en fait le désengagement de l'Etat à travers un processus de décentralisation et au profit d'une économie de marché.

Figure 2 : Évolution des superficies aménagées de 1960 à 2002



Source : AMVS in Bethemont et al., 2003, 47

Ce passage d'une économie socialiste à l'économie libérale, s'est opéré de façon non pas brutale, mais au terme de nombreuses transitions. Parmi les plus marquantes de celles-ci, l'abandon des plus grands périmètres, équipés de machines importées, comme les pivots et rampes hippodromes de Di, organisés non pas en coopératives mais en fermes d'Etat ; le délaissement du grand périmètre initialement cultivé par des étudiants durant la grande époque de la Révolution ; les facilités accordées à des promoteurs particuliers

opérant le plus souvent sur la rive occidentale du Sourou selon des méthodes inspirées de l'agrobusiness. De façon non moins progressive, les plans de production qui portaient initialement sur les cultures vivrières ou industrielles, canne à sucre et coton (le riz faisant exception) ont été relayés par des incitations – non accompagnées d'aide, il va de soi – à une reconversion dans les cultures primeuristes, notamment la production de haricots verts destinés à l'exportation.

De tous ces processus de désengagement, le plus délicat a porté et porte encore sur le passage des coopératives du stade de l'assistanat à celui de l'autonomie. Se pose tout d'abord le problème de la diversité de ces coopératives dont la taille et les effectifs varient de 50 ha et 63 exploitants (la CAPIN sur Dédé 1) à 500 ha et 473 exploitants (la CANI sur Dédé 2) ou 910 ha pour 320 membres (GPMAD à Dédé IV), tout comme varient les orientations de production qui vont du riz à la culture des primeurs. Cet émiettement, lié au contexte morphologique de la vallée, a été compensé par diverses instances de regroupement dont l'*Union des Coopératives Agricoles de la Vallée du Sourou* (UCAVASO) qui, à partir du regroupement de trois coopératives en 1993, aux fins de coordination des ventes de riz, a fini par englober la totalité des coopératives. Le changement de politique coïncide d'ailleurs avec cette même année 1993, durant laquelle les bailleurs de fonds qui fournissaient 90% de l'aide au pays, ont exigé une modernisation et une diversification de la production, via l'abandon du système de fixation des prix, la libéralisation des échanges, la promotion de l'investissement privé et la limitation des dépenses publiques ne portant pas sur la recherche et la vulgarisation. La mise en œuvre de ces directives s'est faite uniquement par le haut, dans le cadre d'initiatives émanant de services de l'Etat, sans concertation avec les organisations paysannes. Des difficultés sont très vite apparues, résultant les unes de l'incapacité des producteurs à gérer les équipements les plus sophistiqués comme les grands pivots de Di, les autres du manque de moyens financiers des coopérateurs pour renouveler le gros matériel, notamment la tuyauterie et les pompes dont beaucoup sont frappées d'obsolescence. Ajoutons à cela le fait que si les coopérateurs se plaignent des pesanteurs et du coût des structures de gestion, ils ne sont pas à même de les relayer. Bref, la plupart des coopératives ne sont pas à même d'assurer leur autonomie et restent bloquées dans ce qu'on appelle un stade pré-coopératif, encore dépendant de services étatiques qui cherchent eux-mêmes à se retirer du jeu. Ces divers éléments peuvent être interprétés en termes de blocage du projet de développement par l'irrigation, mais cette appréciation doit être nuancée par la vérité du terrain.

LA VERITE DU TERRAIN

En première approche : difficultés ou constat d'échec ?

Des lignes qui précèdent ressort à l'évidence un double sentiment d'échec, puisqu'à l'échec de la réforme socialiste s'ajoute l'échec d'une reconversion mise en œuvre sans coordination entre les décideurs gouvernementaux et des agriculteurs précipités sans formation dans une logique de rentabilité économique qui leur échappait. De prime abord, les enquêtes menées sur le terrain entre 1999 et 2002 tendraient à confirmer l'analyse théorique. Les trois pivots et les deux rampes « hippodromes » du périmètre cotonnier de Di ne sont plus en état de marche, exception faite du dernier pivot qui n'arrose que du maïs. Ailleurs, comme à Niassan, des riziculteurs expérimentés sont passés de la culture manuelle à la culture attelée sans recours au tracteur mais peinent à faire

tourner les grandes pompes Hydrovis, compte tenu du coût du gasoil. Certains périmètres ne sont cultivés qu'en partie, à moins que le mil en culture pluviale n'ait remplacé le riz. Entre 1996 et 2001, les superficies rizicoles ont stagné à hauteur de 2100 ha et la reprise des années suivantes (2600 ha en 2003) semble mal assurée, compte tenu du fait que le riz burkinabé ne peut concurrencer le riz d'importation vendu dans le commerce et subventionné par l'aide aux agriculteurs dans les pays d'origine. Enfin, à Guiédougou, là où la pratique de l'irrigation est la plus ancienne et la plus élaborée, là où se cultive de longue date « l'or du Sourou », le haricot vert, l'état d'usure des pompes et des conduites de refoulement nécessite d'urgence l'achat d'équipements neufs. Or, l'état du marché est tel, que les prix au bord du champ ne permettent pas de dégager les capitaux nécessaires à l'achat d'un matériel neuf, alors que les banques refusent de s'engager.

Des difficultés d'ordre social s'ajoutent aux problèmes économiques et techniques. Ici, un conflit avéré oppose les migrants riches de leurs savoir-faire, « les rebelles », au chef coutumier qui fait valoir ses droits de « maître de la terre ». Ailleurs, c'est un directeur de coopérative qui est parti après avoir vendu le matériel et en emportant la caisse. Enfin, dans plusieurs coopératives, le nombre d'adhérents a diminué depuis le passage des coopératives d'Etat au stade pré-coopératif.

Et pourtant...

Au-delà des blocages qui viennent d'être recensés, un premier constat s'impose. Même s'ils ne sont pas encore à même de passer au stade de l'autonomie administrative et financière, les irrigants du Sourou peuvent faire état de nombreux acquis concernant aussi bien des savoir-faire techniques (arrosage mais aussi entretien des pompes) que l'adoption de nouvelles pratiques comme le labour attelé. Ce ne sont pas là des atouts négligeables.

Quelles que soient les réserves que l'on puisse faire sur certaines pratiques, l'apparition de nouveaux acteurs doit être interprétée de façon positive. Sur la rive occidentale du Sourou (mieux vaut ne pas parler de rive gauche ou droite s'agissant d'un cours d'eau qui selon la saison coule d'amont en aval ou d'aval en amont), dans le secteur de Sono encore en voie d'aménagement, des personnages influents et pourvus de capitaux ont entrepris, dans un contexte technique encore précaire, de passer à une certaine forme agrobusiness avec des bananeraies mais aussi des plantations de papayes et de légumes (aubergines, tomates, pastèques, piments). Ces diverses spéculations emploient une main-d'œuvre très chichement rétribuée, le plus souvent étrangère à la région. De leur côté, les entrepreneurs prennent de sérieux risques, compte tenu des défaillances de systèmes d'irrigation comme ces rampes d'arrosage importées et mal alimentées. Il est vrai que ces défaillances sont compensées par le transfert de nombreux investissements incluant les premiers labours et l'adduction d'eau à la parcelle ont été pris en charge par l'AMVS, toute référence à l'économie libérale mise à part. L'Etat reste donc un acteur mis au service d'une élite oeuvrant ou voulant oeuvrer sur de vastes périmètres. En tout état de cause, si le succès n'est pas assuré, il reste probable après un temps de mise au point.

Sur la rive orientale, avec des moyens plus modestes, quelques bons agriculteurs on rompu avec les pesanteurs des coopératives (mais sans doute ont-ils été relayés dans celles-ci par leurs proches) pour cultiver des légumes acheminés vers les marchés relativement proches de Tougan ou de Koudougou. Ailleurs, d'autres entrepreneurs de moyenne envergure (aux environs de 5-10 ha) se sont établis sur des parcelles abandonnées sur le périmètre dit des « étudiants ».

Bien qu'apparemment marginal et totalement négligé tant par l'administration que par les bailleurs de fonds, le mouvement le plus intéressant concerne la petite hydraulique. Tout au nord du projet, en marge des installations officielles, des travailleurs allogènes occupent les rives d'un petit affluent du Sourou. Ils ont creusé le long de ses berges, de diverticules dans lesquels l'eau pénètre et sur lesquels ils ont branché des petites pompes, achetées d'occasion et souvent bricolées ou réparées avec du matériel de fortune acheté et vendu sur les marchés locaux. Ces pompes, propriété d'individus ou de petits groupes, servent à arroser des parcelles qui peuvent avoir de 1 000 à 8 000 m² et sur lesquels sont cultivés en contre-saison des oignons ou des légumes à destination des marchés locaux. C'est également sur les marchés locaux, que ces modestes irrigants se procurent les intrants, notamment des engrais qui pourraient bien provenir des coopératives officielles.

Aux abords de Di, d'autres autochtones se sont regroupés dans le cadre d'une coopérative 6S⁷ qui occupe 19 ha en deux périmètres branchés directement sur le lac. Ce regroupement sur le modèle des groupements d'entraide *naam* (Bin, 2004b) et une gestion simplifiée ont permis le renouvellement des pompes et l'achat d'un matériel léger.

Tout cela reste simple tant sur le plan du matériel et des techniques que sur celui d'une gestion simplifiée à l'extrême. Ainsi de l'accès à la terre, prêtée en saison sèche par un ayant droit local, lequel récupère pour une récolte pluviale, un terrain propre et enrichi par les apports d'engrais. Au final, alors que les coûts s'échelonnent entre 45 et 55% sur les périmètres de l'hydraulique officielle, ils sont évalués entre 6 et 10% sur les petits périmètres. Deux points méritent d'être précisés : d'une part, l'extension de ces périmètres pourrait être acquise à faible coût si l'AMVS acceptait de creuser ou d'approfondir quelques petits canaux branchés sur le lac, mais d'un autre côté, l'existence même de ces petites structures peut être remise en cause si l'AMVS implante de nouveaux périmètres au nord de Di.

Sur le plan de l'économie régionale, il n'y a pas d'incompatibilité entre agriculture irriguée et agriculture pluviale. La plupart des autochtones pratiquent des cultures traditionnelles (manioc, mil et maïs) en culture pluviale et ils prêtent – sans pour autant les céder – des terres aux autochtones. Ces cultures pluviales profitent dans une certaine mesure des pratiques et des mentalités acquises sur les périmètres arrosés, apport d'engrais mais surtout pratique du compostage diffusée par les techniciens du Ministère de l'Agriculture.

Par rapport aux pratiques traditionnelles, deux changements d'importance sont intervenus en quelques années. Tout d'abord, la création d'une vaste retenue a relancé la pratique traditionnelle de la pêche. La nappe d'eau de 100.000 ha à son maximum s'avère propice à la multiplication des espèces piscicoles planctonophages ou autres et la retenue fournit maintenant 800 t. de poisson, soit le dixième de la production nationale. La pêche constitue donc un sérieux appoint dans les comptes régionaux, d'autant qu'un pêcheur qui immerge ses filets le soir et les relève le matin gagne de 4 000 à 5 000 francs CFA par jour contre 500 francs pour un salarié agricole. Les effectifs des pêcheurs ne sont pas comptabilisés mais on relève l'existence de 24 groupements dont 12 de femmes qui travaillent le poisson fumé et séché et environ 150 pêcheurs indépendants.

Dans le même temps, si les pâturages de décrue, le *bourgou*, ont été réduits, les superficies cultivées en riz flottant se sont accrues. Le revers de cette nouvelle dynamique porte sur l'élevage bovin qui garde une certaine importance, les bergers peuls conduisant des troupeaux dont une partie appartient aux autochtones qui voient dans le bétail un

⁷ 6S : Se Servir de la Saison Sèche dans la Savane au Sahel. Groupements de jeunes fondés en 1977 par Bernard Lédéa Ouédraogo sous forme d'ONG.

placement de capital. Malheureusement, la réduction des pâturages de décrue d'un côté, la réduction des terrains de parcours suite à l'extension des cultures pluviales de l'autre, à quoi s'ajoutent les difficultés d'accès aux zones d'abreuvement suite à l'implantation des périmètres irrigués, réduisent les perspectives de l'élevage. Cela non seulement pour les peuls sédentarisés mais aussi pour les grands nomades dont les troupeaux transitaient originellement par le Sourou, sur un parcours allant du Mali à la Côte d'Ivoire.

DU PROJET AU TERRITOIRE

Un premier bilan modeste mais assez diversifié

A s'en tenir aux faits de production, le bilan du projet est assez décevant. Certes la création à bon compte d'une retenue importante a permis le développement de onze périmètres échelonnés sur la rive orientale, plus un douzième sur la rive occidentale. Mais, outre les problèmes économiques et organisationnels que pose leur gestion, ils souffrent d'une contrainte majeure qui risque d'aller en s'aggravant : le relevage de l'eau par pompage. La durée de vie des pompes n'est pas éternelle et l'augmentation de coûts du gasoil pourraient aboutir à une remise en cause radicale, sauf à ce que soit instauré une subvention spécifique. Mais, et ce point est essentiel, la retenue est à l'origine d'une diversification qui dépasse les coopératives patronnées par l'AMVS et intègre les entrepreneurs capitalistes, les petits irrigants et les pêcheurs. A quoi s'ajoute le maintien et la progression en superficie et en productivité de l'agriculture pluviale. Rien de spectaculaire dans ce tableau, mais des perspectives ouvertes à divers niveaux, dans une région jusqu'alors partagée entre les agricultures pluviales ou de décrue et un élevage peu performant.

Des activités dérivées, des infrastructures améliorées

Le processus de diversification a pour corollaire une autonomisation croissante de la région par rapport à des maîtres d'oeuvre – l'Etat et l'AMVS – qui se font de plus en plus distants. La dépendance vis-à-vis des instances gouvernementales qui était totale, tend donc à s'atténuer. Il n'empêche que dans un bilan global, divers apports de l'Etat doivent être pris en compte, ne fut-ce que l'aménagement de pistes carrossables reliant les diverses unités du périmètre entre elles et reliant, au niveau du barrage-écluse, Leri à Tougan et donc à Ouagadougou. La région est ainsi désenclavée et ses divers villages qui, jusqu'alors, communiquaient peu ou pas entre eux sont maintenant anastomosés. Il faut également porter au crédit de l'Etat, la mise en place de deux structures administratives (préfectures) à Di et à Lanfiera, la création d'un réseau scolaire de premier niveau et deux « centres de santé et de promotion sociale », toujours à Di et Lanfiera. On voit donc s'établir un début de hiérarchisation à partir de ces deux centres qui accueillent de nouveaux équipements et des services (Fig. 3 A et B).

Figure 3a. Les trames spatiales traditionnelles

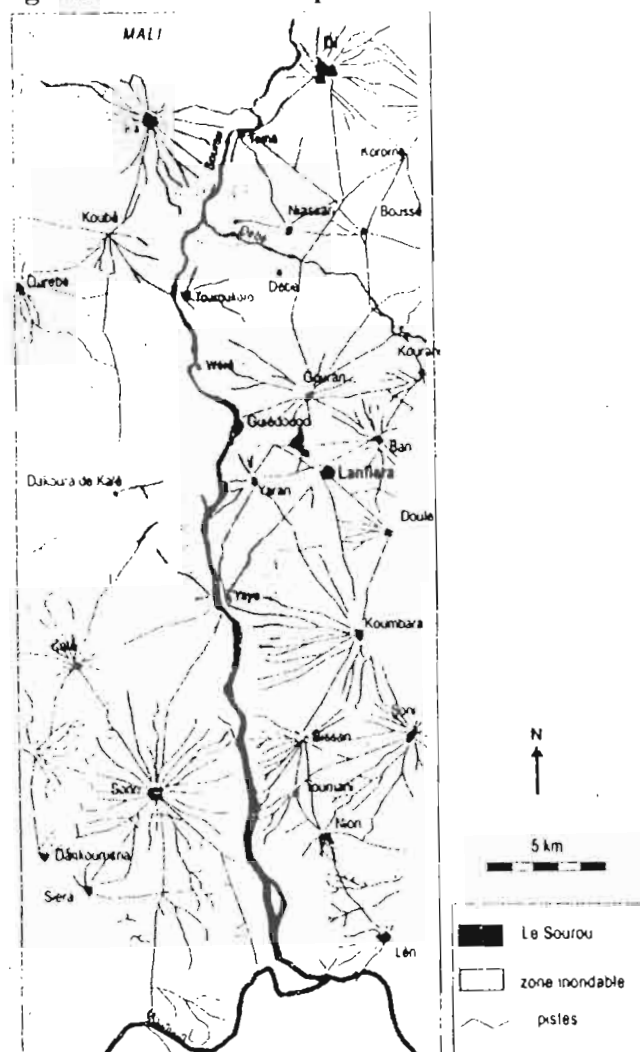
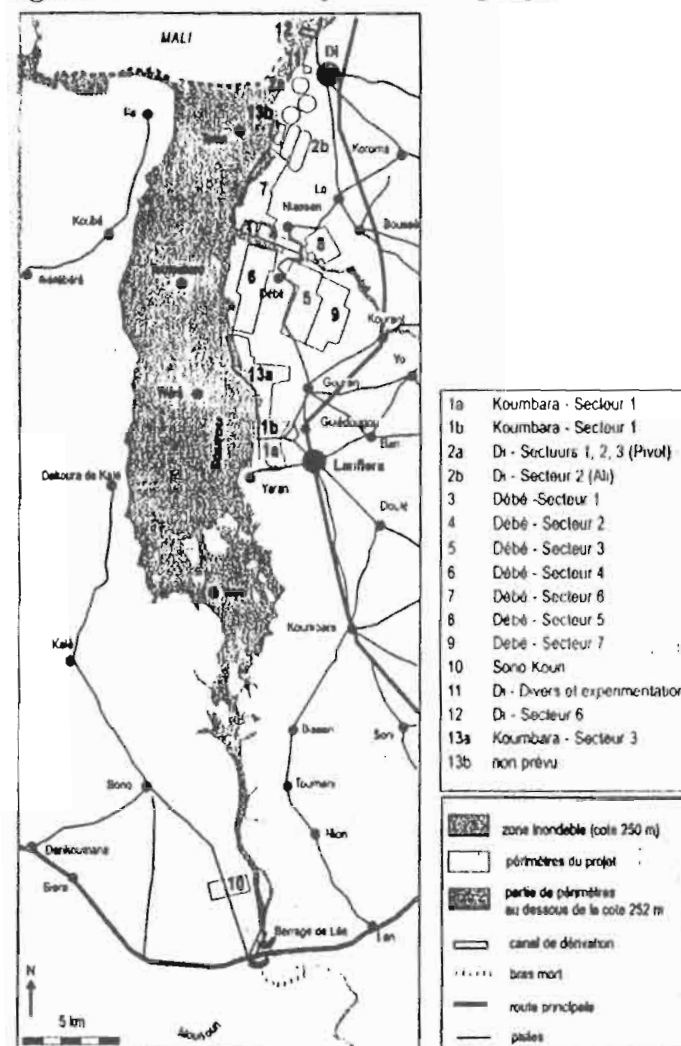


Figure 3b. Les trames spatiales du projet



En dehors des services de l'Etat, on observe, sans qu'il soit pour autant possible de chiffrer le volume monétaire des transactions, une activité croissante des marchés villageois de Di et de Lanfiera avec, d'un côté l'achat de quelques produits alimentaires ou de pièces détachées et de matériel mécanique d'occasion ; de l'autre, la vente de produits agricoles comme le poisson, les oignons et la volaille sans parler du riz, peut-être discrètement soustrait au contrôle des coopératives. Le bilan de ces transactions s'est traduit par l'ouverture de deux guichets de la Caisse Populaire de crédit public à Di et Gouran. Mais le phénomène marquant est incontestablement la diffusion du micro-crédit, notamment dans le cadre des Coopératives d'Epargne et de Crédit qui ont ouvert depuis 1992, une douzaine de guichets répartis entre autant de villages. Des enquêtes réalisées sur place, ressort moins une logique d'investissement, qu'un souci d'épargne en prévision d'éventuelles difficultés, la préoccupation fondamentale restant celle de la sûreté alimentaire. Ouverture sur le monde extérieur donc, mais aussi prudence inhérente à la « condition sahélienne » et moindre confiance dans le rôle de l'Etat-providence.

De cette présentation des faits, ressort une dynamique évolutive qui part d'un constat de marginalisation originelle assorti de réelles potentialités. Suit l'intervention de l'Etat dont l'action aboutit à la mise en place d'un projet conçu sans référence aux contraintes économiques mais associant à des installations techniques, des infrastructures non négligeables. Dans une troisième phase, le retrait progressif mais encore incomplet de l'Etat a engendré de fortes difficultés aggravées tant par un processus de mondialisation dont la maîtrise lui échappait, que par l'acuité des problèmes d'énergie et de renouvellement des installations vieillissantes. Mais ce retrait ou cette moindre pression a eu pour contrepartie l'éclosion de multiples initiatives créatrices à divers niveaux et selon de multiples modalités, de richesses économiques et d'emploi. Il y a donc un relais entre le projet déclinant et un processus de territorialisation qui va s'affirmer. Le projet a généré le territoire mais c'est maintenant le territoire qui soutient ou relaie le projet.

Les problèmes d'un espace en transition

S'il est engagé, le processus de territorialisation ne saurait constituer une panacée. Il soulève en tout cas de multiples problèmes de choix et d'adaptation au cours d'une phase de transition.

Manger ou vendre

La référence à la « condition sahélienne » et aux stratégies de survie s'impose dans bien des domaines, et suffit à expliquer des conduites paysannes qui oscillent entre sécurité alimentaire et ouverture sur une économie d'échanges. Il y a sur ce point, des confusions et conflits entretenus par l'Etat et ses coopératives. Sur le périmètre rizicole de Niassan, par exemple, les coopérateurs voudraient satisfaire en priorité leurs besoins alimentaires estimés à 190 kilos par personne et par an, alors que l'administration de la coopérative donne la priorité à la vente du riz, jusqu'à obtention de l'équilibre comptable, le reliquat étant laissé aux sociétaires... mais comme le riz burkinabé se vend difficilement (aide alimentaire oblige) et que les frais de gestion sont très élevés, les coopérateurs resteraient souvent sur leur faim, n'était le recours au maïs en culture pluviale. Ce type de conflit ou à tout le moins de tension se retrouve à bien des niveaux, ne fut-ce que dans la recherche d'un équilibre entre les agricultures irriguées et pluviales ou si l'on préfère dans

le choix entre manger ou vendre. Pourtant, le suivi des marchés montre que les apports des agriculteurs vont en se diversifiant et en augmentant, alors que leur demande en produits manufacturés, même modestes, bottes, bassines, petit matériel agricole, intrants non fournis par les services de l'Etat, s'accroît corrélativement.

Intégration ou communautarisme

Les tensions entre allochtones et autochtones, sont longtemps restées à un niveau modeste. Il n'empêche que les premiers arrivants repliés du Mali et installés à Guédougou, loin de se joindre à la communauté *dafing* d'accueil, avaient construit leur propre village et leur propre mosquée en marge du village éponyme. Par la suite, le même phénomène s'est reproduit sur d'autres sites d'accueil. Non que les autochtones fassent preuve d'une hostilité de principe, mais ils tiennent à maintenir leurs droits et traditions sur quelques points essentiels, notamment la coutume dans le droit foncier. Ils sont les « maîtres de la terre », maintiennent leurs hiérarchies lignagères et entendent contrôler leur terroir. Mais dans le même temps, la coutume veut qu'on ne refuse pas l'accès à la terre à qui la demande dans les formes. Les nouveaux venus ont donc pu accéder aux terres de culture pluviale non sans quelques restrictions, puisqu'ils n'ont pas la possibilité d'entretenir du gros bétail faute de droits sur les terrains de parcours ; de même, ils ne peuvent pas planter d'arbres sur les terres qui leur sont attribuées, l'arbre étant la marque de la pleine possession ; enfin, ils n'ont pas le droit de récolter le riz flottant qui reste aux mains des communautés autochtones.

Le véritable terrain d'affrontement se situe sur le plan de la maîtrise des techniques de l'eau. Les allochtones sont, de façon générale plus compétents en matière d'irrigation que les autochtones. Ils réclament donc la maîtrise des périmètres, et le retrait progressif de l'Etat et de ses services les incite à prendre le pouvoir pour assurer la survie des périmètres irrigués... mais ils ne sont pas les « maîtres de la terre » et les autochtones font valoir leurs droits et priorités de façon d'autant plus énergique qu'ils n'ont jamais admis le principe de la nationalisation des terres et qu'ils reconnaissent leurs anciennes parcelles dans la trame des casiers aménagés. Sur ce point, la tension est parfois très vive entre les deux groupes, s'agissant tout au moins des premières générations.

En fait, le problème des relations est conditionné par des problèmes d'effectifs. Sur le papier, le nombre des allochtones dépasse celui des autochtones sans qu'ils constituent pour autant un bloc cohérent : les nouveaux venus viennent de 6 provinces sur les 140 ha du périmètre de Koumbara et de 23 provinces sur les 500 ha de Dédé 4. Leur cohérence n'est donc pas évidente et les tensions se situent non seulement entre anciens habitants et nouveaux venus mais entre ceux-ci, alors que les anciens constituent dans chaque village un groupe homogène. Du moins les uns et les autres sont unis dans leurs revendications face à l'administration.

Un milieu naturel perturbé

Le passage sur le Sourou d'un régime lotique à un régime lentique a considérablement modifié la faune aquatique avec un recul des salmonidés et une proportion croissante de cyprinidés, carpes et tilapias. On assiste simultanément à la prolifération de plantes aquatiques fortement consommatrices d'oxygène et la désoxygénation s'accroît avec le rejet des eaux de colature fortement chargées en nitrates et en résidus de produits phytosanitaires. La faune terrestre a subi également des

modifications, suite à la mise en eau qui a provoqué le relais des antilopes par les hippopotames. On compte maintenant plus de trois cent individus de cette espèce redoutée aussi bien des pêcheurs qui comptent plusieurs victimes d'agression chaque année, que des agriculteurs qui n'apprécient pas le goût de ces mastodontes pour le riz en herbe et les haricots verts.

Le drame de l'insularité

Quelques villages, en leur temps prospères, s'étaient implantés sur les bourrelets fluviaux de la rive orientale, Yayo, Wéré, Toroukoro, Toma. Ils profitaient au mieux de la pêche et de la récolte du riz flottant tout en cultivant des terres dans la zone non inondable. En contrepartie, ils supportaient un isolement de quelques semaines au plus fort de la remontée des eaux. Suite à la création du réservoir, leur insularité est devenue permanente et pénalisante. Le maintien des eaux à un niveau élevé a provoqué une remontée capillaire qui a imbibé les murs des habitations les plus basses, jusqu'à provoquer leur effondrement, ce qui a obligé une partie de la population à s'installer dans des conditions misérables sur le terroir des villages en terre ferme. Il faut d'une à deux heures pour effectuer la traversée et les villages sont maintenant d'autant plus isolés que, pour gagner les marchés, il y a une rupture de charge pénalisante. La proximité de leurs ressources, pêche et riz flottant, ne compense pas leur isolement spatial et social, à quoi s'ajoute un accroissement de la morbidité et de la mortalité, consécutif à la malaria (mal combattue par des fumigations qui engendrent des maladies respiratoires) et aux maladies de l'eau. Celles-ci sévissent d'autant plus que l'eau de la retenue sert à tous les usages, depuis la boisson jusqu'aux lieux d'aisance. Repliées sur elles-mêmes, ces communautés se décomposent et il n'est même pas sûr que leur transfert sur des périmètres aménagés en terre ferme, puisse les redynamiser.

Des problèmes de santé

Il n'y a pas d'évaluation simple dans ce domaine. Il est certain que la conjonction entre la création d'une nappe d'eau permanente et l'introduction de l'agriculture hydraulique, ne peut que favoriser la propagation des maladies de l'eau, malaria, bilharziose, schistosomiase et trypanosomiase. De fait, les statistiques du centre de santé de Niassan attribuent aux maladies de l'eau 75% des consultations. Encore faut-il observer que cette mise en évidence des problèmes de santé est d'autant plus apparente qu'il existe un encadrement sanitaire de la région, rattachée au Centre médical et chirurgical de Tougan mais incluant sur place deux Centres médicaux avec médecin en poste (Koumbara et Lanfiéra) et deux Centres de santé et de promotion sociale animés par un groupe d'infirmiers. Une analyse comparative montre que, s'agissant de la malaria, les consultations sont d'autant plus nombreuses que la couverture sanitaire est dense, de sorte que les taux d'impaludation peuvent être plus élevés mais non évalués dans des zones moins bien encadrées. En tout état de cause, le nombre des consultations effectuées au dispensaire de Niassan sur un même laps de temps, est passé de 903 à 1 181 entre 1994 et 2000.

Ce constat est d'autant moins satisfaisant qu'il existe un encadrement sanitaire correct. On peut, bien entendu, mettre en cause le milieu, mais ce sont surtout les pratiques quotidiennes et le manque d'hygiène qui sont à l'origine de certaines maladies : les

riziculteurs pataugent pieds nus dans les rizières, plutôt que de mettre des bottes et l'usage de la moustiquaire est encore loin d'être généralisé⁸.

Une possible remise en cause à l'échelle du Mouhoun

L'essentiel des débits du Mouhoun se forme à l'amont et au sud du Sourou, dans la zone tropicale plus humide. Le module de 24 m³/s n'a pas grande signification, compte tenu de la concentration des pluies sur quelques mois. Il vaut mieux tabler sur le flux saisonnier qui a pu varier entre 1,6 km³ en 1970 et 0,24 km³ en 1983 pour une moyenne de 0,75 km³. C'est dire que la cuvette du Sourou peut ne pas être totalement remplie lors des années déficitaires. Mais même en année moyenne, le débit minimum réservé de 4 m³/s ne satisfait pas les besoins des riverains de Douroula et Woro en aval. Ceux-ci demandent un réajustement des débits afin d'éviter l'assèchement du bief litigieux. Il existe une menace beaucoup plus préoccupante en amont, avec le projet d'un barrage retenant les eaux du Mouhoun à hauteur des chutes de Samandeni. L'énergie produite pourrait satisfaire une grande partie de la demande énergétique de Bobo-Dioulasso tout en permettant l'irrigation de 20 000 ha dont la production serait facilement écoulee sur les marchés de cette même ville.

Le plan d'eau, d'une capacité de 1,05 km³, va créer une zone humide de 150 km². Alors même que les fonds ne sont pas encore mobilisés, la controverse s'installe. Pour le Ministère de l'eau, l'aménagement va réguler le Mouhoun en assurant un débit sanitaire de 15 m³/s contre des valeurs actuelles allant de 2 à 0 m³/s. Cette régulation préservera les aménagements du Sourou et protégera les riverains contre les inondations répétitives. On escompte une baisse du coût de l'électricité et une production piscicole de plus de 1000 tonnes par an. D'aucuns pensent cependant que le projet ne sera pas nul de conséquences néfastes en aval, et pourrait menacer l'irrigation des champs. Des associations écologistes pourraient donner de la voix sur la détérioration de l'environnement.

Aussi longtemps que le Sourou a représenté « l'avenir du Burkina Faso », toute analyse de rentabilité restait inconcevable. Il n'en va plus de même maintenant et, tant la comparaison avec l'ouvrage de Bagré qui produit de l'énergie et alimente son périmètre par gravité, alors que la Vallée en consomme pour relever l'eau de la retenue, que la comparaison avec les perspectives offertes par l'ouvrage de Samandeni, pourraient remettre en cause les investissements passés ou futurs dont a bénéficié le Sourou. En tout état de cause, en l'absence du tapage médiatique et de la contrainte qui avaient porté le Sourou dans les fonts baptismaux, l'unanimité n'est pas au rendez-vous pour le projet Samandeni, suscitant de nombreuses interrogations sur la faisabilité politique du barrage en question autant que sur le devenir de la Vallée en cours d'incubation par le jeu complexe des modalités transformationnelles.

⁸ Se basant sur les recherches qu'il a faites à Bagré, T. P. Zoungana (2001) estime toutefois qu'après une période d'invasion malarienne suivant la mise en eau des rizières, les agriculteurs développent des processus d'auto-immunisation.

QUEL AVENIR POUR LA VALLEE ?

Étant entendu que l'avenir n'est écrit nulle part, il n'est pas interdit pour autant d'envisager quelques scénarios et de les confronter aux tendances observables sur le terrain.

Pessimisme et optimisme

Un scénario pessimiste supposerait que l'Etat se désintéresse de la Vallée, au point de n'accorder aucune aide au renouvellement du gros matériel hydraulique, ce qui condamnerait à terme l'ensemble des coopératives. Ne subsisterait, en conformité avec le contexte actuel, que quelques entrepreneurs comme ceux de Sono et les tenants de la petite hydraulique. Mais celle-ci, en dépit des recommandations de René Dumont ne pourrait guère valoriser, compte tenu de ses moyens, qu'une centaine d'hectares. Les installations existantes pourraient alors intéresser de grands investisseurs du secteur privé à ceci près que, d'une part les autochtones feraient valoir leurs droits sur ces terres quitte à les tenir en cultures pluviales et que d'autre part, les nouveaux venus, soit réduits à la condition d'ouvriers agricoles, soit contraints d'opérer des migrations de misère, constitueraient une masse prolétarienne incontrôlable. Pour autant, les potentialités de l'agriculture pluviale qui fournit à ce jour 85% de la production agricole dans les deux départements de Di et de Lanfiera, maintiendrait une activité économique renforcée par la pêche et la culture du riz flottant, ces deux activités restant compatibles avec une moindre dotation hydraulique de la Vallée. Le retour au *statu quo ante* n'est donc pas concevable.

Un scénario optimiste est plus crédible, ne fut-ce qu'en raison de la présence de bailleurs de fonds à même de relayer l'Etat, qu'il s'agisse d'ONG, de la Banque mondiale ou de banques du Moyen-Orient. En excluant la menace probable des aménagements du Mouhoun supérieur, on peut également faire valoir que les rendements de la riziculture qui varient actuellement entre 2,5 et 4,5 t/ha peuvent dans un délai raisonnable atteindre et dépasser la norme des 6 t/ha. On observe enfin, une tendance positive : les meilleurs praticiens, soit à titre individuel, soit dans le cadre de petits groupements reprennent des terres en déshérence ou en voie d'équipement, pour pratiquer des cultures plus rentables que celle du riz. Il s'agit d'une diversification qui tient aux capacités du territoire, créée par le projet, afin d'activer sa dynamique endogène pour renouveler le territoire : en s'autoproduisant, le territoire reproduit le projet aussi. On peut enfin compter sur un relais des générations par des jeunes dûment scolarisés et donc capables d'autogérer les périmètres dans leur définition actuelle.

Entre ouverture et tradition

Dernier regard sur le terrain. Lors de notre passage à la fin de l'année 2002, nous avons été impressionnés par le périmètre de Guédougou : d'excellents agriculteurs mais une mauvaise gestion et un matériel de pompage-relevage en fin de course. La catastrophe redoutée est arrivée en avril 2003, avec la casse du matériel de pompage, combinée avec une faillite frauduleuse au détriment des créanciers et des coopérateurs. Dans cette conjoncture, les récoltes de haricots verts et de pommes de terre ont été pratiquement nulles en 2003. Le pire était, semble-t-il arrivé. Or, les coopérateurs ont réagi de façon positive en jouant sur plusieurs registres. Certains se sont regroupés en entrepreneurs privés, d'autres ont adhéré à la coopérative 6S, d'autres enfin ont constitué

une nouvelle coopérative qui a trouvé les capitaux nécessaires à la remise en ordre du périmètre sinistré⁹.

Autre indication positive. En février 2005, l'Etat via l'AMVS, a décidé de remettre en ordre de marche le système d'irrigation hippodrome, pour cultiver du blé, plante qui n'exige que peu d'arrosage. Pour ce faire, le Royaume chérifien a offert pneus, batteries et moteurs. L'initiative étatique relance un nouveau projet qui s'appuie sur les échecs des précédents autant que sur les savoir-faire capitalisés par les exploitants. La phase pilote se déroule sur 350 ha exploités par 130 familles pour une production attendue de 1 000 tonnes. Dans une phase ultérieure, la superficie atteindra 2 500 à 3 000 ha pour une production de 25 000 à 30 000 tonnes de blé. La commande de 25 rampes d'irrigation serait déjà faite.

On assiste là à une nouvelle inflexion du système : le projet a créé le territoire ; puis le territoire s'est émancipé du projet ; c'est maintenant le territoire qui pourrait relancer le projet. Mais le territoire a lui-même développé une nouvelle dynamique ou, plus exactement, il est en passe de trouver de nouveaux équilibres entre agriculture irriguée et agriculture pluviale ; entre structures d'Etat et économie de marché ; entre la tradition sahélienne et l'ouverture sur l'Afrique et le monde. Reste à déterminer, mais il est sans doute trop tôt pour le faire, quel est le niveau de subsidiarité dans le processus de territorialisation-décentralisation. Il est certain que la relation avec l'Etat tend à se distendre mais non à disparaître. En témoigne la relance de la culture du blé qui relève davantage de l'hydraulique stratégique qui a prévalu avant les PAS. Ce qui émet l'idée d'une dynamique en dents de scie qui combine temps linéaire et circulaire, entraînant une succession de stades de plus en plus complexes, impliquant des acteurs de mieux en mieux outillés pour la production et la gestion autonome du territoire, dans des réseaux locaux et supralocaux de plus en plus élaborés. Mais cela ne signifie pas le passage à l'autonomie. On assiste plutôt à un relais des prises de décision, du niveau national au niveau international. On ne peut donc pas davantage exciper d'une gouvernance régionale, la répartition des rôles ne permettant pas de dégager de véritables décideurs locaux qui soient en mesure de gérer la Vallée comme entité régionale. Cette étape constitue une dimension incontournable pour activer des processus de développement réellement autogérés et durables. Pour autant, il ne faut pas désespérer et s'il fallait pour conclure faire référence au mythe, ce serait non plus celui des abeilles d'Aristée mais celui du phénix renaissant de ses cendres que nous évoquerions.

⁹ Cf. Sara Bin, 2004a

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Le périmètre irrigué de Mashushu, province du Limpopo, Afrique du Sud, comme étude de cas d'une transformation participative des institutions locales de gestion de l'eau.

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Résumé

Dans la continuité de l'adoption d'une constitution et de lois progressistes favorisant l'égalité entre les citoyens, leurs participations aux affaires de la nation et la sécurisation de leur accès aux services de base, l'Afrique du Sud met en œuvre aujourd'hui une politique sectorielle de l'eau qui vise une transformation des institutions locales de gestion au profit de Water User Associations accordant une place prépondérante aux usagers. La réforme du cadre législatif s'accompagne de mesures d'accompagnement destinées aux populations les plus démunies et exclues par l'ancien régime d'apartheid.

Les résultats présentés se basent sur une étude de cas réalisée au sein de la communauté noire de Mashushu, située sur le bassin de la rivière Oliphant, dans la province du Limpopo. La pression sur la ressource en eau dans cette province est forte d'autant plus qu'elle est limitée et utilisée par un grand nombre d'acteurs aux objectifs différents (mines et industries, agriculture, villes et villages). Mais, au-delà de la pénurie possible d'eau, le problème de la communauté noire des petits agriculteurs est leur difficulté à faire valoir leurs droits dans les institutions qu'ils n'ont pas contribué à établir et qui s'adaptent mieux aux structures héritées de l'apartheid (grands périmètres irrigués « des anciennes zones blanches » qui regroupaient de grandes exploitations agricoles de type patronal, fortement capitalisées et à but commercial). Cet aspect de représentation réelle et de participation active au processus décisionnel dans la gestion de l'eau est au centre de cette communication.

Elle se focalisera, sur la description d'une société locale où tout semble concourir actuellement à un investissement plus important des usagers dans l'accès et la participation à la gestion de la ressource (argent, appui extérieur, cadre législatif réformateur) mais marquée par « l'absence » de ces mêmes usagers du fait d'un décalage entre la temporalité des structures sociales (ou des sociétés) et celle des politiques. Cet exemple montre aussi les problèmes d'inertie sociale et le poids des structures sociales et économiques en place qui ne changent pas le jour où la constitution change (organisation des filières, pouvoir local,...).

L'analyse proposée est que les rapports sociaux historiquement construits sur les bases du régime d'apartheid, la faiblesse des dynamiques collectives locales constitutive des zones des anciens bantoustans et les retards technico-économiques accumulés par la communauté noire en général, à Mashushu en particulier, limitent et conditionnent la capacité effective de représentation et de participation de la WUA pour participer aux processus décisionnels de gestion de l'eau tels qu'ils sont proposés dans la politique sectorielle nouvellement instaurée.

On peut, cependant, étudier la transformation progressive des institutions locales de gestion de l'eau (au niveau du périmètre irrigué de Mashushu) par implication de plus en plus importante des usagers. Ainsi, à travers cet exemple, nous proposerons une analyse du processus de transformation participative des organisations locales de gestion appuyé par des institutions publiques d'encadrement et une nouvelle législation.

Introduction

L'Afrique du Sud est considérée comme un pays avec de faibles ressources en eau, avec de faibles précipitations annuelles (moins de 500 mm) et à l'inégale répartition des eaux de surface et souterraines (à cause du climat et de la géographie). L'eau d'irrigation représente un aspect important de toutes les problématiques agricoles. Cependant, Hamann & O'Riordan (2000) ont mis en évidence que ce manque d'eau était bien souvent un concept socialement construit. En effet, pendant l'époque coloniale et le régime de l'apartheid, le contrôle et l'utilisation des ressources en eau en Afrique du Sud, qui étaient étroitement liés au contrôle de la terre, reflétaient les intérêts de la minorité blanche. Avec la fin de

l'apartheid en 1994, l'Afrique du Sud fut confrontée à d'importants changements sur le plan politique, institutionnel et législatif qui menèrent à l'établissement d'une démocratie constitutionnelle et d'une société ouverte basée sur des valeurs démocratiques, de justice sociale et de droits humains fondamentaux.

Dans la continuité de l'adoption d'une constitution et de lois progressistes favorisant l'égalité entre les citoyens, leurs participations aux affaires de la nation et la sécurisation de leur accès aux services de base, l'Afrique du Sud met en œuvre aujourd'hui une politique sectorielle de l'eau qui vise une transformation des institutions locales de gestion au profit d'Associations d'Usagers de l'Eau (Water User Associations) accordant une place prépondérante aux usagers. La réforme du cadre législatif s'accompagne de mesures d'accompagnement destinées aux populations les plus démunies et exclues par l'ancien régime d'apartheid.

Les résultats présentés dans cette communication se basent sur une étude de cas¹ réalisée au sein de la communauté rurale de Mashushu, située sur le bassin de la rivière Oliphant, dans la province du Limpopo. La pression sur la ressource en eau dans cette province est forte. L'eau est limitée et utilisée par un grand nombre d'acteurs aux objectifs différents (mines et industries, agriculture, villes et villages). Mais, au-delà de la pénurie possible d'eau, le problème de la communauté noire des petits agriculteurs est leur difficulté à faire valoir leurs droits même dans les nouvelles institutions (agences de bassin versant) qui s'adaptent mieux aux structures héritées de l'apartheid (grands périmètres irrigués « des anciennes zones blanches » qui regroupaient de grandes exploitations agricoles de type patronal, fortement capitalisées et à but commercial).

Dans le cas de la communauté de Mashushu, on peut ainsi s'interroger sur la capacité de leur Association d'Usagers de l'Eau à faire valoir ses droits au sein de l'Agence de Gestion du Bassin de la rivière Olifant (Oliphant River Catchment Management Agency) qui regroupe tous les usagers de la ressource en eau du bassin versant notamment les entreprises minières et les grands périmètres irrigués des anciennes zones blanches qui sont bien organisés et donc bien représentés. Tout l'enjeu consiste à replacer les communautés des petits agriculteurs exclues dans le jeu institutionnel tout en veillant à ce que leurs organisations conservent une représentativité légitime.

Cet aspect de représentation réelle et de participation active au processus décisionnel dans la gestion de l'eau est au centre de cette communication.

I. Le petit périmètre irrigué de Mashushu, une pauvreté hydraulique aux caractéristiques particulières...

1. Une pauvreté hydraulique paradoxale marquée par l'exclusion

Le périmètre irrigué de Mashushu est localisé dans une vallée assez étroite et isolée, entourée de montagnes, de zones humides et de réserves naturelles. Cette vallée est localisée sur le territoire de l'ancien homeland² Lebowa. Elle se caractérise par une colonisation agraire ancienne mais mouvementée avec de nombreuses migrations et

¹ Ferrand P. (2004): *Participatory diagnosis about Farming Systems and Social Management of Water in the Small-Scale Irrigation Scheme of the Mashushu Community, Limpopo Province, South Africa*. CNEARC / UL / GRET.

² **Homelands**: Appelé aussi Native Areas ou Bantoustans. Territoires délimités selon des critères ethniques, géographiques et économiques, ils formaient les "réserves" pour les populations noires pendant le régime d'apartheid (depuis le Native Land Act de 1913).

installations forcées durant le régime de l'apartheid (cf. carte 1 Localisation de la zone d'étude p. 4). La rivière Mohlapietsi traverse cette vallée d'est en ouest. C'est un des derniers affluent important de l'Olifant river avant que cette rivière ne se jette dans le Limpopo.

Ce périmètre a été créé par un agriculteur blanc (1920-1940), puis fut transféré aux agriculteurs noirs de la zone (1964) lorsque la zone a été déclarée zone exclusivement noire sous un contrôle étroit du gouvernement central. La réhabilitation et les extensions successives du périmètre irrigué qui suivirent ont été réalisées par les agriculteurs (sous contrôle d'agents étatiques) entre 1964 et 2000. On note un désengagement massif de l'Etat à partir de fin années 80 et la suppression des limites "officielles" du périmètre irrigué.

Aujourd'hui, le périmètre de Mashushu représente une surface de 42 ha irrigués, soit environ 52 parcelles d'une superficie comprise entre 0,5 et 0,85 hectare attribuées par les agents du gouvernement et les autorités traditionnelles à chaque agriculteur: par le biais d'une autorisation d'exploiter délivrée par le chef traditionnel (Permission To Occupy : PTO, 1 parcelle par agriculteur). L'agriculture est familiale, peu intensifiée et peu mécanisée. Elle est essentiellement destinée à couvrir les besoins des foyers. Il y a une faible commercialisation des produits (Arachide sur les marchés locaux, Coriandre par des grossistes indiens des régions voisines) et une baisse récente des activités agricoles suite à des inondations violentes (destruction de canaux, de clôtures...). Les cultures principales sont le maïs, l'arachide et le niébé.

Le réseau physique d'irrigation apparaît comme plutôt sommaire. Il se compose de 3 canaux primaires en terre plutôt irréguliers, alimentés par des prises sommaires sur la rivière Mohlapietsi. Il en résulte une faible efficacité du transport et beaucoup de pertes malgré un volume d'eau capté important.

Le réseau de canaux secondaires et tertiaires en terre est relativement étendu pour couvrir les 42 ha, mais très irrégulier avec des problèmes d'infiltration importants à certains endroits du périmètre (sols très sableux, présence importante de pierres due à l'ancien lit de la rivière localisé dans le périmètre irrigué). Les agriculteurs utilisent préférentiellement pour l'irrigation des parcelles des raies longues (*long furrows*) qui ont une faible efficacité d'application de l'eau (par rapport aux raies courtes, *short furrows*). La couverture des besoins en eau est partiellement réalisée avec une concentration des problèmes au sein de la zone alimentée par le 2ème canal, pendant les mois de Janvier et Février. L'irrigation apparaît nécessaire et importante pour l'activité agricole due aux faibles précipitations (< 500 mm) et à leurs caractères erratiques.

Cette rapide présentation du périmètre irrigué de Mashushu, pourrait parfaitement s'inscrire dans un contexte de pauvreté hydraulique, hérité et façonné par un régime raciste, autoritaire et répressif. En effet, considérant la pauvreté hydraulique de manière globale et en s'appuyant sur les travaux de H. Ayeb (2004) dans le cas égyptien³, on peut la définir comme la conjonction de trois dimensions qui caractérisent la relation des usagers et consommateurs à l'eau : La pauvreté (le faible niveau d'autofinancement) des usagers de l'eau, l'accès difficile à cette même ressource et la non participation réelle et active des usagers à la gestion de l'eau (et aux processus administratifs, juridiques, politiques et économiques de prises de décisions). Cette étude de cas illustre en partie l'aspect tri-dimensionnel de la gestion de l'eau par ses usagers.

³ Ayeb H. (2004) : La question Hydraulique en Egypte : Pauvreté, Accès et Gouvernance. De la pauvreté hydraulique. Communication séminaire PCSI, décembre 2004, Montpellier, France.

Outils Méthodologiques

Observation participante au niveau de la vie de la communauté rurale.

→ Etudier et replacer chaque phénomène ou pratique dans son contexte et révéler les conditions socio-économiques et pratiques comportementales des populations locales.

Election par la communauté rurale d'un groupe d'agriculteurs représentant et participant au processus de recherche - action avec le chercheur.

- Ateliers de travail sur les principales problématiques agricoles de la zone (cartographie, transects, approche historique, système de productions, gestion de la distribution de l'eau au sein du périmètre, organisation sociale...).
- Diffusion continue et informelle du savoir élaboré par le groupe d'agriculteurs au sein de la communauté rurale.
- Réunions publiques régulières avec l'ensemble de la communauté rurale.

→ Feedback des principaux résultats des ateliers de travail et du savoir local élaboré par le groupe d'agriculteurs représentant.

Différents types d'entretiens

- Entretiens individuels ouverts ou semi directifs avec les autorités locales, le président du comité d'irrigation, les agriculteurs...
- Entretien avec des personnes ressources privilégiées (très important dans l'approche participative et peut fournir d'utiles suggestions concernant le choix des agriculteurs à rencontrer).
- Entretien de groupe (informations fournies par un grand nombre d'individus, à l'échelle du village avec une triangulation immédiate).

Rencontres et Echanges entre agriculteurs d'autres petits périmètres irrigués des environs.

Principaux Résultats

Elaboration et partage de connaissance...

- Une population **hétérogène** installée dans une zone de **colonisation agraire** ancienne mais **mouvementée** (ancien périmètre irrigué d'agriculteurs blancs abandonné) suite à de nombreuses **migrations et installations forcées**. *Que s'est il passé et que pourrait il arriver ?*
- Une grande partie d'agriculteurs « **pensionnaires** » relativement **agés** et fortement investis dans la gestion du périmètre concurrencés par des **mères de familles dynamiques** cultivant principalement des **cultures vivrières** (maïs et arachide). *Qu'est ce qui est cultivé et qu'est ce qui pourrait être introduit ?*
- Un **périmètre irrigué** caractérisé par des **infrastructures** en terre, **sommaires et peu entretenues**, mais d'où a émergé récemment un comité d'irrigation. *Qui devrait être impliqué dans la maintenance des infrastructures et dans l'élaboration d'une constitution pour le comité ?*

Action

Ré -
Action

...renforçant un processus d'organisation sociale locale

- Elaboration et appropriation d'un savoir local et communément partagé par l'ensemble des agriculteurs.
- Appui et renforcement des dynamiques sociales locales.
- Echanges entre agriculteurs de régions différentes et émergence de nouvelles perspectives pour le comité d'irrigation.

Cependant, de par son contexte historique très structurant et encore très récent et les grandes réformes sociales lancées lors de l'avènement de l'African National Congress au pouvoir en 1994, il semble nécessaire de nuancer l'importance de ces trois dimensions dans le cas sud africain, et plus particulièrement dans celui de Mashushu. La réalité locale est bien plus complexe et paradoxale que ne le laisse supposer la description précédente.

Pas d'investissement productif malgré des revenus réguliers

La première dimension correspond majoritairement à un niveau économique de la pauvreté. Or, ce niveau économique de la pauvreté et la faible capacité d'investissement qui lui serait rattachée n'est pas totalement valable dans les communautés noires sud africaines. Le gouvernement injecte massivement de l'argent « frais » dans les zones rurales les plus démunies par le biais d'aides sociales (*social grants*) distribuées mensuellement et sans passer par le marché. Cela représente environs 3 Milliards de Rands (384M €) d'investissement par mois concernant plus de 10 millions de Sud Africains⁴. Ainsi, ces populations ont des revenus élevés comparativement à d'autres populations d'Afrique. A titre de comparaison, le Produit Intérieur Brut par habitant en Afrique du Sud est de 2 800 \$ contre 300 \$ en moyenne pour le reste du continent⁵. La Banque Mondiale estime que seulement 9 pays d'Afrique Subsaharienne sur 48 ont un revenu moyen par habitant de plus de 1000 \$, et seulement 5 dépasseraient les 2500 \$ (Gabon, Seychelles, Botswana, Maurice et Afrique du Sud)⁶.

Néanmoins, on constate que ce flux régulier d'argent dans les communautés rurales (complété par les revenus des activités extra agricoles de la main d'œuvre masculine travaillant en zone urbaine ou dans les mines) ne bénéficie que très rarement à des investissements productifs (agriculture irriguée par exemple). Les revenus sont majoritairement consacrés à l'achat de biens de consommation ou à l'emploi de manœuvres pour certaines opérations culturales pénibles. Cela allège la charge de travail de l'exploitant sans pour autant accroître l'investissement de ce dernier dans son exploitation. Cette « consommation de luxe » est peut-être à rattacher au consumérisme ambiant en Afrique du Sud où le travail est toujours associé au salariat. Ainsi, la petite entreprise agricole ne doit pas être contraignante, elle doit améliorer la vie sans créer de nouvelles contraintes.

A Mashushu, on peut ainsi constater que 35% des foyers reçoivent une pension ou une autre aide sociale du gouvernement, 30% bénéficient de revenus extra agricoles et 20% seulement tirent la majorité de leurs revenus de l'agriculture. L'agriculture semble, néanmoins, peu dynamique et plutôt moribonde, menée par une minorité d'agriculteurs à plein temps et une majorité d'agriculteurs bénéficiant de ressources extra agricoles. Elle est caractérisée par peu d'investissement social de la part des agriculteurs dans la gestion du périmètre irrigué.

L'exclusion endogène malgré une politique de distribution égalitaire

La pauvreté est avant tout caractérisée ici par l'exclusion. Cette dimension unique englobe à la fois la difficulté d'accès à la ressource et celle de la participation à sa gestion. Elle peut ensuite se décliner selon différentes modalités techniques (marchés, information, services, éducation...).

Il est, toutefois, important de noter que la ressource n'est pas réellement limitante. La communauté rurale de Mashushu qui est située dans la partie amont de la rivière se sert la première. L'accès au sol s'est aussi fait de manière égalitaire avec une répartition centralisée et limitée par exploitant. Mais, l'état des infrastructures (prises et canaux) rend la localisation

⁴ Source : site Internet http://www.southafrica.info/ess_info/sa_glance/social_delivery/social_grants.htm consulté le 21 Octobre 2005.

⁵ Mutume G. (2004), Alimentation en eau des zones rurales, le gouvernement s'engage à fournir de l'eau à tous d'ici à 2008. In Afrique Renouveau ONU, Vol.18#2 (Juillet 2004), page 21.

⁶ World Bank (2000): Can Africa Claim the 21st Century? Washington DC, USA.

des parcelles stratégique et seuls quelques uns profitent de l'eau eu égard à leur statut social ou leur importance dans « l'histoire » de la construction des infrastructures. La pauvreté est donc toute relative à l'intérieur même de la communauté.

La participation voulue mais incomprise

De même, le terme d'exclusion est à préciser car comme nous le verrons par la suite, cette communauté rurale n'est pas en rupture totale avec le contexte d'intervention de l'état Sud Africain. Elle bénéficie d'un important appui de la part du service de vulgarisation agricole du Département de l'Agriculture (Limpopo Department of Agriculture). La vulgarisation agricole n'est pas nouvelle mais elle s'est considérablement transformée avec l'avènement du régime démocratique. Très dirigiste avant 1994 (cultures, pratiques culturales et débouchés imposés) elle veut désormais favoriser – faciliter- un développement agricole au service des nouvelles réformes engagées, en particulier pour la mise en place d'une politique sectorielle de l'eau mais aussi la libéralisation des marchés des produits agricoles et l'avènement de la libre entreprise devant permettre aux communautés noires de rejoindre l'agriculture commerciale (Black Economic Empowerment).

Ainsi, si les fondements historiques de l'exclusion en Afrique du Sud sont relativement connus, il paraît important de s'attarder sur les difficultés à passer d'une société foncièrement inique et à une société respectant les droits de chaque citoyen.

L'exemple de Mashushu est à ce titre très intéressant car on est en présence de ressources financières (revenus extra agricoles et aides sociales), de ressources naturelles (terres et eau) et de services d'appui (vulgarisation) sans pour autant assister à un phénomène d'intensification de l'agriculture et surtout d'investissement plus important des populations locales dans l'accès et la participation à la gestion de la ressource (investissement dans les instances de gestion du périmètre irrigué par exemple).

La notion de « *capabilité* » développée par Sen A. à partir du début des années 1980 pourrait permettre de mieux comprendre la situation. Sen la définit lui-même comme « *un ensemble de vecteurs de fonctionnements, qui reflètent la liberté dont dispose actuellement la personne pour mener un type de vie ou un autre* »⁷. Elle apparaît ainsi comme "liberté réelle". Dans ce sens, elle englobe d'une part ce que la personne est capable d'être ou de faire et d'autre part ce que l'environnement socio-culturel dans lequel elle évolue (société, traditions, lois, marché,...) lui permet d'être ou de faire⁸.

Au niveau de Mashushu, on constate ainsi une situation où les usagers semblent « absents ». On se retrouve face, en quelque sorte, à une situation locale paradoxale où la pauvreté / l'exclusion sont présentes dans un contexte d'accès à un certain nombre de ressources. Cette situation qui illustre bien la notion de « *capabilité* » pourrait s'expliquer par l'existence d'un décalage entre la temporalité des structures sociales (ou des sociétés) et celle des politiques.

2. Un décalage entre la temporalité des structures sociales et celle des politiques...

Nombre de facteurs expliquant un type d'exclusion comme celui que nous venons de décrire pour Mashushu, prévalaient sous le régime de l'apartheid et perdurent encore du fait d'une certaine inertie et structuration de la société sud-africaine. Le poids des structures sociales et économiques ne va pas changer brutalement le jour où la constitution change, où les législations sont réformées. Il paraît ainsi difficile de penser que la petite agriculture

⁷ Sen A. (1992) *Inequality Reexamined*, Oxford: Clarendon Press, 1992. Page 40: "a set of vectors of functionings, reflecting the person's freedom to lead a type of life or another".

⁸ Thelen L. (2005), Cours de Sociologie du travail et de l'emploi, *les Mondes Sociaux de l'Entreprise*.

familiale des anciennes zones noires puisse être intégrée rapidement dans les circuits des filières agricoles, des marchés et des services qui étaient réservées jusqu'à présent aux grandes exploitations commerciales des anciennes zones blanches.

Une organisation sociale encore dominée par l'autorité tribale

Au-delà de cette structuration de l'environnement socio-économique des zones rurales comme Mashushu il y a aussi un phénomène d'inertie sociale endogène très important à prendre en compte.

On pourrait qualifier ce phénomène d'auto exclusion par conditionnement et déstructuration sociale durant le régime d'apartheid. Cette « dépropiation⁹ » fut historiquement construite et constitue la base des rapports sociaux. Elle permet, en outre, d'expliquer en partie la faiblesse de la participation de ces populations longtemps sous contrôle étroit.

Par ailleurs, il paraît important de souligner le rôle non négligeable des pouvoirs traditionnels locaux qui ont contribué et collaboré à la mise en place de tels rapports sociaux et qui sont largement responsables de l'inertie sociale actuelle freinant toute initiative locale.

Ainsi, les chefs traditionnels ont joué un rôle principal dans l'allocation des terres, surtout après la proclamation du Bantu Authorities Act de 1951 par le régime d'apartheid qui « transférait » certaines attributions de l'Etat comme la propriété des terres communales aux autorités tribales ou traditionnelles au sein des bantoustans nouvellement créés. Ces dernières devenant de fait des fonctionnaires payés par l'administration centrale.

Mamdani (1996)¹⁰ a parfaitement résumé la situation. Selon lui, la particularité des gouvernements locaux en zone rurale pendant la période d'apartheid, était la concentration ou la fusion des pouvoirs administratifs, législatifs et exécutifs en un seul, appelé l'Autorité Tribale qu'il associe à un « despotisme décentralisé ». Les autorités traditionnelles, à travers la mise place et l'application des politiques et législations du régime d'apartheid, sont parvenues à maintenir voire à renforcer leur emprise sur les communautés rurales qu'elles contrôlaient. Il en résulte des situations locales où, malgré le changement politique, la dynamique de transformation démocratique semble encore largement freinée par les communautés mêmes qui placent toujours leur destin entre les mains d'autorités tribales qui ont du mal à reconnaître dans leurs sujets des concitoyens.

Depuis la fin de l'apartheid, de nombreuses initiatives au niveau politique ont été prises en faveur d'une plus grande participation des usagers à l'échelle locale et en particulier dans les zones historiquement défavorisées. Mais ces initiatives se heurtent à différents problèmes de représentations légitimes et de temporalités liées d'une part à la situation pré existante dans les anciens bantoustans et d'autre part au décalage entre les objectifs nationaux de la nouvelle politique de l'eau (Water Act, 1998) et les attentes locales.

Le Water Act, 1998, une législation ambitieuse pour les petits périmètres irrigués...

Pour bien saisir ce qui se passe au niveau national et local, il s'avère intéressant de recontextualiser la situation sud africaine actuelle et de rappeler quelques éléments importants sur le nouveau cadre légal de la gestion de l'eau.

La nouvelle loi sur l'eau sud africaine est internationalement reconnue comme étant un des cadres juridiques les plus prometteurs s'adressant aux nombreux pays confrontés à des changements dans la gestion de l'eau¹¹. Elle intègre plusieurs objectifs dont la protection

⁹ Néologisme permettant de traduire le caractère insidieux et progressif d'une atteinte à l'intégrité morale par « expropriation » (sous le régime d'apartheid) et ses conséquences sur les individus et la société dans son ensemble.

¹⁰ Mamdani M. (1996) *Citizen and subject: contemporary Africa and the legacy of late colonialism*. Princeton: Princeton University press, p 23.

¹¹ (Hanann and O'Riordan, 2000 ; Perret, 2002)

de la ressource (durabilité), le développement et l'équité sociale, la représentativité et l'efficacité économique. La ressource en eau est considérée comme un bien commun. L'Etat, en tant qu'administrateur des ressources en eau de la nation doit s'assurer qu'elle est protégée, utilisée, conservée, gérée et contrôlée de manière durable et équitable¹². Elle rompt totalement avec la législation antérieure qui définissait l'eau des rivières, les eaux souterraines ou les eaux captives comme biens privés, appartenant aux propriétaires de la terre traversée¹³.

Le Water Act agit en faveur d'un développement progressif de stratégies de gestion de la ressource à l'échelle du bassin hydrographique (Catchment Management Strategies). Ces stratégies intègrent, elles aussi, les composantes écologiques, institutionnelles, économiques et sociales. Les besoins et les attentes des usagers des ressources existantes et potentielles en eau sont pris en considération, et des institutions sont créées à un niveau décentralisé dans ce but : les agences de gestion de l'eau à l'échelle d'un bassin hydrographique (Catchment Management Agencies). La population doit pouvoir participer à la gestion des ressources en eau par un dispositif complémentaire : les associations d'usagers de l'eau à l'échelle locale (Water User Associations). Les stratégies développées dans le cadre de ce dispositif doivent contribuer à plus d'équité, d'efficacité et de durabilité. .

Cette nouvelle législation sur l'eau est aussi guidée par la volonté de mettre en place un processus de transfert des infrastructures (Irrigation Management Transfer) et de désengagement de l'Etat. De nombreux périmètres irrigués ont été développés dans les années 1950-60 dans les *homelands* afin de promouvoir une agriculture de subsistance. Dans les années 1990, on a constaté la faible performance économique de ces petits périmètres irrigués malgré les importants investissements réalisés. Suite aux élections de 1994, la dissolution des *homeland* (dont l'administration fut alors rattachée à l'Etat) et les changements progressifs des politiques agricoles en Afrique du Sud ont amplifié le dysfonctionnement de nombreuses infrastructures d'irrigation dont certaines se sont retrouvées en très mauvais état.

Dans la province du Limpopo, 171 petits périmètres irrigués sont moribonds et inexploités depuis plusieurs années. Les raisons invoquées sont la conception inadaptée des infrastructures, le manque de gestion, un savoir faire technique inadapté (aussi bien du côté des bénéficiaires que des agents de vulgarisation agricole du gouvernement), le manque de participation de la population, des institutions inadéquates et un système de tenure foncière inappropriée¹⁴.

Ainsi, les petits périmètres irrigués doivent maintenant faire face aux coûts de fonctionnement et de maintenance au fur et à mesure que le désengagement de l'Etat progresse. Le processus de transfert (Irrigation Management Transfert) en cours dans les zones pilotes de la province du Limpopo sous la direction du Département provincial de l'Agriculture (LDA), vise, avec la participation des communautés, à :

- Réhabiliter les infrastructures
- Etablir des entités locales de gestion (Water User Associations)
- Accompagner le transfert avec de conseils techniques.

Cependant, il a été constaté que le Water Act affecte différemment les périmètres irrigués en zones d'agriculture commerciale anciennement blanches où les agriculteurs sont déjà très organisés et prêts à relever les défis d'une gestion décentralisée dans laquelle ils se retrouvent à jouer un rôle important. Cela semble beaucoup plus délicat en revanche dans les anciens *homelands* où l'Etat a toujours subventionné les infrastructures et leur fonctionnement laissant peu d'initiatives aux petits agriculteurs (construction et maintenance

¹² (Department of Water Affairs and Forestry, 1999)

¹³ (Leestemaker, 2000)

¹⁴ (Perret, 2002)

des infrastructures, gestion de la distribution de l'eau, subventions sur l'eau, conseils techniques...). Ceci s'explique notamment par des systèmes agraires, hérités du régime de l'apartheid, totalement différents dans les deux zones.

Les anciennes zones blanches sont insérées dans l'économie marchande et fortement liées au secteur para-agricole : les banques pour le financement, l'industrie agro-alimentaire pour les débouchés, les grands groupes agro-industriels pour les intrants et les instituts de recherche pour l'innovation qui ont fait de cette agriculture une agriculture de pointe au niveau international. A l'inverse, l'agriculture de subsistance des anciens homelands est en dehors des circuits de commercialisation et a toujours bénéficié d'appuis directs très paternalistes du gouvernement (largement inférieurs, néanmoins, aux subventions accordées à l'agriculture blanche durant le régime d'apartheid au travers de financements privilégiés, de filières réservées et d'investissements publics notamment le réseau routier...)

La politique sectorielle de l'eau mise en place actuellement par le gouvernement Sud Africain suit largement les grandes orientations du processus de transfert de gestion de l'irrigation (Irrigation Management Transfer) qui incite fortement à la mise en place d'une Gestion Participative de l'Irrigation. Cette dernière repose sur le développement de capacités locales qui impliquent l'émergence d'acteurs sociaux. La construction collective d'institutions (modalités de régulation et structures) se fait à mesure qu'apparaissent de nouvelles opportunités, provoquant ainsi un agencement différent de la société. Cela dépend essentiellement de la connaissance qu'ont les acteurs de leur propre situation (*cognitive process*), de la façon dont les sociétés perçoivent ces nouvelles opportunités et les défis qui les entourent. Dès lors, « l'innovation managériale » que représente le transfert de gestion doit être portée par une construction sociale impliquant les usagers dans un réel processus participatif.

A l'échelle de Mashushu, la mise en place d'un comité d'irrigation pour la gestion du périmètre irrigué semble issue d'une forte volonté locale de changer la gestion sociale de l'eau et d'établir une institution capable de faire respecter un tour d'eau et d'organiser la maintenance. Elle se rapproche en cela des objectifs généraux du Water Act et paraît s'affranchir peu à peu du poids des structures sociales anciennes. Cependant, en s'intéressant de plus près à l'organisation et la fonctionnalité de ce comité d'irrigation, on s'aperçoit rapidement que ce dernier est encore balbutiant, peu formel et peu fonctionnel. Il reste fortement marqué par le statut social de quelques agriculteurs et il en résulte un manque de transparence, de représentativité, de légitimité, de reconnaissance juridique et de responsabilité.

Par ailleurs, il est intéressant de souligner l'apparent paradoxe d'une perte de pouvoir des autorités traditionnelles au travers de ce processus de participation accrue des usagers et dans le même temps d'un attachement renouvelé voire renforcé à ses mêmes autorités par les populations locales dès lors qu'un changement intervient trop rapidement (influence persistante du système coutumier).

A l'inverse, au niveau national, le gouvernement s'appuie sur la mise en place d'Associations d'Usagers de l'Eau (Water Users Associations) afin de soutenir la petite agriculture noire et permettre son développement. Ces institutions sont comprises comme des interlocuteurs formels, légalement reconnus, et capables de supporter un processus d'enregistrement des individus préalable à la mise en place d'une tarification de l'eau.

Cette volonté politique de transfert de gestion des périmètres irrigués aux usagers au travers d'une participation accrue de ces derniers peut aussi s'expliquer par la volonté du gouvernement à transférer le coût de cette gestion aux usagers eux même. Ce transfert de gestion semble nécessaire et l'état semble, apparemment, prêt à en payer le prix avant de pouvoir y « gagner » quelque chose (par exemple, le programme de revitalisation des petits périmètres irrigués, RESIS, qui apparaît comme un préalable indispensable pour le transfert

de gestion, est mené par le gouvernement avec un budget de 1,08 milliards de Rands sur 6 ans¹⁵).

Cette politique « sociale » (visant à rompre avec la politique d'apartheid, permettre aux populations défavorisées et exclues de revenir dans le processus de décisions, d'avoir la possibilité d'être représentés et de défendre leurs intérêts...) apparaît comme la voie sud africaine pour concilier la volonté de développement d'une part et les objectifs d'une politique économique néo-libérale en phase avec le contexte mondialisé actuel d'autre part.

Dans le même temps, l'état mène une politique d'aides directs avec injection d'argent « frais » dans les communautés via allocations sociales et pensions de retraite. Cette volonté de dynamiser l'économie et l'initiative locale n'induit cependant pas pour le moment l'effet escompté. Dans le cas de Mashushu, les allocations sociales et les revenus d'emploi extra-agricole représentent la plus importante source de revenu pour plus de 70% des foyers sans pour autant participer à un processus d'intensification de l'agriculture et à une augmentation de l'investissement social (au travers d'une participation accrue) dans le périmètre irrigué.

Mais, le fait que l'argent « frais » mensuel (des allocations sociales par exemple) ne soit pas investi mais immédiatement consommé semble avant tout lié à un problème de structuration économique et financière de l'environnement local. En effet, de ce manque de structuration du milieu ne résulte que très peu d'opportunités. Cela se construit avec le temps. Et la démocratie sud africaine n'a que 10 ans. Le transfert du périmètre pourrait être un exemple intéressant d'opportunités d'investissement. Les allocations sociales et autres subventions peuvent se révéler une chance que populations et développeurs doivent saisir pour amorcer une économie locale plus dynamique, outre le fait qu'elles permettent de remettre à flot nombre de situation d'extrême pauvreté. Ainsi, elles peuvent être considérées comme une donnée désormais stable qui pourrait servir de levier. Les communautés rurales ne sont pas exclues de la nation, elles sont entièrement consciente de la richesse du pays qu'elles ont contribué à construire et attendent une redistribution.

A travers cette analyse, on peut mettre en évidence que les rapports sociaux historiquement construits sur les bases du régime d'apartheid, la faiblesse des dynamiques collectives locales constitutive des zones des anciens bantoustans et les retards technico-économiques accumulés par la communauté noire en général, à Mashushu en particulier, limitent et conditionnent la capacité effective de représentation et de participation de l'Association d'Usagers de l'Eau aux processus décisionnels de gestion de l'eau tels qu'ils sont proposés dans la politique sectorielle nouvellement instaurée.

Enfin, il est important de noter à ce propos que le phénomène d'auto exclusion par conditionnement et déstructuration sociale, hérité du régime d'apartheid, qui freine l'initiative de la communauté noire et leur participation à la gestion des ressources se trouve aussi renforcée par le fait que les instances régionales de gestion instituées par le Water Act de 1998 (Catchment Management Area, Oliphant River Basin Board...) sont beaucoup plus adaptées aux organisations pré-existantes dans les zones d'agriculture commerciale (Irrigation Boards en charge des grands périmètres irrigués « des anciennes zones blanches »). Même si elle se veut comme volontairement « participatives » (dans le sens où elle encourage la participation de tous les usagers) et ouvertes aux communautés des petits agriculteurs noirs, elles demeurent fortement contrôlées par les tenants de l'agriculture commerciale.

L'enjeu, à présent, est d'encourager l'émergence d'une dynamique créative dans les communautés rurales noires. La participation dans un processus de développement d'exclus du développement est en soi une gageure et c'est à ce niveau que repose une grande partie de la responsabilité des agents de développement par delà les politiques.

¹⁵ Budget speech by MEC for Agriculture, Dr Pa Motsoaledi, Limpopo Provincial Government, 28 June 2004, (<http://www.info.gov.za/speeches/2004/04070708151001.htm>).

Dans le cas de Mashushu, l'Université du Limpopo par son Centre d'Appui aux Communautés Rurales (CRCE), le Département de l'Agriculture du Limpopo (LDA), par son programme d'appui aux initiatives de base (BASED) accompagnent la dynamique de changement initiée depuis quelques années. La participation résultant d'un rapport de forces modelé par l'histoire, il est important que les usagers, et les communautés rurales de manière plus générale, d'approches participatives en constitution de comité d'irrigation, de comité d'irrigation en Association d'Usagers de l'Eau avec ses contrats de maintenance avec l'agence de bassin changent peu à peu les rapports de force et écrivent une nouvelle histoire.

En résumé, la situation actuelle de Mashushu pourrait être considérée comme une communauté rurale où l'organisation sociale est certes dominée par l'autorité tribale qui gèle les initiatives organisationnelles, mais aussi soumise à des politiques nationales créant de nouvelles opportunités (notamment économiques) de nouveaux espaces (de gestion, de négociation...) encore non exploitées. Elle est, en parallèle, accompagnée par des institutions de vulgarisation, engagées à ses côtés, dans la recherche-action de nouvelles formes de gouvernance locale.

II. Un processus de transformation participative des organisations locales de gestion appuyé par des institutions publiques d'encadrement et une nouvelle législation

Une gestion sociale de l'eau locale historiquement construite et en pleine mutation.

Le périmètre irrigué a été transféré à la communauté rurale de Mashushu en 1964 sous contrôle étroit d'agents étatiques. La gestion de l'eau y sera initiée et organisée par le gouvernement jusqu'au début des années 1990. Cependant, cette gestion de l'eau était organisée à l'échelle du périmètre mais pas de la parcelle. Ainsi, il n'y avait pas de tour d'eau formellement établi. Enfin, l'organisation de la maintenance des infrastructures était quasi inexistante et laissée à la charge des agriculteurs sans que cela ne leur soit non plus clairement signifié.

Du fait de cette gestion globale et « éloignée », certains agriculteurs ont rapidement contrôlé la gestion effective du périmètre. Leur position, au travers de la gestion de l'accès et de la distribution de l'eau, reposait alors essentiellement sur le statut social. L'ancienneté du peuplement et la participation aux travaux de réhabilitation du périmètre à l'origine étaient des critères importants pour déterminer l'attribution des parcelles dans le périmètre (plus ou moins proches du canal primaire). Le genre et des réputés « pouvoirs de sorcellerie » étaient des critères importants dans l'organisation de la distribution de l'eau avec des fréquences d'irrigation variables. Enfin, la proximité avec les Autorités Tribales déterminait une certaine légitimité pour « organiser ou superviser » l'activité agricole irriguée comme réunir les intéressés pour décider d'actions communes.

Dans les années qui précédèrent la chute de l'Apartheid en 1994, le contrôle de l'état sur les terres irriguées et sur les limites du périmètre est devenu de plus en plus faible. La surface cultivée et irriguée en dehors des limites officielles du périmètre irrigué a été augmentée avec saturation du réseau physique nécessitant son extension : réhabilitation du canal primaire existant et construction d'un nouveau canal. Dans ce contexte de pression accrue sur la ressource disponible le rôle du statut social et des règles informelles a été amplifié pour sécuriser un accès régulier à l'eau à certains. La gestion de l'eau semble s'être transformée en une gestion de moins en moins équitable, provoquant l'exclusion des plus faibles.

A partir des années 2000, cette dérive est contrecarrée par de nouvelles interventions des institutions d'encadrement extérieures qui facilitent et supportent l'émergence d'une nouvelle organisation sociale. Tout d'abord, le lancement du programme BASED

(Broadening Access to Services and Extension Delivery, Elargir l'accès aux services et à la vulgarisation) dans la vallée de Ga Mampa (2001) soutenu par le Département de l'Agriculture du Limpopo (LDA), a abouti d'une part à la formation du vulgarisateur agricole local à une approche plus participative de ses interventions et d'autre part, à l'élection d'un comité d'irrigation pour la gestion du périmètre de Mashushu. Par la suite en 2003, le LDA a commencé la réhabilitation d'ouvrages du réseau physique (prise du 2^{ème} canal avec construction d'un petit barrage en gabions par les agriculteurs et des agents du LDA, par exemple). En 2004, le LDA lance à l'échelle de la province son programme de revitalisation des petits périmètres irrigués (RESIS) qui intègre des interventions sur le réseau physique et la gestion de l'eau par les usagers, Mashushu est intégré aux sites d'intervention. En parallèle à partir de 2003, l'université du Limpopo (UL) a appuyé la communauté de Mashushu par un diagnostic de développement participatif.

→ Schéma synthétique d'une approche participative pour appréhender les systèmes de productions et la gestion sociale de l'eau p. 17.

Le processus participatif et les interventions extérieures ont initié de nouvelles dynamiques sociales tant au sein du périmètre qu'au sein de la communauté rurale. Les agriculteurs ont commencé à former un groupe réfléchissant sur comment améliorer la situation locale. La gestion sociale de l'eau a été remise au cœur du dialogue des agriculteurs avec une moindre focalisation sur les infrastructures. Cela s'est traduit par une réflexion des agriculteurs sur les principales fonctions du nouveau comité d'irrigation et sur l'élaboration d'un tour d'eau.

Une distorsion importante entre attentes gouvernementales et réalités locales

La situation du périmètre irrigué de Mashushu illustre un processus d'organisation de la gestion sociale de l'eau au fil du temps et au gré des événements comme c'est le cas pour la plupart des petits périmètres irrigués en Afrique du Sud, et plus particulièrement dans la province du Limpopo. Au moins la moitié des petits périmètres irrigués se trouvent dans cette province (171 périmètres représentant 20 000 à 22 000 ha) selon une étude menée par Bembridge (1999). La forme d'organisation sociale varie d'une situation à une autre, notamment de part le type d'infrastructures physiques, leur importance, la surface irriguée et les relations plus ou moins étroites qu'entretiennent ces périmètres avec le gouvernement.

Cependant, il semble que leur caractéristique commune soit la distorsion entre les attentes du gouvernement et de sa politique de l'eau et la réalité locale. Le fossé entre situations locales et politiques nationales se rencontre dans la majeure partie des pays impliqués dans un processus de transfert de la gestion de l'irrigation (Irrigation Management Transfer). Le contexte Sud Africain garde une spécificité.

La majeure partie du nouveau cadre législatif Sud Africain est récente et doit résoudre les inégalités héritées du régime raciste. Le gouvernement a lancé d'importantes réformes s'attaquant à réduire la pauvreté rurale et les inégalités (nouvelle loi foncière, nouvelle loi sur l'eau, amélioration des services en zones rurales...). L'ensemble de ces décisions politiques fut accompagné par un cadre législatif adapté et destiné à rendre possible la mise en œuvre de ces réformes. Ce processus fut largement influencé par le courant de pensée actuel dominant au sein de la « communauté des développeurs », qui repose majoritairement sur une approche participative et les principes d'Ostrom (1992) pour façonner des institutions autogérées et durables. Cela vise essentiellement à supporter le développement des petits périmètres irrigués et à faciliter les processus de désengagement de l'Etat. Dans le même temps, une politique économique libérale fut choisie par le gouvernement sud africain, tout en compensant les effets d'accumulation de valeur ajoutée par une minorité qu'engendre le marché par l'impôt et une redistribution au travers d'allocations sociales. Ainsi, considérant que la mise en œuvre d'un tel corpus législatif est récente (moins de 10 ans) et que règne un climat général de critiques constructives envers

ce nouveau cadre légal (dans le but de l'améliorer)¹⁶, il est intéressant de souligner une telle distorsion entre les échelles nationales et locales. La difficulté repose certainement dans la mise en œuvre des nouvelles directives par des agents administratifs peu nombreux et peu formés à intervenir, comme le présuppose la nouvelle politique, en appui à des usagers autonomes mais qui ne le sont pas encore.

Les enjeux de la lente émergence d'une nouvelle politique publique

Considérant la mise en œuvre du transfert de gestion de l'irrigation, il est important de noter l'importance des enjeux d'un tel processus dans la construction d'une politique publique. Cette dernière, pour être efficace et insuffler un véritable développement, doit passer par une « co-construction » et donc une participation revendiquée des acteurs impliqués. Comme le mettent en évidence les recherches menées par le Réseau Impact¹⁷, il ne s'agit en aucun cas d'un retour à une stratégie de développement uniquement déterminée par l'Etat, les politiques étatiques ayant déjà largement fait preuve d'une faible efficacité par le passé. Pour être réalistes et efficaces, les politiques publiques ne peuvent pas être le seul fait de l'Etat. Et pour *passer d'étatiques à publiques, elles doivent se construire progressivement comme un compromis entre les différents acteurs sociaux concernés, l'Etat continuant à jouer le rôle pivot d'impulsion et d'arbitrage mais renonçant à son monopole*¹⁸.

Or, les agriculteurs issus des communautés rurales noires historiquement défavorisées et exclues ont aujourd'hui une faible capacité à se poser comme des acteurs sociaux de cette « co-construction ». Leur donner les moyens de devenir des acteurs influant ce transfert de gestion représente un enjeu énorme dans la province, et l'une des raisons de l'intervention de l'Université du Limpopo et de ses partenaires¹⁹ à Mashushu.

Cette action, qui s'inscrit dans un cadre régional ou provincial en agissant de manière coordonnée avec le Département de l'Agriculture de la province du Limpopo (LDA) est directement en prise avec les politiques de décentralisation. Ces dernières créent, avec les pouvoirs publics locaux, un nouveau niveau de légitimité en matière de développement local. Les collectivités locales représentent dès lors un acteur stratégique et un nouvel espace public de collaboration entre les pouvoirs locaux et les acteurs sociaux²⁰. Par ailleurs, le renforcement des collectivités locales peut être le lieu décisif d'apprentissage du politique et de la participation, le lieu aussi de l'expression première des dynamismes sociaux nécessaires à l'implication des populations dans les politiques²¹. Cela met, ainsi, en évidence l'importance de telles arènes socio-politiques dans la recherche d'un développement local efficace et participatif.

Cependant, la mise en œuvre de telles politiques publiques « décentralisées » à l'échelle des collectivités locales pose rapidement la question des moyens financiers et humains. La décentralisation des moyens financiers de l'Etat est-elle réellement effective et

¹⁶ Critiques émises par les différents instituts de recherche présents en Afrique du sud (IWMI, ARC, CIRAD...) en ce qui concerne son application locale, particulièrement en situation de « petite agriculture familiale ».

¹⁷ Initiative lancée en 1996 visant à la compréhension des évolutions des sociétés africaines face aux politiques d'ajustement structurel, et remanié sous forme de Réseau en décembre 2002 pour tenir compte de la nouvelle phase ouverte par la mise en œuvre des Cadres stratégiques de lutte contre la pauvreté. Pour le moment constitué d'une vingtaine de membres : des décideurs (MAE, AFD), des chercheurs (IRD, CIRAD, CERI, DIAL), des universitaires (IEDES, Université de Saint Quentin, Université Paris 1), des opérateurs (IRAM, GRET) et des acteurs de la coopération décentralisée (CUF ; le Haut Conseil de la Coopération internationale). Pour plus d'informations, site Internet www.reseau-impact.org.

¹⁸ Réseau Impact (2005), Offre de collaboration sur les politiques publiques de lutte contre la pauvreté et les inégalités, *l'influence des acteurs sociaux sur la gouvernance d'Etat*

¹⁹ Le GRET (Groupe de Recherche et d'Echanges Technologiques) appuie depuis 2002 le Centre d'Appui aux Communautés Rurales de l'Université du Limpopo dans cette optique.

²⁰ Issues des rencontres du Réseau Impact sur *L'importance du local et des collectivités décentralisées dans la lutte contre la pauvreté et les inégalités*.

²¹ Idem

suffisante ? Le recours à une fiscalité locale (taxes et impôts) est-il admis voire encouragé par l'Etat pour pallier au manque, mais surtout est-il possible eu égard au contexte dans lequel il s'insère ?

Dans le cas Sud Africain, et plus particulièrement dans le cas de la province du Limpopo, il semble que cette décentralisation des moyens financiers soit effective mais le problème serait plutôt qualitatif. Le gouvernement provincial n'arrive pas à « consommer » tout son budget ; il y a des ressources mais persistent des difficultés à les utiliser. Cette particularité est spécifique à l'Afrique du Sud, riche mais avec des capacités limitées héritées du passé.

Par ailleurs, l'Etat Sud Africain pensait pouvoir déjà s'appuyer sur des structures mises en place à l'échelle locale au travers des nouvelles lois. La plupart de ces institutions sur lesquelles l'Etat voulait s'appuyer pour mettre en œuvre sa politique de développement « participatif » peuvent être considérées comme des « créations ex-nihilo » dont la réelle « émergence sociale », c'est-à-dire leur acceptation et leur appropriation par les populations ciblées, est encore loin d'être acquise. On constate, à ce propos, que l'Etat serait en train de renoncer à ces structures (telles que les Catchment Management Agencies, les Agences de Gestion à l'échelle d'un bassin hydrographique) pour en rester à une gestion directe par le DWAF, le ministère de l'Eau et de la Forêt (Department of Water Affairs and Forestry) de la plupart des périmètres avec à leur tête une association de gestion locale, marquant ainsi un retour à la planification.

Ainsi, les nombreux problèmes posés par la mise en œuvre de la loi reposent peut-être dans l'émergence, trop lente pour les dirigeants politiques pressés par leur électorat, de nouvelles règles de gouvernance. Le développement d'un système de vulgarisation pertinent pourrait y pallier mais c'est aussi une mesure lente. La temporalité du « citoyen électeur », qui se retrouve incarnée dans l'activisme exacerbé des dirigeants politiques élus, et la temporalité du « citoyen acteur participatif » qui se retrouve incarnée dans l'accompagnement mesuré des processus d'émergence, ne sont pas les mêmes mais n'en sont pas moins toutes les deux légitimes et au cœur de chaque individu.

De plus, ce programme, *mené par les agriculteurs et « facilité » par le Département Provincial de l'Agriculture*²², en poursuivant les objectifs du transfert de gestion de l'irrigation (Irrigation Management Transfer) aux communautés locales n'est pas sans poser quelques interrogations.

S'il tend à favoriser une « revitalisation économique » dans des zones rurales historiquement défavorisées et l'émergence d'une nouvelle gouvernance locale, via des formations sur la gestion de l'eau (appuis techniques et institutionnels) sur les activités de maraîchage et sur la micro finance, il ne doit pas occulter le but ultime poursuivi, à savoir le désengagement progressif de l'Etat et la mise en place d'une tarification de l'eau. Les Associations d'Usagers de l'Eau se doivent donc de devenir autogérés, et par là même, chaque usager de l'eau aura à payer une redevance pour la maintenance des infrastructures hydrauliques. A l'échelle de la vallée de Ga Mampa, où se situe le petit périmètre irrigué de Mashushu (ainsi que deux autres, Fertilis et Vallis) il semblerait que ces coûts d'irrigation supplémentaires, difficilement supportables par la majeure partie des foyers, viennent à peser lourdement sur la bonne mise en œuvre du programme RESIS et sur la gestion future du périmètre irrigué²³.

L'exemple de Mashushu est intéressant. En replaçant ce petit périmètre irrigué dans les rails du nouveau cadre légal national et dans le processus global de développement, cela permet à la fois d'élaborer de nouvelles hypothèses pour des actions de développement

²² Budget speech by MEC for Agriculture, Dr Pa Motsoaledi, Limpopo Provincial Government, 28 June 2004, <http://www.info.gov.za/speeches/2004/04070708151001.htm>.

²³ Chiron, D. (2005) *Impact of the small-scale irrigated sector on household revenues of the rural community of Ga Mampa valley (Mafefe Ward). Contribution to the irrigation management transfer study of the small-scale irrigation schemes, Limpopo province - South Africa*. CNEARC / University of Limpopo / GRET.

local, de fournir des données précises à l'échelle locale et des outils méthodologiques adaptés pour mettre en œuvre les orientations nationales.

Une nouvelle approche participative

L'aspect novateur de la démarche est, d'une part, d'associer les principes théoriques de gestion de ressources communes (principes de bonne gouvernance d'une gestion locale des ressources naturelles comme la décrit E. Ostrom²⁴) à une expérience en recherche / action sur la question des modalités opérationnelles de gestion des ressources. Et d'autre part, de ne se satisfaire ni du marché (modèle en place dans les exploitations commerciales des anciennes fermes blanches) ni de la gestion dite traditionnelle par la communauté comme seuls régulateurs. Le participatif est décliné au travers d'une **approche « acteur »** toujours en devenir qui nécessite l'identification des groupes d'intérêts, des conflits, des enjeux et des acteurs eux-mêmes.

L'enjeu réside ainsi sur la transcription de principes en modalités fonctionnelles de gestion. Notre positionnement est intermédiaire entre une approche « *top-down* » qui fournirait clé en main les nouvelles règles du jeu et une approche « *bottom-up* » simplifiée basée sur un tour de table et une déclaration d'intention de la communauté quant à des modalités respectueuses des intérêts de chacun.

« *Top-down* » dans la mesure où il considère les contraintes techniques et institutionnelles véhiculées implicitement par un système irrigué, il refuse toutefois de considérer que les modalités de mise en œuvre puissent n'être que des directives externes élaborées par des techniciens ou autres intervenants externes. La construction des règles collectives est immanente à l'émergence d'une institution locale selon un principe d'ancrage social des modalités de gestion comme condition de leur effectivité.

« *Bottom-up* » certes, mais en assumant la complexité et la vision politique de la société dans laquelle l'émergence a eu lieu. Le postulat est de considérer que la structure d'encadrement n'aborde pas une « communauté » au travers d'activités prédéfinies, mais en interaction avec des individus, des groupes d'intérêts, des acteurs. Le risque est le monopole de la parole et de la ressource au détriment du plus grand nombre d'où l'importance du cadre démocratique où le citoyen électeur influence les règles et les limites de la gestion locale. Afin d'être en mesure de travailler sur la question interne à la communauté du partage de la ressource et donc de la prise de décision quant à son affectation, notre approche participative est ainsi complétée et complexifiée en y intégrant une double dimension institutionnelle et politique.

La **dimension politique** intervient dans la mesure où la communauté n'est pas considérée comme le support d'un fonctionnement démocratique idéalisé, mais une société locale avec des enjeux de pouvoir, des conflits, des individus et des désirs. Prendre acte de cette complexité permet de se confronter aux difficultés de la gestion partagée des ressources collectives et d'aborder les contraintes de l'opérationnalité et de l'équité des mesures décidées a priori de manière participative.

La **dimension institutionnelle** est mobilisée dans la mesure où il est vain de considérer les règles par rapport aux seuls principes et fonctions qui en justifient la forme et l'existence, si l'on n'aborde pas également le problème de leur mise en œuvre effective. La méthode opératoire utilisée pour affiner l'opérationnalité des règles construites collectivement est l'itération. Il s'agit en fait de concevoir la construction des règles régissant chaque fonction élémentaire comme un processus itératif en perpétuelle évolution. Le processus est construit selon un cycle qui alterne quatre phases de discussion/décision, suivi/contrôle, réflexion/évaluation et discussion/modification. En premier lieu, une règle est discutée puis approuvée collectivement. Puis, le projet et des représentants de la communauté en observent la réalité de la mise en œuvre. En troisième étape du cycle,

²⁴ Ostrom E. (1992), *Crafting institutions for self-governing irrigation systems*, ICS Press, Institute for contemporary studies, San Francisco, 111 p

une nouvelle discussion est de nouveau organisée afin de confronter la réalité à la volonté initiale et les conséquences pratiques qu'on en tire. Enfin durant une quatrième phase qui rejoint la première, les règles sont modifiées et adaptées au cours d'un nouveau cycle de discussions et de décisions. Cette approche permet d'introduire l'idée que les institutions sont des construits vivants qui évoluent en fonction des besoins et contraintes de leurs utilisateurs.

La formulation de la démarche de recherche/action participative est d'accompagner les acteurs organisés ou en émergence (et non la communauté indiscriminée) dans leur construction progressive de règles de gestion de l'eau qui les satisfassent.

Cette approche est développée par le LDA à travers le programme BASED pour élaborer une vulgarisation agricole participative et soutenir les organisations sociales locales, de même, que par l'université du Limpopo et les programmes de recherche-action en site pilote du CRCE. Il s'agit en quelque sorte de faire converger les appuis concomitant de programme de développement local (BASED/LDA et CRCE/UL) et de programmes politique sectoriels de transformation de la petite agriculture irriguée de la province (via LDA/RESIS).

Cette démarche se matérialise par exemple à travers l'association des étudiants de Master of Science en vulgarisation agricole (Agricultural Extension) à la réflexion et l'élaboration de nouveaux outils méthodologiques pour faciliter la mise en œuvre du Water Act et développer la « petite agriculture familiale ». Il semble que ces différentes actions soient la clé d'une meilleure adéquation entre un cadre législatif national ambitieux et moderne et une situation locale souvent mal connue et en retrait des décisions nationales. Il ne faut, cependant, pas oublier que l'émergence d'un savoir, d'une connaissance et d'une conscience à l'échelle locale est la clé de voûte de toute action de développement se voulant participative. Faire devenir les agriculteurs, acteurs de leur propre développement peut paraître une évidence mais est encore bien loin d'être acquise et mise en application.

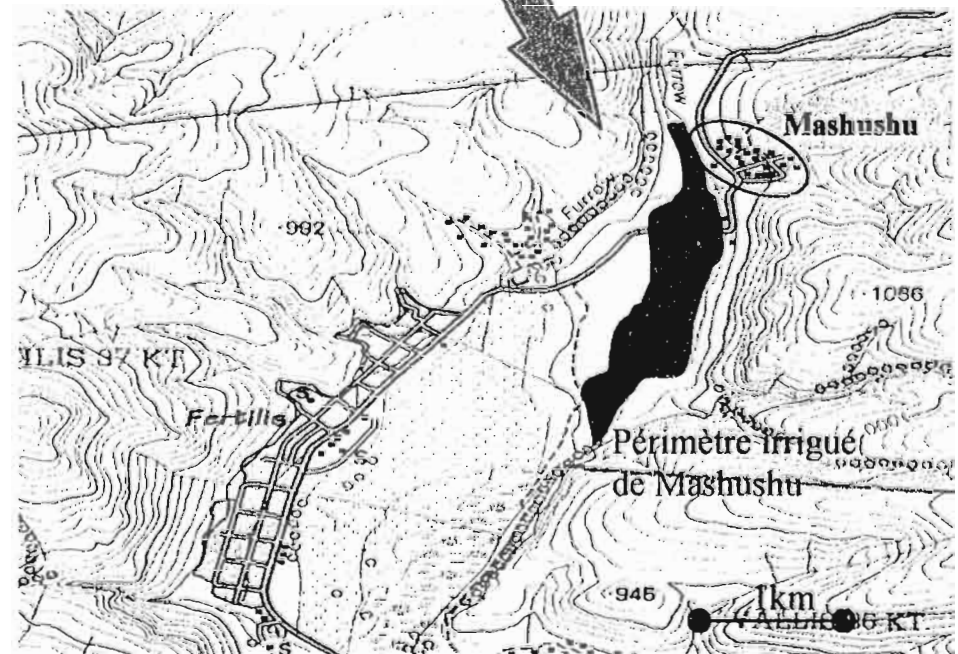
Ainsi, l'introduction d'une approche participative novatrice (Participative Rural Appraisal) a en partie débouché sur la mise en place de comités d'irrigation. Ces derniers ont fait place peu à peu à des Water User Associations et à l'établissement de contrats de maintenance avec la Limpopo Department of Agriculture au travers du programme RESIS (REvitalisation of Smallholder Irrigation Schemes). On assiste à un début de participation réelle des populations locales aux instances de gestion même si beaucoup de chemin reste à parcourir.

Les 9 Provinces de la République d'Afrique du Sud.



Carte 1 : Localisation de la zone d'étude

Zone d'étude



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Com. N° 22 -- atelier 4d (3)

Colloque : Pauvreté Hydraulique Et Crises Sociales
Perspectives de recherches et plan d'action

**L'irrigation dans le périmètre du N'Fis : difficile adaptation des petits fellahs
aux nouvelles conditions d'irrigation.**

Communication pour le colloque du 11 au 15 décembre 2005

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Resumé

La présente communication est un extrait des résultats d'une étude menée dans le périmètre du N'Fis entre septembre 2003 et juillet 2004. Elle a porté sur les conditions dans lesquelles l'irrigation est pratiquée dans ce périmètre irrigué et s'est faite à travers une analyse du service de l'eau prodigué aux usagers par l'Office Régional de Mise en Valeur Agricole du Haouz (ORMVAH) et de l'efficacité de fonctionnement de deux Associations des Usagers des Eaux Agricoles (AUEA) installées dans la zone.

Le choix de la zone d'étude a été motivé par plusieurs raisons parmi lesquelles une volonté de fournir des données de base fiables pour le projet ISIIIMM intervenant dans la zone.

Les résultats obtenus proviennent surtout d'observations et d'enquêtes réalisées sur le terrain à travers des entretiens menés avec les divers acteurs intervenant dans la gestion de l'irrigation, complétées par une riche recherche bibliographique.

Ces résultats font ressortir un service de l'eau affecté par une diminution criarde de la disponibilité en eau, un aménagement incomplet avec des infrastructures vétustes et un système de gestion lourd et complexe.

Selon le type d'usagers, ces facteurs affectent de façon variable l'accès à l'eau d'irrigation. Les uns, les plus riches sont en effet moins affectés car ayant les moyens de trouver des solutions individuelles et bénéficiant dans la pratique d'un traitement privilégié par rapport aux moins nantis. Ces derniers sont souvent contraints de désolidariser du réseau collectif devenu inapte à leur fournir l'eau nécessaire à la production. Ils se retrouvent ainsi plongés dans un cercle vicieux de non paiement des redevances, coupure de l'eau, chute de la production qui conduit certains à la décapitalisation et à l'abandon du périmètre irrigué dont l'aménagement était censé les y retenir en réduisant leur niveau de pauvreté.

Introduction : L'irrigation au Maroc : fer de lance du développement

L'agriculture irriguée est dans de nombreux pays et depuis quelques années soumise à des bouleversements. En effet, si elle a longtemps été caractérisée par une gestion de l'offre et une intervention quelque peu dirigiste des Etats (construction de barrages et aménagements et gestion de grands périmètres irrigués), on assiste depuis quelques années à un désengagement de ceux-ci vers une responsabilisation des usagers dans la gestion des grands périmètres irrigués.

Le Maroc n'échappe pas à cette vague de désengagement de l'Etat et les Associations des Usagers des Eaux Agricoles créées dans les périmètres irrigués en sont les organes moteurs.

En effet ce pays, qualifié de « *royaume de la grande hydraulique* » a basé son développement sur le domaine agricole à travers un ambitieux programme de construction de barrages qui l'a doté aujourd'hui de plus d'un million d'hectares irrigués.

Cette politique avait pour objectif de faire de l'agriculture principalement l'agriculture irriguée le moteur du développement du pays. Elle devait permettre entre autre une augmentation et une diversification de la production pour assurer l'autosuffisance alimentaire. Sur le plan social, l'agriculture irriguée devait constituer un moyen de retenir les populations rurales désireuses de tenter leurs chances dans des villes de plus en plus peuplées et de moins en moins aptes à fournir du travail à une population peu qualifiée.

Ainsi, dès l'indépendance on assiste à une course pour la construction de retenues d'eau à des coûts élevés. Les périmètres ainsi aménagés (souvent partiellement) sont gérés par l'Etat qui y dicte les assolements à pratiquer, y réglemente les normes d'exploitation.

Au fil du temps, les aménagements sont devenus de plus en plus coûteux (ceux qui ont été réalisés les premiers sont ceux qui demandent le moins d'investissement), l'entretien de ceux déjà construits revient aussi de plus en plus cher. C'est donc principalement pour des raisons économiques que l'Etat marocain à l'instar de beaucoup d'autres Etats s'est engagé vers un désengagement de la gestion des périmètres irrigués.

Le périmètre irrigué du N'Fis est l'un des grands périmètres où ce désengagement est en cours tant bien que mal. L'office régional de mise en valeur agricole du Haouz, chargé de la

gestion du périmètre est confronté à divers problèmes qui entravent son bon fonctionnement.

- augmentation de la population donc des besoins en eau ;
- diversification des secteurs utilisateurs de l'eau ;
- manque de moyens financiers pour l'entretien des réseaux, donc vétusté de ceux-ci ;
- manque croissant de la disponibilité due aux sécheresses.

Tous ces facteurs contribuent à influencer la qualité du service de l'eau fourni par l'ORMVAH à ses usagers-clients.

Comment la qualité de ce service influe sur l'accès à l'eau des usagers ? Qui sont ceux qui pâtissent le plus de cet état de fonctionnement ? Comment ils interviennent dans la gestion ? Tels sont les points qui seront traités dans cette communication.

1. L'irrigation dans le périmètre du N'Fis

1.1. Situation géographique du périmètre du N'Fis et caractéristiques de l'agriculture

C'est dans l'extrême ouest de la zone d'action de l'Office Régional de Mise en Valeur Agricole du Haouz que se situe le périmètre du N'Fis (voir Carte 1). Il s'étend sur les parties planes des bassins des oueds N'Fis et Bahja, qui sont des affluents de l'oued Tensift. Au sud le périmètre du N'fis est délimité par la route Marrakech-Guemassa tandis que les oueds N'Fis et Tensift constituent respectivement les limites ouest et nord.

Il s'étend sur une superficie de 21000 hectares. L'agriculture dans ce périmètre revêt trois (3) caractéristiques principales :

- la rareté des ressources en eau due en particulier à la faiblesse et l'irrégularité des précipitations ainsi qu'à la baisse des apports en eau provenant des barrages qui alimentent la plaine du Haouz ;
- une agriculture peu diversifiée et basée en grande partie sur la céréaliculture et l'oléiculture (40% de la superficie) ;
- une mosaïque de statuts fonciers (terres domaniales, terres melk, guich, collectives) ;
- et une structure foncière éclatée entre la micropropriété vivrière et l'exploitation moderne de plusieurs dizaines d'ha.

1.2. Historique de l'irrigation

L'irrigation dans le N'Fis est une pratique très ancienne. Des khetaras¹ sous les Almoravides au système moderne sous pression aujourd'hui, la technique d'irrigation y a connu une riche évolution qui a abouti de nos jours à la cohabitation sur le territoire de plusieurs ensembles de réseaux juxtaposés et/ou superposés. La carte n°5 montre cette superposition du réseau moderne au réseau traditionnel de seguias.

Dès le XI^{ème} siècle, l'irrigation est en effet pratiquée dans la plaine du Haouz. Elle se faisait en ce moment grâce à la technique des khetaras introduite et développée par les Almoravides. Plus tard, vers le XIII^{ème} l'irrigation se développe grâce aux seguias (voir carte n°2), technique introduite par les almohades. Celles-ci du fait de l'importance de la main d'œuvre requise pour leur construction et leur entretien sont des ouvrages construits et gérés par les Etats et les tribus. L'irrigation sera en grande partie assurée par ces deux types d'ouvrages jusqu'à l'époque coloniale.

¹ Les khetaras sont des galeries creusées dans le sol qui drainent les eaux captées dans la nappe phréatique et les conduisent à la surface irrigable par une pente régulière inférieure à celle du sol. C'est une technique très complexe qui, selon Mohamed El Faiz (2003) serait originaire de Babylonie au Nord de l'Irak et aurait été transmise grâce à l'Islam.

Au début du XX^{ème} siècle, la colonisation introduit de nouvelles techniques d'irrigation et modifie les règles de gestion. Elle introduit la technique des barrages avec la construction du barrage Cavagnac en 1935. Cette technique permet de régulariser les apports d'eau sur l'année. L'irrigation à partir de ces ouvrages est faite grâce à des lâchers décidés par l'Administration et selon un ordre de priorité préétabli. Les droits d'eau des agriculteurs sont fixés mais les règles de gestion sont favorables aux colons. Au sein des tribus et des douars des règles de distribution basées sur le lignage sont pratiquées.

A l'indépendance, l'Etat marocain opte pour une poursuite de la politique de grande hydraulique avec pour objectif principal d'irriguer plus d'un million d'hectares en l'an 2000 (objectif d'ailleurs atteint). Dans le périmètre du N'Fis, le barrage Cavagnac devenu barrage Lalla Takerkoust est surélevé en 1979 et le canal de Rcade construit en 1985 permet le transfert sur une distance de 118 km des eaux de l'oued Lakhdar vers le bassin du Tensift où est situé le N'Fis.

Dans les années 80 (de 1986 à 1993), l'Etat entreprend l'aménagement du périmètre du N'Fis par un réseau sous pression. La dénivellation naturelle est mise à profit pour fournir l'eau à des bornes d'irrigation installées en début de parcelles. La carte n°3 donne l'emplacement de ces bornes sur l'ensemble du périmètre du N'Fis.

2. A nouveau réseau moderne, mode de gestion nouveau

2.1. Structure du réseau : complémentarité entre réseau moderne et réseau traditionnel

2.1.1. Le réseau traditionnel

Avant la mise en service du barrage Lalla Takerkoust, le système hydraulique de base était celui de la distribution traditionnelle de l'apport de l'oued N'fis. Les volumes d'eau étaient dérivés de l'oued par des ougougs² dans des canalisations creusées dans le sol arable (seguias) qui ont pour but de conduire l'eau de l'oued vers les terres cultivables situées en contrebas. Des canaux creusés d'un degré inférieur (mesrefs) captent l'eau des seguias et l'amènent au niveau des parcelles où elle est répartie dans des micro-canalisation (arroseurs).

Après la mise en service du barrage, l'irrigation dépendait des lâchers effectués par l'administration coloniale. Les seguias sont alors classées selon l'ordre d'alimentation suivante :

- les seguias d'hypothèque constante alimentées jusqu'à hauteur de 1150l/s,
- au-delà de 1150 l/s jusqu'à 4500 l/s les seguias dites de premier rang sont alimentées,
- si le débit est supérieur à 4500 l/s, ce sont alors les seguias de crue ou de deuxième rang qui sont alors alimentées.

Aujourd'hui encore, certaines de ces seguias assurent l'alimentation en eau des zones du périmètre qui ne sont pas aménagées en réseau sous pression. Ce sont les seguias dites réalimentées. En outre, des seguias de crue construites par les habitants de certains douars et rattachées aux oueds Bahja et N'Fis permettent de dériver les eaux de crue pour l'irrigation de leurs champs respectifs. La carte n°2 présente le réseau traditionnel de seguias du périmètre du N'Fis.

Le long de la partie aval de la seguia, l'eau est répartie dans un réseau de mesrefs selon une organisation de tour d'eau propre à l'unité hydraulique que constitue le périmètre de la seguia.

2.1.2. Le réseau moderne sous pression

² Les ougougs sont des barrages de dérivation situés sur l'oued, généralement construits en terre et branchages

Le réseau sous pression de la rive droite du N'Fis a été construit entre 1986 et 1993 ; il est desservi en eau par le barrage Lalla Takerkoust et le barrage Hassan 1^{er} par l'intermédiaire du Canal de Rocade. Le barrage Lalla Takerkoust alimente le bassin 513 tandis que le Canal de Rocade alimente le bassin 520.

De ces bassins partent les conduites principales souterraines du réseau sous-pression subdivisé en secteurs (N1, N2, N3, N4), et sous-secteurs qui sont alimentés par des bornes équipées de limiteurs de débit et compteurs. Ces bornes desservent des unités foncières appelées blocs d'irrigations qui sont exploitées par un nombre variable d'irrigants.

Dans les zones de micropropriété, on assiste à un regroupement d'un nombre important d'irrigants autour d'une même borne. Les grandes propriétés bénéficient généralement de bornes individuelles. Les bornes sont commandées par des chambres de vannes installées sur les conduites principales et secondaires qui permettent de fermer un tronçon entier du réseau. L'intervention de l'Administration s'arrête au niveau de la borne, la gestion de la ressource en aval de celle-ci devant être théoriquement à la charge des irrigants. Cet aménagement devait se substituer au réseau traditionnel de seguias et devait permettre la pratique de l'irrigation sous pression (aspersion ou localisée) qui n'est réellement présente, dans le cas du N'Fis, que sur environ 10% de la superficie. En effet, la majorité des agriculteurs acheminent l'eau des bornes à leurs parcelles dans les *mesrefs* du réseau traditionnel. Le parcellaire est un parcellaire traditionnel, non remembré.

2.2. Règles de gestion

2.2.1. Réseau traditionnel : Cas de la seguia Jibelia, distribution égalitaire entre ayants droits

La seguia Jibelia³ est une seguia de la rive droite du N'Fis. Elle prend source sur l'oued N'Fis et permet d'irriguer une superficie d'environ 3000 ha comprise entre la seguia Sarro et la seguia souihla (voir carte 4). Elle était avant la mise en place du système sous pression classée parmi les seguias dites de deuxième rang, c'est à dire que son alimentation en eau se faisait après celle des seguias d'hypothèque constante et de premier rang, donc si le débit est supérieur à 4500l/s.

En plus de l'alimentation directe à partir de l'oued, la seguia Jibelia est, le long de son cours alimentée par l'intermédiaire des seguias de crue construites sur l'oued N'Fis. Avant la mise en place du système sous pression, ces seguias de crue, alors appelées seguias de deuxième rang bénéficiaient des lâchers à partir du barrage après l'alimentation des seguias de premier rang.

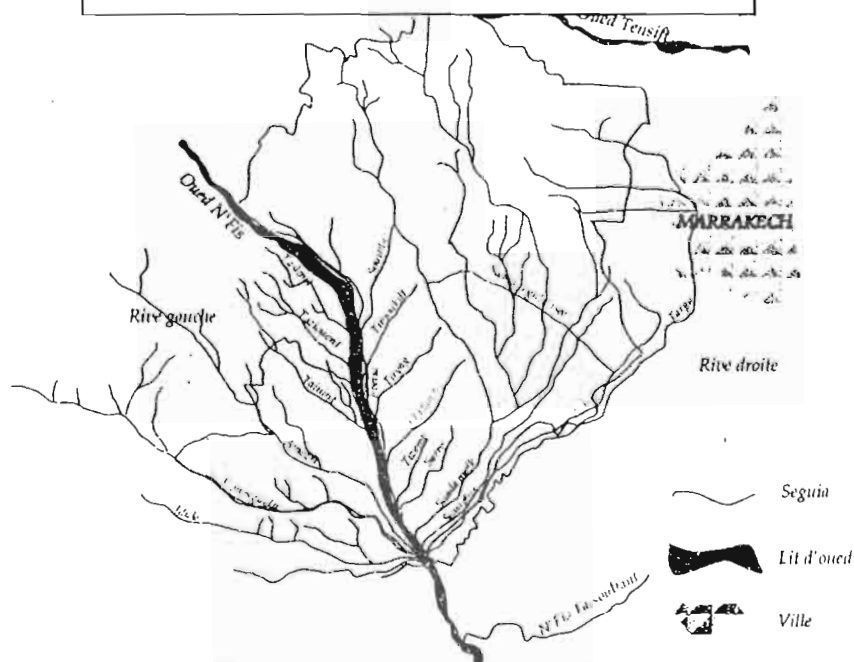
Le long de la seguia, l'eau était distribuée entre les *douars*⁴ selon des droits acquis lors de leur installation par les autorités avec pour principe comme le dit Paul Pascon "*de parvenir à un partage équitable de l'eau*". Au sein de chacun des douars, la répartition entre ayants-droits suit toujours la même distribution égalitaire, les facteurs qui ont entraîné la différenciation étant surtout la démographie et les transactions. Des amazzals⁵ sont chargés de veiller au respect des règles entre douars et au sein des douars.

³ Littéralement signifie qui descend de la montagne

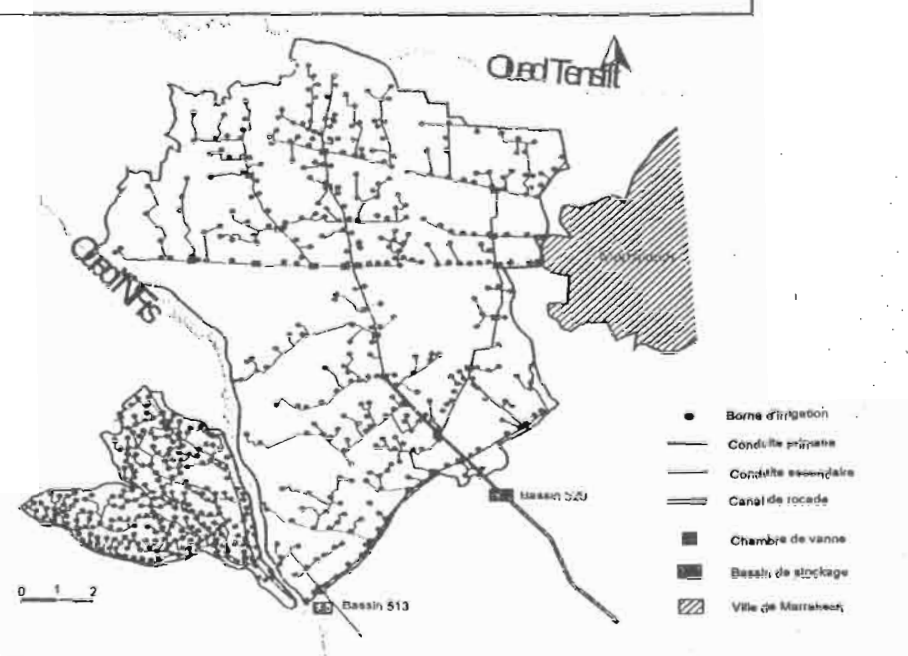
⁴ Le douar est un regroupement d'habitations, un hameau, un village.

⁵ Terme berbère désignant la personne chargée de la surveillance de la distribution de l'eau entre ayants droits

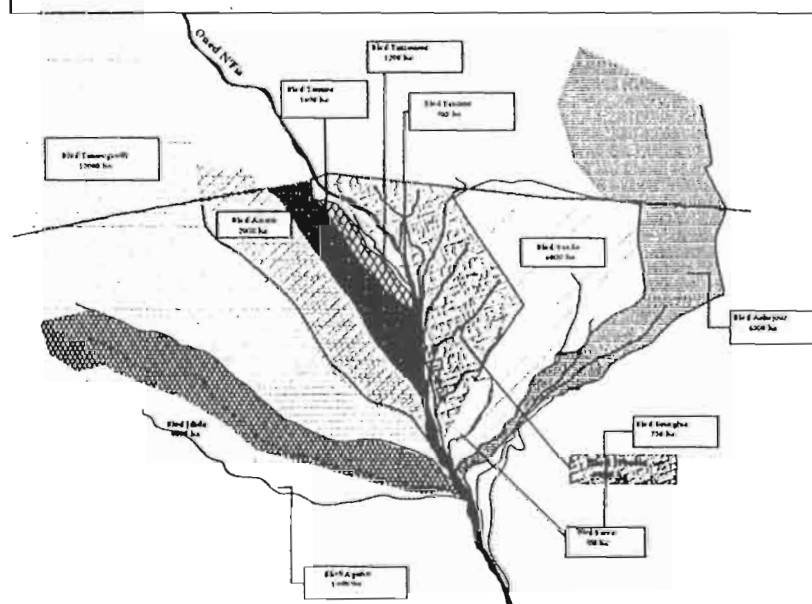
Carte 2 : réseau de seguias traditionnelles



Carte 3 : réseau sous pression, bornes et conduites

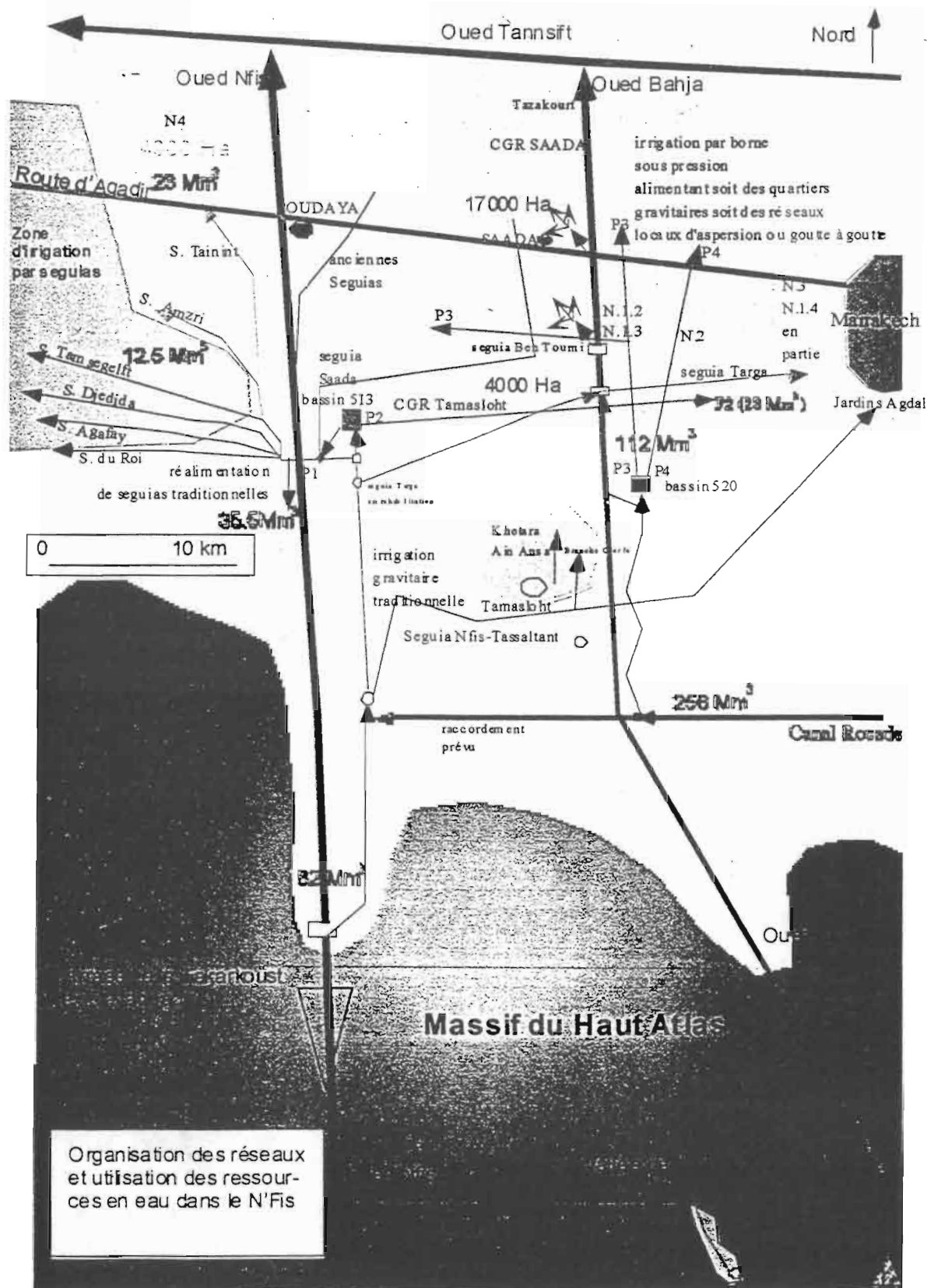


Carte 4 : Aires irriguées par les seguias du N'Fis avant le RSP



Carte 5 : superposition réseau traditionnel et réseau moderne





Source : T. Ruf⁶

⁶ Il s'agit d'un schéma de T. Ruf modifié, les modifications concernent les affectations des volumes d'eau et les superficies

2.2.2. Réseau moderne : une distribution théorique égalitaire entre usagers.

L'objectif qui a guidé l'aménagement du périmètre du N'Fis était d'aboutir à une amélioration des conditions d'irrigation par l'augmentation des volumes d'eau disponibles, la régularisation des apports sur l'année et l'assurance d'une égalité d'accès à l'eau afin d'accroître et de sécuriser la production agricole. Un système de distribution qui se veut égalitaire a donc été adopté, l'ORMVAH ayant décidé d'attribuer une dotation théorique par unité de surface égale pour tous quelque soit la position sociale, la superficie possédée, la culture pratiquée, ou la position physique sur le réseau. Cette dotation annuelle est de $6800\text{m}^3 / \text{ha}$ et correspond aux besoins de l'olivier, culture dominante du périmètre. A cette dotation égale est associée un principe de distribution "à la demande contrôlée", l'ambition étant selon Ducrocq et Zerhourri (1986 cités par CNEARC 2000) de permettre à chaque irrigant de mieux coller aux besoins des cultures en place, tout en réservant à l'ORMVAH le contrôle des lâchers en tête et, le cas échéant, leur adaptation aux disponibilités dans les barrages.

La gestion de la distribution de l'eau implique divers acteurs qui sont l'ORMVAH, les CGR (Centre de Gestion des Réseaux) qui sont des délocalisations de l'ORMVAH sur le terrain et les usagers utilisateurs des bornes. L'opération de distribution débute par la fixation de la dotation mensuelle⁷. Les usagers peuvent alors répartir cette dotation sur le mois par une programmation qui se fait au CGR. A ce niveau les demandes sont regroupées par borne et la programmation des irrigations est faite en veillant à ne pas dépasser d'une part les capacités des réseaux d'adduction, d'autre part la dotation mensuelle de chaque usager. Le CGR offre la possibilité de modifier la programmation en cours de mois en respectant un délai de 48 heures.

La programmation ainsi faite, des aiguadiers sont chargés de l'ouverture des bornes laissant la gestion de l'irrigation en aval de celles-ci aux usagers installés autour de la borne.

Si ces usagers installés autour de bornes collectives sont soumis à une programmation mensuelle obligatoire, d'autres bénéficiant du privilège de disposer d'une borne individuelle peuvent être exemptés de cette programmation : ce sont les possesseurs de clé. Les possesseurs de clé sont des usagers qui jouissent d'une borne individuelle dont ils possèdent la clé. Ils peuvent ainsi réaliser eux-mêmes l'ouverture et la fermeture de leurs bornes sans l'intervention de l'aiguadier. Le paiement des redevances se fait deux fois par an.

3. L'accès pratique à l'eau d'irrigation : résultante d'une pluviométrie irrégulière et insuffisante et d'un service de l'eau peu efficient

3.1. L'état de la ressource

Le périmètre du N'Fis est soumis à un climat semi-aride avec des ressources en eau très limitées. La rareté des ressources en eau apparaît en premier lieu à travers la faiblesse de la pluviométrie enregistrée dans la région, l'irrégularité des précipitations et leur mauvaise répartition dans le temps. En effet, l'ensemble des ressources en eaux utilisées pour l'irrigation du périmètre du N'Fis provient principalement de deux retenues d'eau (voir schéma 1). A l'aval du barrage Lalla Takerkoust est construit le barrage compensateur qui permet de stocker les eaux turbinées et les utiliser aux fins de l'agriculture. Le surélévement du barrage Lalla Takerkoust en 1979 suite à des problèmes d'envasement lui permet de régulariser désormais 85Mm^3 .

Le canevas hydraulique du N'Fis est complété par le canal principal sur lequel sont branchées plusieurs seguias et les prises d'eau sur l'oued : les seguias du canal principal ne permettaient pas d'assurer l'irrigation de toutes les cultures du périmètre, le complément était donc assuré par les eaux de crue.

⁷ La dotation mensuelle théorique de $540\text{m}^3/\text{ha}$ pouvant être revue à la baisse ou à la hausse selon les disponibilités

A cela viendra s'ajouter en 1985 le Canal de Rocade dont la turbidité élevée des eaux est source de dysfonctionnement du réseau d'irrigation par bouchage des bornes et des compteurs.

A ces eaux superficielles s'ajoutent les ressources en eau souterraine exploitées grâce aux forages et aux puits.

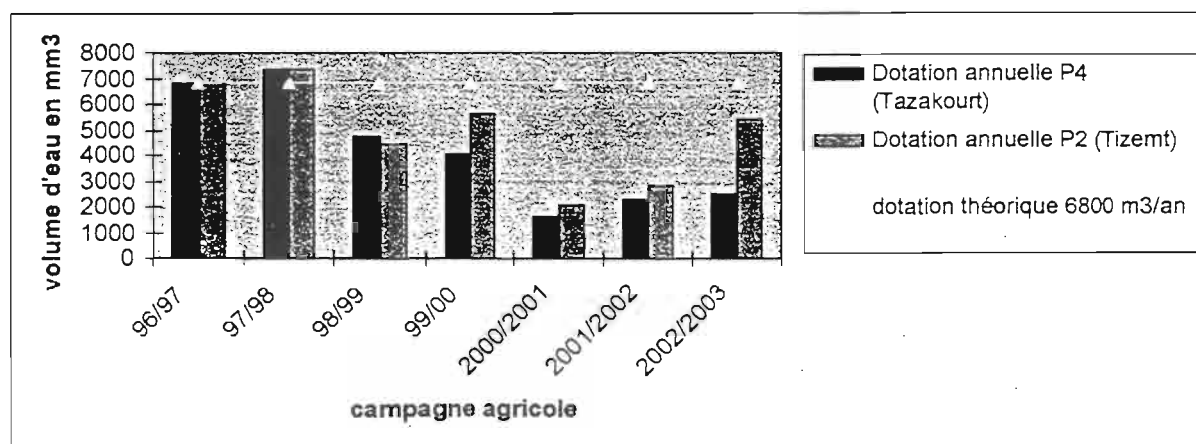
En outre, les apports en eau provenant de ces barrages alimentant le N'Fis ont connu ces dernières années une nette régression due à une succession de sécheresses. En effet, entre les années 1998 et 2002, la région du Haouz a connu une baisse de pluviométrie (tableau 1) qui s'est ressentie sur les disponibilités en eau des barrages donc sur les dotations allouées par l'ORMVAH qui ont connu des restrictions draconiennes.

Tableau 1 : Précipitations enregistrées à la station de Marrakech (1996-2003)

Campagnes agricoles	SEP	OCT	NOV	DEC	JAN	FEV	MAR	AVR	MAI	JUN	JUL	AOU	TOTAL	Ecart par rapport à la moyenne
96-97	2,0	6,0	46,4	67,2	28,2	-	43,4	90,1	24,0	0,2	0,0	0,0	307,5	22%
97-98	82,1	25,8	17,0	47,9	22,1	33,0	25,5	5,6	0,7	0,0	0,0	0,0	259,7	8%
98-99	0,7	0,0	0,0	28,1	52,9	39,4	72,1	0,0	6,0	0,2	0,0	0,0	199,4	-20%
99-00	0,3	67,1	22,8	32,2	16,3	0,0	0,0	28,7	16,0	0,0	0,0	0,0	183,4	-31%
00-01	7,0	12,3	7,0	33,4	35,8	1,0	3,6	0,0	0,3	0,0	0,0	0,0	100,4	-139%
01-02	0	0	4,3	60,4	0,0	1,4	50,4	51,7	16,5	0	0	0	184,7	-30%
02-03	2,1	0,6	74,1	10,6	11,1	7,2	24,7	62,1	7,3	15,0	0,0	8,8	223,6	-7%

Source : ORMVAH

Ces disponibilités n'ont pas permis depuis la campagne 1997/1998 d'assurer, comme le montre le graphique n°1 la dotation théorique prévue.



Graphique n°1: Evolution de la dotation annuelle par rapport à la dotation théorique au niveau des deux AUEA étudiées.

3.2. Etat de la gestion : une différence de traitement de fait entre "gros" et "petits" exploitants

La distribution de l'eau aux usagers dans un système d'irrigation implique des décisions comme qui a droit à l'eau, quelle quantité sera fournie à chaque usager et à quel moment elle sera délivrée (Brewer J. et al. 1997). La définition du service de livraison de l'eau au niveau du système de distribution inclut donc :

- la spécification du droit d'eau du bénéficiaire (par exemple m³/ha, ou une dotation proportionnelle au stock disponible dans les cas où l'on ne connaît pas les disponibilités) ;
- spécification du point de livraison (la parcelle, au niveau de l'association d'usagers, etc.) ;
- la flexibilité dans le taux de livraison (fixe, variable, variable entre certaines limites) ;
- la flexibilité dans la durée (fixe, variable mais prédéterminée, variable par accord) ;
- la flexibilité dans la fréquence (chaque jour, chaque semaine, ou chaque mois).

Selon Gilot et Ruf⁸, trois modes de livraison constituent les configurations principales de distribution de l'eau : distribution par rotation fixe (date, débit et durée de chaque arrosage sont fixés à l'avance), à la demande (l'usager décide seul de ses arrosages) et par gestion centrale (l'agence décide seule des arrosages).

Mais entre ces trois modes de distribution, des situations intermédiaires combinent certaines caractéristiques et caractérisée chacune par un degré de prédétermination, un degré de choix des usagers, un degré de modulation de la part de l'agence de gestion.

La définition du service doit aussi spécifier les responsabilités des parties prenantes (agriculteurs, associations d'usagers, les opérateurs des canaux primaires, ceux des canaux secondaires, l'agence...) dans le fonctionnement et la maintenance du système d'irrigation. (T. Facon, 2000)

Dans le périmètre du N'Fis, c'est (l'ORMVAH) qui a la charge de la gestion du périmètre irrigué à travers divers services mis en place dont le SGRID (Service de Gestion des Réseaux d'irrigation). C'est l'unité chargée entre autres de l'exploitation et de la maintenance des ouvrages et des équipements de prélèvement, de transport et de distribution de l'eau. Malgré la GPI (Gestion Participative de l'Irrigation) adoptée depuis 1990 qui vise l'implication des usagers dans tout le processus de gestion, l'ORMVAH assure toujours la quasi-totalité des opérations de gestion. Seule la distribution de l'eau entre usagers à l'aval des bornes est à la charge des usagers. La qualité du service de fourniture d'eau aux usagers par l'ORMVAH détermine donc l'accès de ces usagers à l'eau.

Le système mis en place dans le N'Fis avait pour ambition de permettre d'utiliser l'eau délivrée au niveau de la borne soit pour une irrigation gravitaire, soit pour une irrigation par aspersion. Il faut souligner que la borne définit une unité territoriale qui est celle du groupe de parcelles qu'elle dessert (appelée « bloc »), ainsi qu'une unité sociale, le groupe d'utilisateurs de la borne. Lors de l'emplacement des bornes, toute propriété de taille suffisante a pu bénéficier d'une borne individuelle. Dans les autres cas, plusieurs parcelles sont desservies par une même borne collective, celle-ci étant implantée en tête de ces zones, sans pénétrer à l'intérieur ; un nombre très important de parcelles peut alors être desservi par la même borne.

Sont regroupés donc autour de ces bornes collectives les exploitants qualifiés de « petits » par les usagers et les gestionnaires » qui exploitent une faible superficie. Ils constituent la majorité des irrigants, plus de 60% des usagers exploitent des superficies de moins de 3 ha dans l'AUEA Tizemt avec une superficie moyenne par exploitant de 1,64 ha. La culture principale est l'olivier souvent associé aux céréales quand le climat le permet. C'est une exploitation surtout vivrière, les récoltes étant consommées, mais sont souvent vendues selon les opportunités.

Face à ces petits fellahs, on trouve les « gros » exploitants, bénéficiant du fait de la superficie dont ils disposent d'une borne individuelle et souvent de la clé de celle-ci. Ils pratiquent des cultures de rente avec comme objectif principal de gagner de l'argent. A

⁸ Modalités et pratique de la distribution de l'eau

Tazakourt par exemple 18 bornes sur les 34 situées sur le périmètre de l'AUEA sont individuelles. Ces 18 usagers (12% du total) exploitent à eux seuls 42% de la superficie totale de l'AUEA.

Si dans la théorie, le service offert par l'ORMVAH est le même pour ces deux types d'usagers, des différences de fait apparaissent dans la pratique de la distribution de l'eau.

Cette différence apparaît en premier lieu dans la flexibilité de distribution qu'offre l'organisme gestionnaire aux usagers. Une bonne flexibilité devait permettre aux usagers de moduler les apports d'eau (sur le plan du débit, la fréquence d'irrigation, de la durée d'irrigation) en fonction des cultures et des objectifs de production qu'ils se sont fixés. Dans le périmètre du N'Fis, les débits délivrés par les bornes sont en général faibles, et cette faiblesse des débits a des conséquences différentes selon que l'utilisateur se trouve sur une borne individuelle ou une borne collective. En effet, comme nous l'avons souligné précédemment, en aval de la borne, l'eau est véhiculée vers les parcelles par les mesrefs du réseau traditionnel. Ceux-ci étaient dimensionnés pour véhiculer les eaux de crue de débit pouvant atteindre 300 l/s ; ils ont donc un gabarit important et inadapté pour véhiculer les petits débits. En plus ces mesrefs sont souvent sujets à un enherbement important qui ralentit l'écoulement de l'eau. Combinés à l'évaporation importante, ces facteurs engendrent une perte importante durant le trajet. Sur les bornes collectives, cette perte est souvent très importante pour les usagers situés en aval, la longueur des mesrefs étant très élevée⁹. Ainsi la faiblesse de la dotation (résultante d'une superficie faible, une dotation à l'hectare faible) fait donc que la quantité d'eau qui arrive au niveau de la parcelle n'est qu'une petite partie de la quantité délivrée par la borne. Cette situation a entraîné l'abandon de l'irrigation à partir le réseau sous pression par certains irrigants.

En plus de la faiblesse générale des débits, les débits réels délivrés par les bornes sont souvent inférieurs au débit nominal. En outre, contrairement aux bornes individuelles qui ont un compteur généralement fonctionnel¹⁰, les bornes collectives ont souvent un compteur non fonctionnel. Les propriétaires des bornes individuelles sont donc assurés de ne payer que l'eau consommée, ce qui n'est pas le cas des usagers des bornes collectives facturés sur la base d'un débit nominal supérieur au débit réel.

Par ailleurs, si certaines bornes délivrent un débit inférieur au débit nominal, d'autres par contre délivrent un débit réel supérieur au débit nominal. Dans ce cas aussi un problème d'un autre type se pose sur les bornes collectives : quand l'automatisme de la borne fonctionne, celle-ci est programmée pour se fermer au bout d'un certain volume, volume qui est calculé sur la base d'un débit théorique qui est inférieur au débit réel délivré par la borne. La fermeture de la borne intervient alors sans que tous les irrigants programmés n'aient pu consommer la totalité de leur dotation¹¹. Certains usagers perdent ainsi une partie importante de leur dotation.

Sur le plan de la fréquence des irrigations, la possession de la clé des bornes permet aux usagers des bornes individuelles de mieux piloter l'irrigation. Ils sont exemptés de la programmation mensuelle et ont également la possibilité de faire une programmation annuelle impliquant parfois des reports de dotation d'un mois sur l'autre en accord préalable avec l'ORMVAH. Cela leur permet de pratiquer vraiment une irrigation à la demande, privilège dont ne jouissent pas les usagers installés sur les bornes collectives.

⁹ Cette longueur peut atteindre 2 kms, c'est le cas par exemple des bornes 816 (2220 m), 807 (3300m), 801 (2730m)

¹⁰ L'aiguadier vérifie en effet régulièrement ces compteurs pour éviter tout dépassement de la dotation

¹¹ Si nous prenons l'exemple du mois de mars 2004, sur 22 bornes de l'AUEA Tazakourt sur lesquelles l'eau du réseau sous pression a été demandée, neuf (9) avaient un compteur fonctionnel et sur ces 9, 4 délivraient un débit réel supérieur au débit nominal avec une proportion d'augmentation pouvant atteindre 100%

4. Les deux types d'agriculteurs face aux effets de la sécheresse des années 1998-2002.

La sécheresse des années 1998-2002 a eu des conséquences dont l'ampleur varie logiquement selon le type d'agriculteurs.

L'effet de sécheresse se ressent toujours surtout chez les petits agriculteurs qui n'ont pas accès à l'eau et pour qui l'adaptation a été difficile. La diminution des dotations accordées par l'Office a des conséquences désastreuses pour ces petits agriculteurs qui, faute de moyens de se doter de forages sont dépendants d'un réseau sous pression qui n'est plus apte à leur fournir les quantités d'eau dont les cultures ont besoin.

La description faite par Arnaud Finet illustre parfaitement leur évolution : dans un premier temps la diminution de la dotation accordée par l'ORMVAH entraîne une diminution de la production, une complémentation ne pouvant être apportée à partir de la nappe. Ceci entraîne une diminution de leur revenu agricole. Au bout d'un certain temps ils réduisent leurs dépenses. Ils peuvent limiter leurs avances aux cultures (achat d'engrais, de semences...) ou décider de ne pas payer la facture d'eau. S'ils ne paient pas leur facture l'eau va leur être coupée. Ils devront alors payer les intérêts par la suite pour rétablir leur droit d'eau. De toute façon, la récolte va se réduire et les plantations vont pâtir de la sécheresse. S'il y a des animaux sur la ferme, le manque d'alimentation va pousser l'agriculteur à les vendre. Le revenu tiré de cette vente va permettre de faire vivre la famille, éventuellement de payer les dettes diverses. Si la situation se détériore, autrement dit si les arbres meurent par exemple, l'agriculteur vendra le bois.

Plusieurs situations semblables nous ont été rapportées à Tizemt. Plusieurs irrigants ont ainsi vendu leurs terres pour soit migrer vers Marrakech, soit trouver du travail de chargeur de camions de gravier dans les entreprises de concassage le long de l'oued N'Fis. Certains aussi effectuent des travaux agricoles temporaires divers pour les agriculteurs qui ont besoin de main d'œuvre.

Pour les usagers qui avaient les moyens de se doter de forages, les effets de la sécheresse ne sont pas aussi dramatiques. Les forages leur ont permis de suppléer le manque d'eau du réseau collectif par les apports de la nappe. S'en est suivi une prolifération du nombre de forages à Tazakourt et Tizemt ce qui ne manque pas de se ressentir sur le niveau de la nappe qui descend dangereusement.

5. Participation à la gestion : une faible représentation des petits exploitants dans les bureaux exécutifs des AUEA.

A travers la politique de Gestion Participative de l'Irrigation adoptée par le pays depuis les 90 au niveau national en général et dans le N'Fis en particulier, l'objectif des autorités est de faire participer ces usagers regroupés en AUEA conjointement à l'ORMVAH à la gestion du périmètre irrigué afin de permettre à la fois une amélioration de la valorisation de l'eau d'irrigation, une maîtrise des volumes d'eau prélevés et des coûts d'exploitation des équipements et ouvrages d'irrigation et une sauvegarde du patrimoine hydraulique. L'un des objectifs était en effet à terme d'avoir des AUEA « possesseurs de clé », c'est-à-dire que les AUEA les plus dynamiques devaient disposer des clés de leurs bornes comme les usagers individuels.

Mais l'étude révèle une faible participation des usagers dans cette gestion. Cette participation se résume en effet à la distribution de l'eau en aval de la borne. Les AUEA qui devaient constituer les organes à travers lesquels les usagers pourraient participer pleinement à la gestion sont en fait une mosaïque d'intérêts et de situations avec un décalage énorme entre les situations d'usagers exploitant des superficies exiguës pour nourrir la famille et d'autres dont les productions sont destinées à la vente. Ces associations sont en général dirigées par les gros exploitants. En effet, loin d'être vues comme organe de gestion des activités de leur association, le bureau de l'AUEA est plus envisagé comme un organe de relation avec l'Administration, jouant un rôle de représentant politique pour défendre les intérêts (Jolly, 2000). Les petits agriculteurs élisent ainsi à la tête de ces

associations ceux qu'ils considèrent comme étant les plus influents et ayant de bonnes relations avec l'administration pour finalement les accuser de ne pas prendre en compte leurs intérêts dans leurs revendications.

Conclusion : Le périmètre irrigué du N'Fis, un aménagement aux résultats contradictoires¹²

L'aménagement du N'Fis en 1990 s'inscrivait en droite ligne dans l'objectif global de l'Etat marocain d'atteindre l'autosuffisance alimentaire en irrigant un million d'hectares en 2000. Il avait ainsi pour ambition de résorber la pauvreté de la paysannerie afin de réduire l'écart de richesse entre ruraux et citadins. L'ORMVAH est l'organe chargé de gérer les infrastructures mises en place et de fournir un service de l'eau adéquat aux usagers afin de faire cette ambition une réalité.

Une dizaine d'années après sa mise en place, plusieurs constats peuvent être faits quant aux résultats atteints :

- il a permis une diversification de l'agriculture et le développement de l'élevage laitier,
- l'adoption bien que réduite de techniques d'irrigation économes d'eau,
- une augmentation de la production par une augmentation des surfaces cultivées et des rendements¹³.

Cependant s'il a permis d'atteindre des résultats positifs, plusieurs facteurs ont aussi contribué à l'émergence de problèmes qui tendent à mitiger ces résultats.

Il s'agit de l'état même de l'aménagement, de la procédure de gestion adoptée par l'ORMVAH, et surtout de la réduction de la pluviométrie observée entre 1998 et 2002.

Ces divers facteurs ont entraîné :

- une diminution de la production,
- une descente dangereuse du niveau de la nappe due à la prolifération des pompages,
- et surtout une décapitalisation des exploitants qui n'ont plus accès à l'eau en quantité

suffisante pendant que les plus nantis ayant la capacité de se doter de forages exploitent des cultures de rente très consommatrices d'eau mais source de revenus importants. Loin d'assister à une réduction de l'écart de richesses entre citadins et ruraux, on assiste plutôt à l'installation et l'intensification de cet écart entre agriculteurs du périmètre irrigué. Pendant que la minorité, constituée des gros exploitants s'enrichit grâce à l'exploitation de la nappe et de cultures de rente, la grande majorité (les petits propriétaires fonciers) s'appauvrit davantage car incapables de s'adapter aux conditions d'irrigation. Ils alimentent alors le flux de l'exode rural dont la diminution était l'un des objectifs de l'aménagement du périmètre.

¹² Ce titre est emprunté à Arnaud Finet dans son mémoire de fin d'étude présenté en octobre 2002 pour l'obtention du Diplôme d'Ingénieur en Agriculture et du Diplôme d'Agronomie Tropicale.

¹³ Les rendements du blé et de l'orge étaient respectivement de 11 et 8 Qx/ha avant l'aménagement et sont passés à 24 et 20 Qx/ha en 93-94

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Colloque international:
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Perspectives de recherche et d'action

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Politique de gestion des ressources en eau et équité hydraulique:
Cas des bassins du Souss et du Dra (Sud marocain)

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INTRODUCTION

En matière de ressources en eau, le Maroc est considéré parmi les pays privilégiés au niveau du monde arabe dont une bonne partie du territoire se situe en zones arides et semi-arides. Les facteurs expliquant cette particularité sont nombreux: les potentialités hydriques ont été considérées pendant longtemps suffisantes en comparaison avec le poids démographique du pays; ces mêmes potentialités ne font pas l'objet de litiges avec les Etats voisins; les objectifs de la politique adoptée en matière d'aménagement et de gestion des ressources en eau sont atteints et la couverture des besoins stratégiques en eau est relativement assurée.

Mais, si l'effort accompli en terme de gestion des potentialités hydrauliques est mondialement reconnu, « l'équité hydraulique » n'est pas instaurée pour autant. Les sécheresses subies par notre pays ces dernières années ont démontré la sagesse de la politique suivie, mais elles ont révélé également les fortes disparités qui caractérisent l'accès à l'eau. Certes les actions de développement accomplies en matière d'aménagement hydraulique ont couvert une part importante des besoins de l'irrigation, tout comme elles ont réduit les carences accumulées en matière d'approvisionnement en eau des villes et des activités urbaines, mais pour atténuer les écarts multidimensionnels marquant l'accès aux services de l'eau, il reste encore beaucoup à faire. Les inégalités d'accès à l'eau sont d'autant plus graves qu'elles contribuent directement ou indirectement à la prolifération de la pauvreté et de l'exclusion et à la persistance des facteurs de marginalisation et de crise sociale. Ces inégalités constituent enfin des contraintes sérieuses pour le développement humain.

Pour contribuer au débat sur "pauvreté hydraulique et crises sociales", la présente communication se propose de traiter des aménagements hydrauliques mis en œuvre dans les bassins du Souss et du Dra moyen dans le Sud marocain, considérés sous l'angle de l'accès à l'eau et de l'équité hydraulique.

1 - LE SOUSS-MASSA-DRAA : UN ANCIEN ESPACE HYDRAULIQUE EN MUTATION

1-1 Des ressources en eau relativement abondantes

Située au centre du territoire national, la région du Souss-Massa-Dra, apparaît comme une région à l'image du paysage hydrologique du Maroc. Malgré sa situation méridionale, la configuration de son relief et l'agencement de sa géologie lui permettent de se doter d'un

potentiel hydrologique et hydrogéologique relativement abondant, de l'ordre de 2 milliards m³, soit le 1/10^e des ressources nationales mobilisables.

Potentiel hydrologique et hydrogéologique du Sous-Massa-Dra (Mm³)

Bassins	Eau Superficielles	Eau Souterraine
Haut Dra- Moyen Dra	600	110
Souss-Massa	660	480
Autres bassins	100	20

Source des données: Agence du Bassin hydraulique du Souss-Massa, Agadir.

OCEAN ATLANTIQUE

1-1-1 Les eaux superficielles: les apports et leurs caractéristiques

Les ressources en eau superficielle locales sont tributaires de l'écoulement de deux principaux systèmes hydrographique, l'oued Souss-Massa et l'oued Dra, dont l'apport global moyen annuel est estimé à plus de 1,3 milliard m³. Les deux systèmes connaissent une variabilité importante liée à un régime d'écoulement de type thermo-pluvial marqué par une fréquence assez importante de cycle d'années de sécheresse.

Le Souss-Massa comprend deux principaux oueds: Oued Souss et Oued Massa. Avec une superficie de plus de 16.000 km², l'oued Souss assure un débit moyen annuel de 420 Mm³. Il prend naissance à partir du Jbel Toubkal, point culminant de l'Afrique du Nord à 4.165 m, pour drainer les versants sud-ouest du Haut Atlas et ceux de l'Anti Atlas septentrional, et ce avant d'atteindre l'océan Atlantique au niveau de la ville d'Agadir après avoir parcouru une distance de plus de 260 km.

L'oued Massa alimenté par les reliefs de l'Anti-Atlas, constitue une ressource non négligeable dans la région car les eaux issues de ce bassin après leur stockage dans le

barrage Youssef Ben Tacheffine, sont utilisées pour l'irrigation du périmètre des Chtoukas et tassila et pour l'alimentation en eau potable de la ville de Tiznit et ses environs

L'oued Dra prend naissance au niveau du massif de Tichka à l'Est de Toubkal et du "Massif de Megoun" dans le haut Atlas central à des altitudes allant de 3.000 à 4.000 m. Il représente le système hydrographique le plus long du pays sur une distance de 1.200 km. Les géographes y distinguent trois sections différentes:

- Le Haut Dra ou le domaine des grands affluents (Dadès, Ouarzazate et Ait Douchen), drainant les versants méridionaux du Haut Atlas central et le versant nord de l'Anti Atlas.
- A partir du site de Ouarzazate, ces affluents s'associent en un drain principal qui traverse les assises géologiques assez durs de l'Anti Atlas oriental en formant une succession de gorges et de dépressions s'étalant jusqu'à Mhamid, constituant ainsi le Dra moyen. C'est au niveau de ces dépressions, appelées "feïjas", que sont logées les oasis de Dra qui se présentent comme « *un collier de six perles dont le fil de jointure est constitué par le lit de l'oued Dra* ».
- Le Bas Dra, constitue la section la plus longue et la plus aride de ce système hydrographique. Eloigné des cimes enneigées du Haut Atlas, ce tronçon du Dra connaît un écoulement sporadique et reste tributaire des perturbations locales.

Le régime d'écoulement des deux systèmes est globalement saisonnier et très influencé par un climat à caractère méditerranéen; l'écoulement se concentre dans l'hiver, froid et humide, tandis que l'étiage coïncide avec l'été chaud et sec. Cet écoulement prend la forme de crues de grande envergure, pouvant drainer la majorité des apports annuels en eaux superficielles pendant une période où la demande en eau est relativement limitée. La manifestation des crues représente un événement hydrologique capital dans la zone, elles contribuent à l'alimentation des aquifères locaux.

1-1-2 Un potentiel hydrogéologique dominé par la nappe du Souss

Le même contexte morpho-structurel qui offre des conditions d'interception de l'humidité des perturbations atmosphériques, permet de constituer des situations d'apparition d'aquifères dont le plus important est la nappe de la plaine du Souss.

Coincée entre le Haut Atlas et l'Anti Atlas, la plaine du Souss fonctionne comme un fossé de subsidence polarisant les formations superficielles et les eaux émanant de ces chaînes montagneuses qui l'encadrent.

La nappe de la plaine du Souss est une nappe libre ouverte sur l'océan Atlantique, c'est un système souterrain renouvelable étroitement tributaire du régime climatique et du régime hydrogéologique locaux. Son volume global est d'environ 40 milliards m³, mais sa recharge moyenne annuelle est évaluée à 400 millions de m³ environ, soit le 1/5^e du potentiel hydraulique régional global et les 2/3 du potentiel hydraulique souterrain régional.

L'alimentation de la nappe de la plaine du Souss se fait principalement à partir des eaux de ruissellement et surtout à partir des eaux des crues du réseau hydrographique relativement dense et localement à partir des eaux de pluie. L'alimentation à partir des nappes souterraines limitrophes des montagnes ou à partir des nappes profondes reste limitée du fait des conditions géologiques non convenables et du fait de l'aridité de l'Anti Atlas. Par contre les sorties naturelles d'eau de cette nappe sont représentées par l'évaporation qui s'intensifie pendant l'été, la série de résurgences le long du lit de l'oued Souss actuellement asséchées, et par une partie des eaux qui trouve son chemin vers l'océan.

Le bilan de la nappe du Souss reste irrégulier à cause de l'importance de la variabilité climatique, mais depuis quelques décennies, ce bilan est devenu négatif de façon continue du fait de la surexploitation de cet aquifère et de la diversification de ses usagers.

En dehors de la nappe du Souss, le potentiel hydrogéologique régional reste très limité. Les résultats de prospection des nappes profondes ne sont pas encourageants, les aquifères

découverts à ce jour sont de petite taille ou de qualité médiocre à part le turonien qui montre localement un artésianisme. Les eaux mobilisables sont représentées par des nappes phréatiques discontinues attachées aux alluvions étalées autour des lits d'oueds comme celui du Dra moyen, mais il s'agit plus d'inferoflux que de réserves d'eau souterraines.

1-2 De l'aménagement hydraulique traditionnel à l'ère de la grande hydraulique

Par leur capital hydrique relativement important et par leur situation en marge du vaste domaine aride que représente le Sahara africain, les bassins du Souss-Massa-Dra sont dotés de tous les éléments nécessaires à l'apparition d'une vie sédentaire depuis des temps immémoriaux, et au façonnement d'un espace hydraulique originel basé sur l'irrigation. La prospérité des oasis de la vallée du Dra et des vergers du Souss est signalée pratiquement dans tous les textes et les sources de l'histoire du Maroc et des régions voisines.

De nos jours, malgré les éléments de crise qui le marquent, ce territoire continu toujours à occuper une place distinguée à l'intérieur du paysage hydraulique national. Trois phases principales marquent l'histoire hydraulique de la région.

1-2-1 Le système de gestion traditionnelle des eaux

Le système hydraulique dit "traditionnel" est basé principalement sur l'irrigation. Les besoins en eau non agricoles étaient assez limités et ne posaient pas de problèmes d'accès. Selon les conditions naturelles locales deux paysages agricoles irrigués se sont développés: le Dra moyen et le Souss. Ces deux paysages différents par leurs systèmes de production, mais ils sont assez identiques dans leur système de gestion des ressources en eau:

Pour le Dra, l'aridité du climat, d'une part, et l'arrivée plus ou moins régulière des eaux de crues de l'oued, d'autre part, offrirent les conditions favorables pour l'apparition des oasis de la Vallée du Drâa moyen. Il s'agit d'une série d'oasis étalés sur une distance de 140 km entre Ouarzazate et Mhamid El Ghazlane. Le palmier dattier occupe une place capitale dans la structuration du paysage et de l'économie agricole locale.

Dans la vallée du Souss-Massa, l'augmentation du niveau de l'humidité dans cette zone ouverte sur l'Atlantique, la manifestation des crues d'un réseau hydrographique plus étoffé et la présence d'une nappe libre ont favorisé le développement d'un paysage agricole irrigué, ce paysage est constitué d'une nébuleuse de périmètres irrigués organisés autour de seguias dérivées des lits des oueds Souss et Massa de leurs affluents. L'absence ou le retrait du palmier dattier est compensée par l'olivier.

Les eaux utilisées dans les deux bassins sont gérées d'une manière collective depuis la collecte et la mobilisation jusqu'à la distribution en direction des parcelles. Les eaux souterraines locales font l'objet d'un usage individuel par le biais des puisages qui prennent une grande ampleur au niveau de la plaine du Souss.

1-2-2 Les changements de l'époque coloniale

Les interventions coloniales durant la première moitié du XXème siècle ont profondément bouleversé l'ordre hydraulique en place. Dans leur action, les autorités coloniales s'étaient plus intéressées à la création d'un secteur irrigué moderne qu'à la réhabilitation du secteur traditionnel existant.

Dans le cadre de cette action, et compte tenu de l'importance des potentialités souterraines de la plaine du Souss, un nouveau secteur irrigué dit "moderne" basé sur le pompage thermique est installé, imposant de ce fait une concurrence déloyale au secteur existant.

En une durée relativement courte, allant de la deuxième guerre mondiale à la fin de la colonisation en 1956, l'évolution du secteur d'irrigation moderne a connu une montée vertigineuse non seulement en termes de superficies plantées, mais aussi en dotation en eau. Les besoins en eau des spéculations de ce secteur, constituées principalement d'agrumes et de primeurs, dépassent de loin ceux du secteur traditionnel.

Aussi avant même la fin de la colonisation, le rabattement de la nappe et ses conséquences hydrauliques et sociales a-t-il commencé à se manifester dans plusieurs zones au niveau de la plaine du Souss.

En dehors de cette action, les interventions de l'Etat dans le secteur traditionnel au niveau de la vallée du Souss comme au niveau de la vallée du Dra étaient limitées. Ces actions n'ont pas dépassé le niveau d'imperméabilisation de portions de réseau d'irrigation ou de tentatives d'organisation des agriculteurs. De même l'alimentation des groupements humains ruraux et des villes en eau potable n'a pas bénéficié des mêmes efforts que ceux consacrés à l'irrigation moderne.

Durant cette même période, des études de sites de barrages pour la préparation de la rentrée du Maroc à l'ère de la grande hydraulique ont été élaborées, mais la mise en œuvre est ajournée à la période de l'indépendance.

1-2-3 Les interventions de l'Etat national

Au lendemain de l'indépendance, les autorités nationales ont adopté l'aménagement hydraulique comme un outil d'aménagement du territoire, un levier du développement économique et social du pays et, enfin, un moyen susceptible de faire face et de dépasser la réalité complexe héritée de l'époque coloniale.

De ce fait, l'Etat s'était dans l'obligation d'affronter une situation difficile exigeant de mobiliser les ressources en eau nécessaires pour répondre aux besoins de développement, de répondre à la demande en croissance continue et de réduire le déficit accumulé en matière d'eau potable, de couvrir les besoins des nouveaux usagers tels que l'industrie et le tourisme, d'écarter les eaux des crues et de protéger les équipements et les groupements humains contre les inondations, de couvrir les besoins d'abreuvement du bétail...

Dans ce cadre, tous les grands projets hydrauliques impulsés par l'Etat marocain ont été pratiquement conçus pour répondre à ces objectifs, en plus de la création des activités génératrices de revenus, dans une perspective de fixation des populations rurales, de lutte contre l'exode rural, d'amélioration des recettes de l'Etat en devises, par l'exportation de la production agricole, et d'intégration des zones marginalisées dans le tissu économique et l'amélioration des conditions de vie de leurs habitants.

C'est dans cette prospection d'une politique de planification territoriale destinée à amoindrir les disparités régionales qu'il faut replacer les grandes interventions de l'Etat au profit de la Région du Souss-Massa-Dra, à partir de la fin des années soixante, pour atteindre des objectifs diversifiés en fonction de la situation de chaque bassin versant ; celui du Souss-Massa a bénéficié de plus d'intérêt que celui du Dra.

Dans ce contexte, l'aménagement hydro-agricole de la vallée du Dra fut entamé en 1969, date de lancement des travaux de la construction du barrage Mansour Eddahbi sur l'oued Draa. Cette retenue, mise en service en 1972, et d'une capacité initiale de 560 Mm³, est conçue pour collecter les apports du bassin du Haut Dra en vue de réguler leur restitution aux oasis situées en aval selon les besoins et sous forme de lâchers d'eau dans le lit de l'oued contrôlé. Notons que dernièrement une partie des eaux de la retenue est prélevée pour répondre aux besoins en eau potable de la ville de Ouarzazate en pleine expansion.

Pour la gestion des eaux régularisées et pour l'amélioration de l'encadrement agricole, la réalisation de la retenue et des équipements corollaires fut précédée par la création, dès 1966, de l'Office Régional de Mise en Valeur Agricole d'Ouarzazate.

Mais les interventions les plus substantielles ont été réalisées au niveau du bassin du Souss-Massa où une politique d'eau à objectifs multiples fut adoptée. Les barrages construits jusqu'à présent sont au nombre de huit de taille différente et d'une capacité totale de retenues normales d'environ 850 Mm³. Leurs réserves d'eau sont destinées à l'irrigation de nouveaux périmètres agricoles, à la sauvegarde des périmètres agricoles en difficulté, à l'alimentation de la nappe du Souss surexploitée ou exclusivement à l'approvisionnement des villes en eau potable.

En plus de la réalisation de barrages, la vallée du Souss a bénéficié d'une action de réhabilitation des périmètres irrigués traditionnels souffrant de la raréfaction des eaux sous l'effet des sécheresses et surtout de la surexploitation du potentiel souterrain local.

Enfin, pour assurer un encadrement agricole de proximité un Office Régional de Mise en Valeur Agricole (ORMVA-SM) fut créé dès la fin des années soixante.

Tableau des barrages réalisés dans le Souss-Massa-Dra

Barrage	Oued	Date de mise en service	Capacité de la retenue normale (Mm ₃)	Volume régularisé (Mm ₃ /an)	Objectifs principaux
El Mansour Edhahbi	Drâa	1969	560	250	Irrigation + Eau potable
Ibn Tachaffine	Massa	1973	303,5	90	Irrigation + Eau potable
Abd El Moumen	Issen	1981	214	68,5	Irrigation + Eau potable
Dkhila	Issen	1986	0,7	-	Régulation
Aoulouz	Souss	1991	108	294	Recharge artificielle de la nappe
Imi Lkheng	Talekjount	1993	11	5,5	Irrigation + Recharge de nappe
Moulay Abdellah	Tamri	2003	110	-	Eau potable
Ahl Souss	Aït Baha	2004	2,2	-	Irrigation + Eau potable
Mokhtar Soussi	Ouzioua	en cours	50	-	Irrigation

Sources:

- Agence du Bassin Hydraulique du Souss-Massa, Agadir;
- Conseil supérieur de l'Eau et du Climat, documents de la 9^e session, Agadir.

En dehors du secteur agricole étatique, le secteur irrigué moderne privé initié par la colonisation et basé sur le pompage des eaux de la nappe du Souss, a continué à se développer avec une certaine tolérance de la part des autorités hydrauliques. La superficie de ce secteur ne dépassant pas 20.000 ha avec une dotation en eau de 120 Mm³ à la veille de l'indépendance a atteint en 1995 plus de 50.000 ha avec une dotation en eau de 300 Mm³, soit 50% du total de la superficie irriguée et 50% des dotations en eau d'irrigation de tout le bassin du Souss-Massa.

Le processus d'approfondissement des puits et de poursuite délibérée du niveau de la nappe par les agriculteurs pour conserver leur dotation en eau, n'ont pas abouti uniquement à un destockage de la nappe du Souss estimé actuellement à un volume de 4 milliard de m³, mais ils ont entraîné également l'exclusion d'une tranche importante des exploitants dont les terres se sont retrouvées dans une situation perchée au dessus du niveau piézométrique qui était auparavant à la portée des moyens techniques et financiers de ces exploitations. Cette nouvelle catégorie de paysans sans eau est à ajouter à celle des paysans sans terre.

Aujourd'hui, après cette longue et riche expérience en matière d'aménagement hydraulique, il est opportun de considérer l'action accomplie en termes d'accès à l'eau et d'équité hydraulique dans ces confins arides et semi-arides du pays. Deux cas précis serviront à l'illustration de notre propos : la vallée du Dra ayant bénéficiée des eaux du grand barrage Mansour Eddhahbi et la plaine du Souss où la compétition autour de l'eau est arrivée à un stade critique.

2 – L'EQUITE HYDRAULIQUE ENTRE L'INTERVENTION DE L'ETAT ET L'ORDRE COMMUNAUTAIRE : CAS DES OASIS DU DRAA MOYEN

2-1 L'Etat régulateur, une réhabilitation partielle du réseau hydraulique du Draa

La vie humaine dans la vallée du Drâa se distribue en un chapelet de 6 oasis s'égrenant sur environ 200 km le long du Drâa moyen, entre les montagnes de l'Atlas et les confins sahariens. L'agriculture, principale activité économique de la population, est synonyme d'une

irrigation séculaire assurée par un immense réseau de séguías façonné de part et d'autre du lit de l'Oued Drâa.

Partout règne la micropropriété, mais bien plus que la terre c'est l'eau qui manque. Par sa rareté, l'eau passe avant la terre dans la hiérarchie des facteurs de production. On comprend dès lors que parmi les difficultés de cet oued oasis, le problème de l'eau constitue le souci majeur de la population.

En relation avec ces conditions globalement défavorables, cette région a très peu suscité l'intérêt de l'économie et des autorités coloniales. Il a fallu attendre les années 1970 pour voir s'instaurer lentement une politique nationale de planification territoriale destinées à amoindrir les disparités régionales. Les régions présahariennes telles que la vallée du Dra profitèrent alors de la politique des barrages en vue d'atténuer les déséquilibres entre les régions et tenter d'intégrer cette zone marginale dans le tissu économique national.

Dans ce contexte l'aménagement hydro-agricole de la vallée du Drâa fut entamé en 1969, date de lancement des travaux de la construction du barrage Mansour Eddahbi sur l'oued Draa. Cette retenue, mise en service en 1972, constitue la pièce maîtresse d'un schéma hydraulique comprenant en outre: 6 barrages de dérivation, un réseau de 400 Km de canaux principaux, secondaires et de liaison, et l'intégration de près de 90 prises et seguias traditionnelles comme réseau tertiaire et quaternaire. Le lit de l'oued tient le rôle de canal adducteur sur une distance de près de 200 km. La capacité totale initiale de la retenue est de 560 M m³, elle permet la régularisation d'un volume moyen annuel de 250 Mm³ destiné à l'irrigation d'environ de 26.000 ha.

En se référant aux années d'exploitation écoulées, ce grand barrage a largement contribué à la régularisation du régime de l'écoulement annuel du Dra en capitalisant les hautes eaux de l'hiver pour les restituer plus tard en été, la menace des crues et des étiages est ainsi atténuée.

De même cette intervention de l'Etat, comme ordre régulateur, a permis d'atténuer le poids des irrégularités interannuelles de l'écoulement, marqué par l'alternance de séquences d'années humides et d'années sèches. Mais face aux longues séquences d'années sèches, la portée régulatrice du grand barrage est limitée, l'eau reste et restera une denrée rare et irrégulièrement accessible dans ce milieu.

2-2 Le partage et l'accès à l'eau, le poids de l'histoire.

Le volume des eaux régularisées par le grand barrage constitue une amélioration certaine et indéniable des disponibilités en eau de la vallée. Mais, pour autant, le problème de l'eau demeure ici la préoccupation majeure, en d'autres termes cependant : une difficile gestion des eaux mobilisées.

Dans le propos qui nous occupe, on retiendra surtout que l'effort qui a présidé à la réalisation technique de l'œuvre (barrages et réseaux modernes) n'a pas eu son équivalent quant à l'organisation sociale de l'irrigation. Dans ce domaine on se retrouve d'abord en présence de près de 90 communautés d'irrigation formées chacune par les membres d'un plus ou moins grand nombre de villages dont les terres sont desservies par un même réseau d'irrigation- la seguia- qui représente ici l'élément de cohésion dans les communautés en question.

Dans le cadre de l'intervention de l'Etat, ces communautés ont été tout récemment converties en Associations d'Usagers de l'Eau Agricole (AUEA), mais sans remettre en cause le fonctionnement interne des communautés ni les droits d'eau acquis et reconnus par l'Etat.

En considérant cet espace hydraulique sous l'angle de partage et d'accès à l'eau d'irrigation, son fonctionnement est encore en effet totalement régi par les règles ancestrales impliquant des inégalités dans les priorités et dans les droits relativement aux personnes physiques et morales.

Dans ce sens, le partage de l'eau de l'oued entre les seguias successives de la vallée est réglé par un simple « compromis » entre les différentes communautés sur le principe de la « priorité absolue de l'amont sur l'aval ». Ce principe donne « droit » à chaque

communauté/seguia de prélever du lit de l'oued une quantité d'eau, équivalente, en réalité, au maximum de ce que cette seguia peut dériver. En période de faible débit - ce qui est souvent le cas - les seguias situées en amont prélèvent alors les rares disponibilités en eau de l'oued réduisant ainsi à néant l'écoulement vers l'aval et, partant, les communautés concernées se retrouvent exclues de leurs droits d'eau ou tout simplement du droit d'accès à l'eau. Ce principe de la priorité de l'amont sur l'aval aggrave la distorsion entre les disponibilités et les besoins en eau et consacre, par conséquent, une inégalité de partage entre les communautés d'une même vallée.

En cas d'urgence (sécheresse extrême), l'entremise d'une haute instance religieuse ou politique permet de transgresser provisoirement ce principe d'inégalité d'accès à l'eau pour éviter la confrontation entre les communautés de l'amont et celles de l'aval.

A l'intérieur du secteur desservi par chaque seguia, les règles de cheminement de l'eau jusqu'aux parcelles se particularisent, mais en terme de partage nous retrouvons des inégalités d'accès à l'eau voire même des situations d'exclusion du droit à l'eau d'irrigation.

Pour illustrer ces faits, nous nous référons à la répartition des droits d'eau dans la grande seguia Beni Ali desservant le finage de 19 villages de la vallée.

Séguia Bni Ali : répartition des parts d'eau : branche d'Aghla-Ou-Mrade

Classes de Kharoubas(*)	Propriétaires		Kharoubas		Kharoubas/ Propriétaire
	nombre	%	nombre	%	
sans eau	37	14,3	-	-	-
moins de 4	140	54,3	317,3	28,3	2,3
de 4 à 9	52	20,2	346,3	30,9	6,7
de 9 à 16	23	8,9	280,0	25,0	12,2
16 et plus	6	2,3	177,0	15,8	29,5
Total	258	100	1120,6	100	4,3

(*) - *Kharouba*: unité de temps utilisée pour évaluer les parts d'eau. Source: Ouhajou .1996.

Notons tout d'abord l'importante catégorie des non propriétaires, soit près de 15% de ménages exclus de droit à l'eau d'irrigation, ce qui représente tout de même beaucoup pour le moyen de production de première importance qu'est l'eau dans une région saharienne. Parmi les propriétaires, les inégalités sont très fortes, le rapport est de 0,9 à 29,5 au niveau de la propriété moyenne. Dans le détail, les chiffres sont largement suffisants pour conclure que la répartition de l'eau est marquée par une concentration des droits d'eau aux mains d'une minorité de propriétaires, doublée de leur pulvérisation aux mains d'une écrasante majorité de propriétaires sans oublier les exclus des droits d'eau et donc du droit à l'eau.

Une répartition aussi inégale n'est plus pour surprendre. C'est une caractéristique générale à la campagne marocaine, non réductible à la vallée du Dra. Pourtant dans cette contrée, cette inégalité de partage doit retenir notre attention d'une façon particulière, non seulement du fait qu'elle porte sur un élément vital, l'eau, mais parce qu'elle découle d'une évolution historique et d'un cadre social particulier : la hiérarchie sociale et ses implications pratiques dans l'appropriation des moyens de production en général et des droits d'eau en particulier. Les investigations réalisées dans ce domaine ont clairement démontré à quel point la structure de la propriété de l'eau confirme la relation entre le statut social des familles et leur richesse ou pauvreté en eau d'irrigation (ouhajou 1996).

Ce lourd héritage historique vient se mêler de façon prégnante à la situation actuelle du fait de la lente désagrégation des structures sociales, notamment dans le domaine agraire, et surtout en raison de la non intervention de l'Etat pour remettre en cause les « droits d'eau » traditionnels, en dépit des énormes investissements consentis pour l'aménagement hydro agricole de la vallée.

3 – EPUISEMENT DES EAUX SOUTERRAINES ET EQUITÉ HYDRAULIQUE : CAS DE LA NAPPE DU SOUSS

3-1 L'histoire de l'exploitation d'une nappe

Malgré l'accélération de l'exploitation de la nappe libre du Souss par l'introduction du pompage depuis l'époque coloniale, le véritable processus d'épuisement de cette précieuse source d'eau n'a commencé que vers les années soixante-dix. A partir de cette date l'extension des superficies irriguées, l'explosion du phénomène urbain et l'apparition de nouveaux usagers tels que l'industrie et le tourisme ont fait accroître la demande en eau et contribué à la création d'une situation de compétition à facettes multiples.

Pour répondre aux besoins en eau, la nappe de la plaine du Souss a constitué une source à accès facile pratiquement pour tous les usagers en milieu rural comme en milieu urbain. A l'origine, les potentialités souterraines ne constituaient qu'une ressource en eau d'appoint pour l'irrigation pour palier au déficit estival des eaux superficielles. Chaque exploitant pouvait avoir son "Naora", sorte de puits à plan incliné, peu profond et exploité par traction animale. A la fin de l'époque coloniale le nombre de "Naora" fonctionnels était estimé à 5.000 unités (Dijon R.1969). A ce niveau, on doit noter que l'accès à l'eau souterraine était influencé par le régime foncier, la mobilisation de l'eau se fait pour l'arrosage d'une propriété, l'accès à la nappe était conditionné par la possession d'une parcelle et, par conséquent, les agriculteurs sans terre sont pratiquement exclus de l'exploitation du potentiel hydraulique existant.

L'introduction de la motopompe a provoqué, dans un premier temps, le tarissement des "Naoras". Ensuite les propriétaires de ces dernières devaient approfondir leur puits ou l'abandonner définitivement. Beaucoup d'exploitants n'avaient eu que ce dernier choix, mais le sort des exclus de l'accès à l'eau du fait de la baisse du niveau de la nappe a pris d'autres cas de figures.

Jusqu'aux années quatre-vingts, lorsque l'Etat est intervenu pour sauvegarder le patrimoine irrigué par la mise en eau du barrage Abd El Moumen en 1985, les agriculteurs de la plaine du Souss étaient contraints de rentrer dans une course effrénée derrière la nappe dont le niveau ne cesse de baisser. Depuis 1969, la nappe du Souss a perdu une moyenne de 1,5 m par an de profondeur, par endroit cette perte a dépassé 2 m/an. Actuellement, certains exploitants puisent l'eau à une profondeur de plus de 200 m, alors qu'auparavant l'eau était accessible à moins de 25 m en moyenne.

L'abandon des plantations pour ces mêmes raisons se poursuit, de nouveaux exploitants renoncent à l'irrigation du fait de la baisse continue de la nappe. La fréquence des sécheresses et l'ampleur du phénomène de sur- pompage ne permettent pas aux grands barrages réalisés dans la zone de rétablir l'équilibre perdu du système hydrogéologique local. Les bilans des barrages tels que Abd El Moumen, Youssef Ben Tacheffine et Aoulouz confirment ce constat.

Habituellement dans les bilans d'exploitation de la nappe souterraine, les statistiques disponibles portent uniquement sur la quantification du rabattement de la nappe ou des volumes d'eau perdus, tandis que les conséquences d'ordre économiques et surtout sociales de ce processus ne sont que rarement évoquées. Le suivi des réactions et des stratégies des usagers de l'eau en fonction du rabattement du niveau de la nappe constitue un sujet de recherche passionnant dans cette région à potentiel hydrogéologique fragile.

Une autre catégorie des irrigants qui a été plus ou moins épargnée par la baisse du niveau de la nappe souterraine, commence à souffrir du manque d'eau. Il s'agit des exploitants des périmètres traditionnels étalés autour du lit de l'Oued Souss. La construction des barrages a réduit les apports des crues qu'ils dérivait par le biais d'une série de séguias, d'une part, et, d'autres part, la baisse de la nappe a provoqué le tarissement des résurgences du lit de l'Oued qui constituaient une source d'eau pérenne. Les interventions de l'Etat pour la mobilisation des eaux d'irrigation n'ont pas toujours réussi pour surmonter les difficultés. Des champs captant de forages profonds sont créés pour alimenter une canalisation bétonnée amenant l'eau jusqu'au réseau traditionnel, la gestion est confiée à des associations

d'usagers d'eau agricole. Mais progressivement plusieurs associations se sont retrouvées dans des situations difficiles en raison du coût élevé de la facture énergétique ou du fait de la mauvaise gestion. Les plantations sèches en friche font désormais partie intégrante du paysage agricole traditionnel réhabilité.

Le processus de surexploitation, pour ne pas dire de destockage de la nappe du Souss, n'est pas lié uniquement à l'activité agricole. La croissance vertigineuse des villes et les efforts entamés pour subvenir à leurs besoins, ont fait du milieu urbain un usager à part entière dans le système d'utilisation des eaux dans cette région, sa place ne cesse de gagner de l'importance.

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Source: Direction Régionale de l'Hydraulique de Souss-Massa-Darâa, Agadir.

3-2 Les réalités de l'accès à l'eau

Dans le Souss-Massa, l'accès à l'eau est loin d'être équitable et se caractérise par des distorsions prenant de multiples aspects d'inégalité. Les diverses actions de développement et de mobilisation du potentiel hydrique n'ont pas toujours réussi à résorber les déséquilibres liés à la répartition des ressources en eau, au contraire, les disparités sont accentuées dans certains cas. Les distances séparant les composantes de la société quant à l'accès à l'eau d'irrigation et à l'eau potable sont encore importantes.

De larges écarts d'accès à l'eau en tant que facteur de production dans le secteur agricole sont toujours présents, autant dans le secteur agricole moderne privé ou étatique que dans le secteur agricole traditionnel. L'accès à l'eau, tout comme l'accès à la propriété de la terre restent profondément marqués d'inégalités. Le cas des communes de la plaine du Souss marqué par la concentration du secteur irrigué moderne privé reste très significatif (El Mahdad E. 2003).

Répartition des eaux d'irrigation dans le secteur moderne privé dans la Plaine du Souss selon les classes de profondeur des puits

Classe de profondeur des puits (m)	Effectif de puits (%)	Propriétaires (%)	Superficie (%)	Dotation en eau d'irrigation	
				Volume (%)	m ³ /ha/an
moins de 20	23,4	25,2	8,0	1,3	1.606
de 20 à 40	35,9	37,3	24,3	11,7	4.708
de 40 à 60	22,8	21,8	30,8	29,3	9.282
de 60 à 80	10,5	10,0	18,3	25,7	13.719
de 80 à 100	5,3	4,3	12,6	21,5	16.701
100 et plus	2,1	1,4	6,0	10,5	16.170
Total	100	100	100	100	9774

Source: El Mahdad E., 2003. D'après les résultats d'une enquête menée par les services de l'hydraulique d'Agadir.

Dans cette zone, l'accès à l'eau de la nappe souterraine est proportionnel à la taille de la propriété foncière. L'analyse de cet accès, évalué par la dotation en eau pompée et à partir de la profondeur des puits, confirme les réalités suivantes:

- La classe puits à moins de 40 m de profondeur, représente 60% environ du total des puits recensés dans la zone, mais ces puits ne produisent que 13% du total des eaux souterraines destinées à l'irrigation. Les propriétaires de ces ouvrages représentent 62% de l'ensemble des exploitants et ne bénéficient que de 32% des terres irrigables avec une dotation moyenne en eau de 4.700 m³/an/ha pour celle de la classe des profondeurs allant de 20 à 40 m de profondeur et seulement de 1.600 m³/an/ha pour la catégorie des exploitants ayant des puits de moins de 20 m de profondeur. Cette catégorie d'agriculteurs indigents s'est trouvée progressivement sans eau et dans une situation suspendue au dessus du niveau de la nappe en tarissement continue.
- Par contre, les grands exploitants qui sont souvent des absentéistes, même s'ils ne représentent qu'une minorité de moins de 6% de l'ensemble des propriétaires, ils dominent 19% des terres d'irrigation et contrôlent 32% des eaux mobilisées avec une dotation de plus de 16.000 m³/an/ha. Puisque les eaux d'irrigations sont puisées à partir de profondeurs assez importantes de plus de 80 m, la part des points d'eau appartenant à cette catégorie d'exploitants ne dépasse pas 8%. Ces exploitants arrivent souvent à se procurer des terrains agricoles de taille importante et à suivre le recul de la surface piézométrique vers les niveaux les plus bas;
- Entre les plus démunis et les plus aisés parmi les agriculteurs de la plaine du Souss, vit une catégorie moyenne qui représente le 1/3 des propriétaires et possèdent le 1/3 des ouvrages avec une profondeur allant de 40 à 80 m. Ces agriculteurs disposent de la moitié des terres et mobilisent plus que la moitié des eaux souterraines. Leurs dotations moyennes varient entre 9.200 m³/an/ha pour la classe des profondeurs de 40 à 60 m et 13.700 m³/an/ha pour celle des puits de 60 à 80 m de profondeur.

Les profils des propriétaires appartenant à ces trois catégories sont très variés. En plus des propriétaires exerçant en agriculture comme activité principale, on trouve parmi les grands propriétaires des absentéistes ayant occupés des postes de responsabilité ou de décision au niveau central ou à l'échelle régionale, et des propriétaires exerçant dans le commerce et le secteur des fonctions libérales. Une nouvelle catégorie de propriétaire se manifeste de plus en plus dans le paysage irrigué soussi, il s'agit de cas d'anciens techniciens, ingénieurs agronomes, hydrauliciens... qui créent leurs propres exploitations. Ces derniers comme le reste des moyens investisseurs accèdent souvent à la propriété après le morcellement et la mise en vente des terres issues des plantations ruinées par la baisse de la nappe.

Les inégalités d'accès à l'eau concernent également l'alimentation en eau potable prennent des aspects différents. Les écarts les plus remarquables sont ceux qui touchent le milieu rural et les quartiers sous-équipés en milieu urbain. Les douloureuses sécheresses qui ont touché le pays ont démontré l'ampleur de déficit en la matière et poussé les autorités hydrauliques à recadrer les stratégies qui concernent le sujet de l'eau.

La région du Souss-Massa-Dra est considérée parmi les territoires où les différents plans nationaux d'amélioration des conditions d'alimentation en eau potable des populations rurales ont réussi. Ce succès est du, sans doute, à l'existence d'une tradition d'organisation communautaire. Dès les premières années de sécheresses de la décennie quatre-vingts et à la suite des grandes baisses du niveau de la nappe, les habitants commencent à prendre l'initiative d'équiper leurs douars de systèmes pérennes d'alimentation en eau destinée à la consommation domestique et à l'élevage. Ainsi, bien avant l'arrivée des projets initiés dans le cadre des programmes de l'Etat (exemple PAGER), un nombre important des douars de la plaine du Souss s'étaient déjà auto-équipés.

En milieu urbain, malgré l'importance des efforts d'aménagement et de desserte en eau potable, il y a toujours des quartiers clandestins qui restent sous-équipés. Le rythme d'extension des villes l'emporte largement sur celui de l'extension de la couverture des

réseaux d'eau potable. Le cas du Grand Agadir est assez significatif : la couverture des ménages en eau courante au niveau de cette agglomération ne dépassait pas 57% en 1994, et ce malgré le développement d'un rayonnement hydraulique qui dépasse de très loin les limites du périmètre urbain.

A côté de cet aspect quantitatif de la ressource, il ne faut pas oublier l'aspect qualitatif de l'eau dans ces régions sud-atlasiques. Plusieurs travaux et suivis de qualité de l'eau notamment dans le Souss-Massa, montrent bien la dégradation de la qualité de l'eau dans certaines zones. Cette dégradation d'origine multiples, ne pourra que réduire le potentiel hydrique utilisable et priver des usagers d'une eau auparavant saine et à usages multiples. Un phénomène d'intrusion marine dans la frange côtière devient de plus en plus menaçant à cause de la surexploitation et des aléas climatiques.

La mise en place de l'Agence hydraulique du bassin semble être un moyen d'instaurer une réglementation pour gérer les ressources en eau dans ces bassins. Une telle gestion intégrée ne peut être significative que si la loi 10-95 sur l'eau rentre en application d'une manière rigoureuse.

CONCLUSION :

Malgré des ressources en eau relativement abondante, la question de l'eau a toujours été un souci majeur pour la population du Souss-Massa-Dra. Mais cette préoccupation n'est pas une notion absolue; dans ce milieu aride elle se réfère, certes, à la rareté et à l'irrégularité naturelles des ressources en eau, mais celles-ci n'ont de sens que par rapport aux moyens techniques que requiert leur maîtrise, à l'organisation sociale nécessaire à leur gestion et à la volonté politique d'appliquer les règles et principes de la bonne gouvernance susceptible d'asseoir une équité hydraulique. Or l'histoire de notre région présaharienne nous enseigne, en effet, que derrière l'apparence d'une réglementation rigoureuse, souvent idéalisée à tort, l'eau a toujours été l'objet d'appropriation, de compétition voire d'accaparement, au point où la main mise sur l'eau a souvent été le fait d'un groupe social dominant, au détriment et même à l'exclusion des autres : groupes ou individus. *Hier, dans le Dra, la richesse ou la pauvreté en droits d'eau se réfère au statut social des groupes et des individus ; et, aujourd'hui, dans le Souss, seuls les moyens financiers disponibles président à l'accès ou à l'exclusion de la nappe.*

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Stress hydrique et crise socio-spatiale dans les campagnes du Souss-Massa.

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Résumé

La vie rurale et l'économie agricole dans le Souss Massa sont de plus en plus marquées par le stress hydrique. En effet, les potentialités hydriques sont de plus en plus limitées face à des besoins croissants :

Mobilisation de toutes les ressources en eau superficielles, surexploitation et déficit des nappes phréatiques, concurrences entre les différents secteurs ... Dans un contexte de rareté et de gestion dominée par « le laisser faire », une crise socio-spatiale s'installe dont les principaux aspects se présentent comme suit :

- dégradation des espaces agricoles,
- désertification par le bas et l'abandon des petites exploitations,
- passage du petit propriétaire au salarié agricole.
- différenciations des stratégies des forces sociales en présence.
- Efficacité et limite des interventions de l'Etat.

Par ailleurs, nous allons essayer de montrer comment l'eau se présente ici comme un puissant facteur de distinction et d'exclusion sociale. Comment la « chasse à l'eau » exprime les inégalités et les injustices sociales devant l'accès à un patrimoine collectif et par conséquent crée des tensions et des conflits sociaux.

Dans un tel contexte socio-géographique et économique caractérisé par un déficit hydrique et de plus en plus soumis aux nouvelles contraintes de la globalisation, on s'interroge sur la place et de devenir des sociétés paysannes traditionnelles et les conditions qui leur permettent d'accéder à l'eau et donc tout simplement de continuer à exister.

L'EAU DANS LE BANI, DISPARITES ET GESTION PARTICIPATIVE

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Située entre les latitudes 5,6° et 10,1° et les longitudes 28,4° et 30,4°, la région du Bani se trouve à l'extrémité sud du Maroc. Bordée au nord par l'Anti-Atlas et au sud par le Sahara, elle appartient au domaine aride.

Elle est supportée par le Jbel Bani, chaîne montagneuse, qui la structure en une véritable ligne en la traversant d'est en ouest sur près de 400 kilomètres.

La région du Bani est sillonnée par un réseau d'oueds, affluents de la rive droite du Drâa, qui ont entaillé dans le Jbel Bani des gorges étroites appelées foug ou kheng, ou imi en berbère. (Figure 1)

Ce phénomène est répétitif et égrène tel un chapelet les oasis du Bani parmi lesquelles Foug-Zguid et Tata.

Le potentiel en eau de la région du Bani se caractérise par la nature et le type de système aquifère qui provient des nappes alluviales des différents oueds. Celles-ci sont alimentées par les châteaux d'eau de l'Atlas et par l'eau provenant de l'infiltration des crues des oueds. L'écoulement des ces nappes alluviales suit le réseau hydrographique, vers le sud, et converge donc vers les foug, seuls passages possibles, ce qui permet d'avoir un volume d'eau appréciable au niveau de ceux-ci. Les foug jouent donc le rôle d'équilibrateur entre l'amont et l'aval. (Figure2)

Le cas de Foug-Zguid illustre une disparité de l'accès à l'eau avec pour conséquences la dissolution d'une organisation sociale et la modification de la configuration spatiale de l'oasis, alors que l'exemple de Tata démontre la capacité de la population locale à développer une gestion intégrée de l'eau.

Foug-Zguid : l'eau inégalement accessible entre l'amont et l'aval

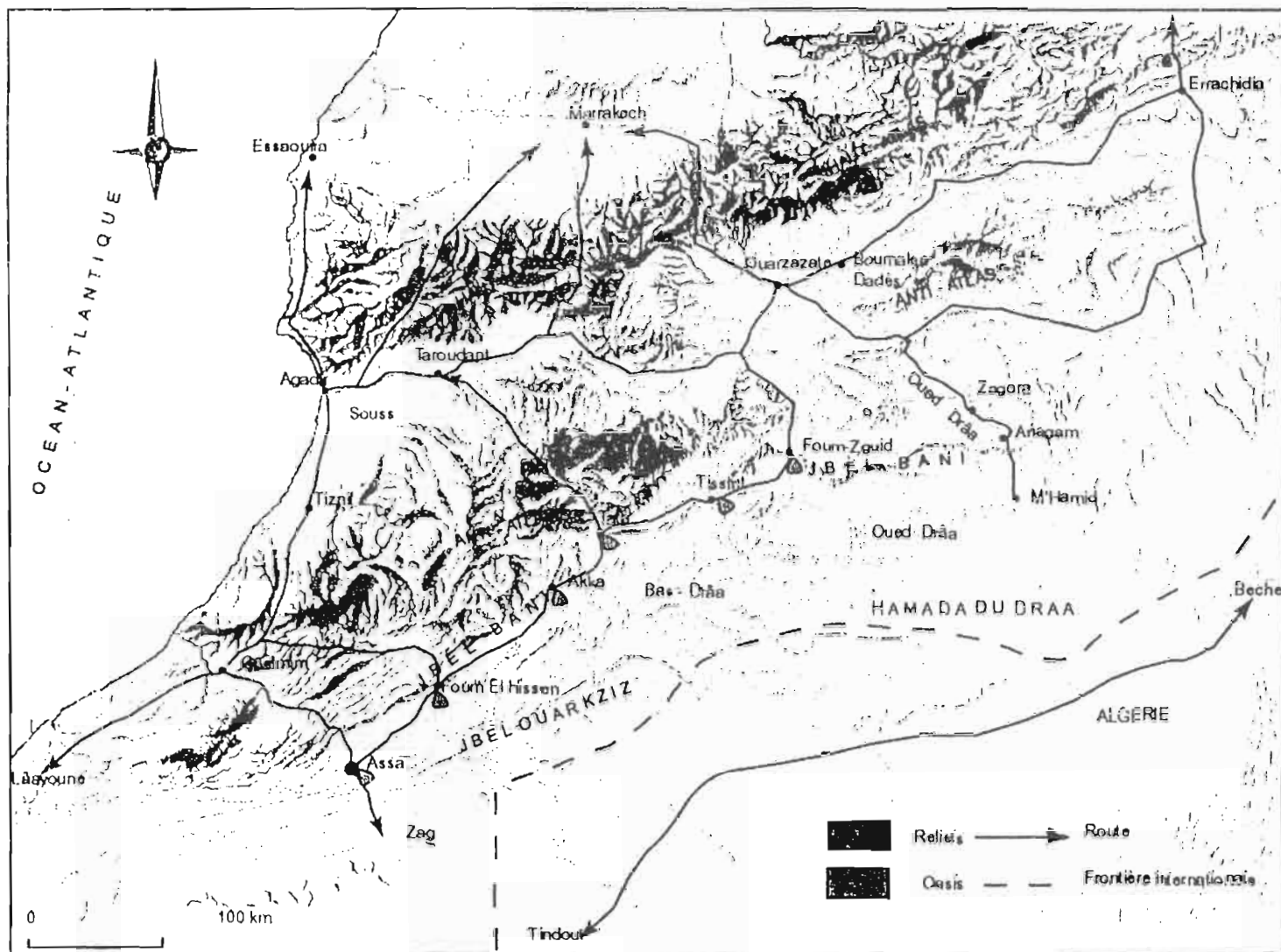
Selon le recensement de 1994, le nombre d'habitants de Foug-Zguid s'élevait à 11934 habitants repartis sur quatorze villages dont sept situés en aval, ceux-ci comptant 5033 habitants soit plus de 40% de la population totale.

L'apparition de nouvelles méthodes d'irrigation symbole du dynamisme hydraulique

Jusqu'en 1980, la mobilisation des eaux d'irrigation à Foug-Zguid reposait sur une organisation traditionnelle, articulée autour d'un système de galeries souterraines : khattara, de puits à balancier, d'aghrou...et autour d'une distribution réglementée et gérée par la Jmâa : le tour d'eau ou nouba, qui permettait un accès identique et équitable à l'eau.

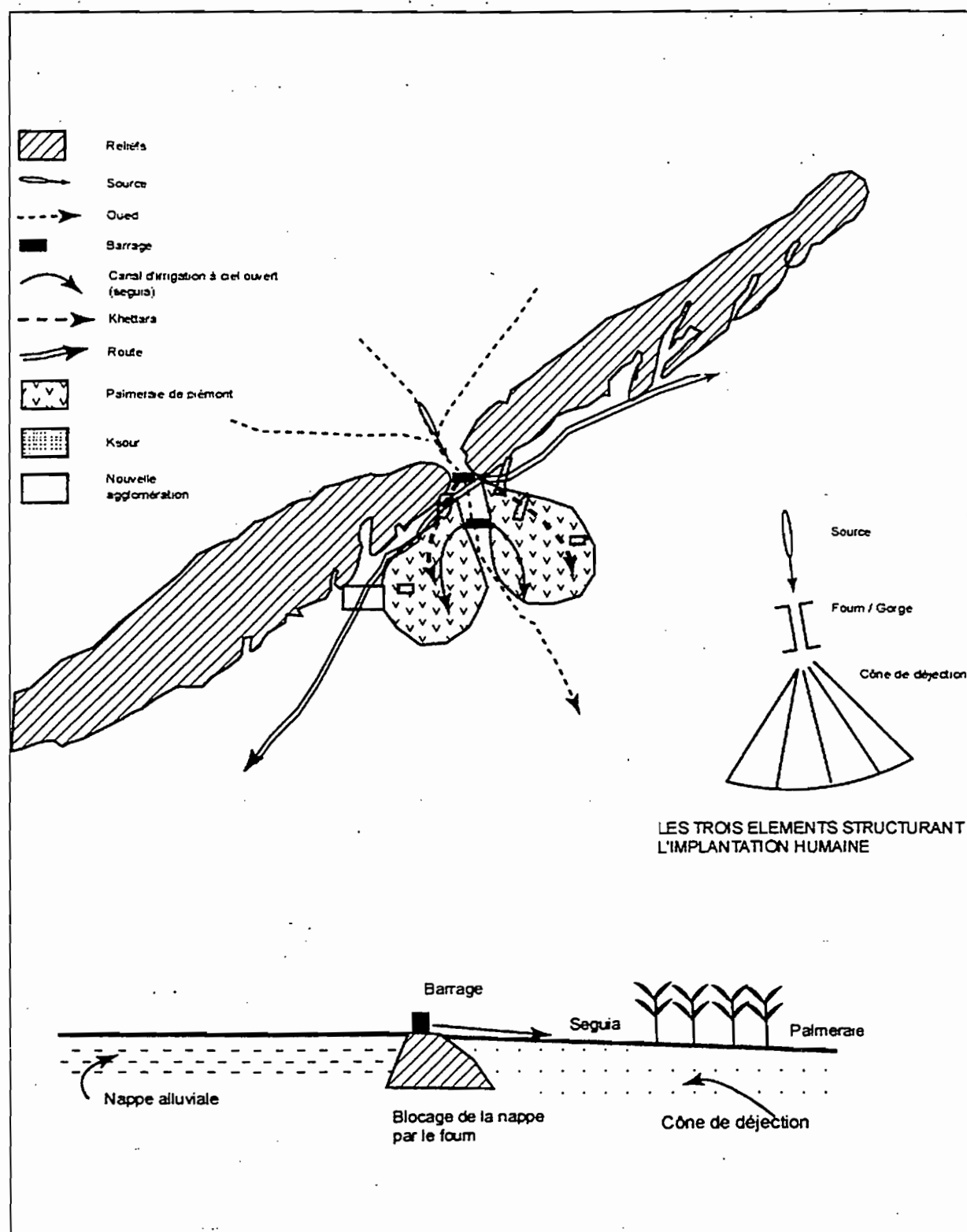
A partir de 1980, en réponse à la croissance démographique de l'oasis, au morcellement de la propriété agricole, à l'insuffisance de l'eau d'irrigation (tour supérieur à quinze jours), les tribus Ouled Hlal et Lmhamid ont autorisé la mise en valeur de leurs terres collectives en amont de l'oasis. La conquête de ces nouveaux espaces s'est accompagnée d'une nouvelle dynamique hydraulique avec l'apparition d'aménagements plus sophistiqués et plus performants. Ainsi, les méthodes ancestrales sont remplacées par des motopompes puissantes diesels ou électriques et des systèmes d'arrosage automatiques, le tout permettant la prise d'eau des nappes phréatiques. Aujourd'hui 97% des puits sont situés en amont du foug.

Figure 1 : La situation géographique des pays du Ban



Source : Atlas du Maroc - Retravaillé par Mohamed Oudada à l'aide de Photoshop et Illustrator

Figure 2 : L'organisation spatiale de type foun



Les retombées de l'émigration : source d'une crise spatiale et sociale

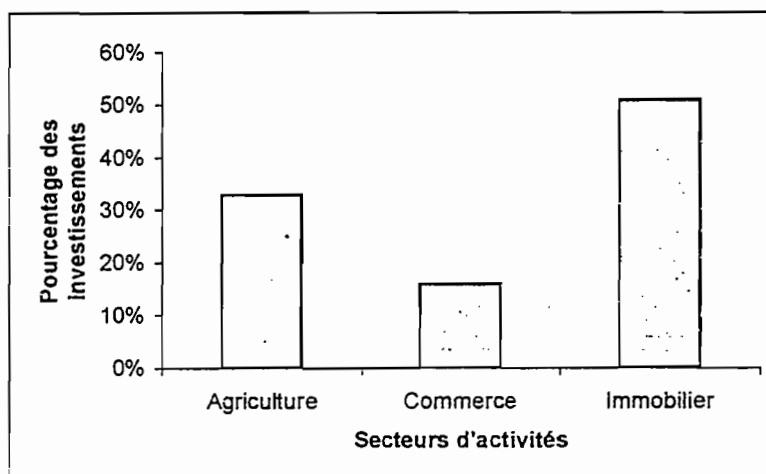
Alors qu'en 1980 Foum-Zguid ne comptait que 34 puits, ce mode d'irrigation a depuis proliféré. Cette nouvelle technique d'irrigation est introduite en amont de l'oasis essentiellement grâce aux retombées financières des émigrés qui ont, entre 1997 et 1999, augmenté de 66% pour atteindre plus de 500 000 Dh (Figure 3), avec à cette même date, un tiers des investissements des émigrés consacré à l'agriculture (Figure 4).

Figure 3 : Evolution des transferts d'argent générés par l'émigration à Foum-Zguid.

Année	Sommes transférées en Dh
1997	326153,64
1998	358449,90
1999	541262,34

Source : Direction Provinciale des PTT

Figure 4 : Répartition des investissements des émigrés à Foum-Zguid en 1999, selon les secteurs d'activité



Source : Enquête de terrain - 2000

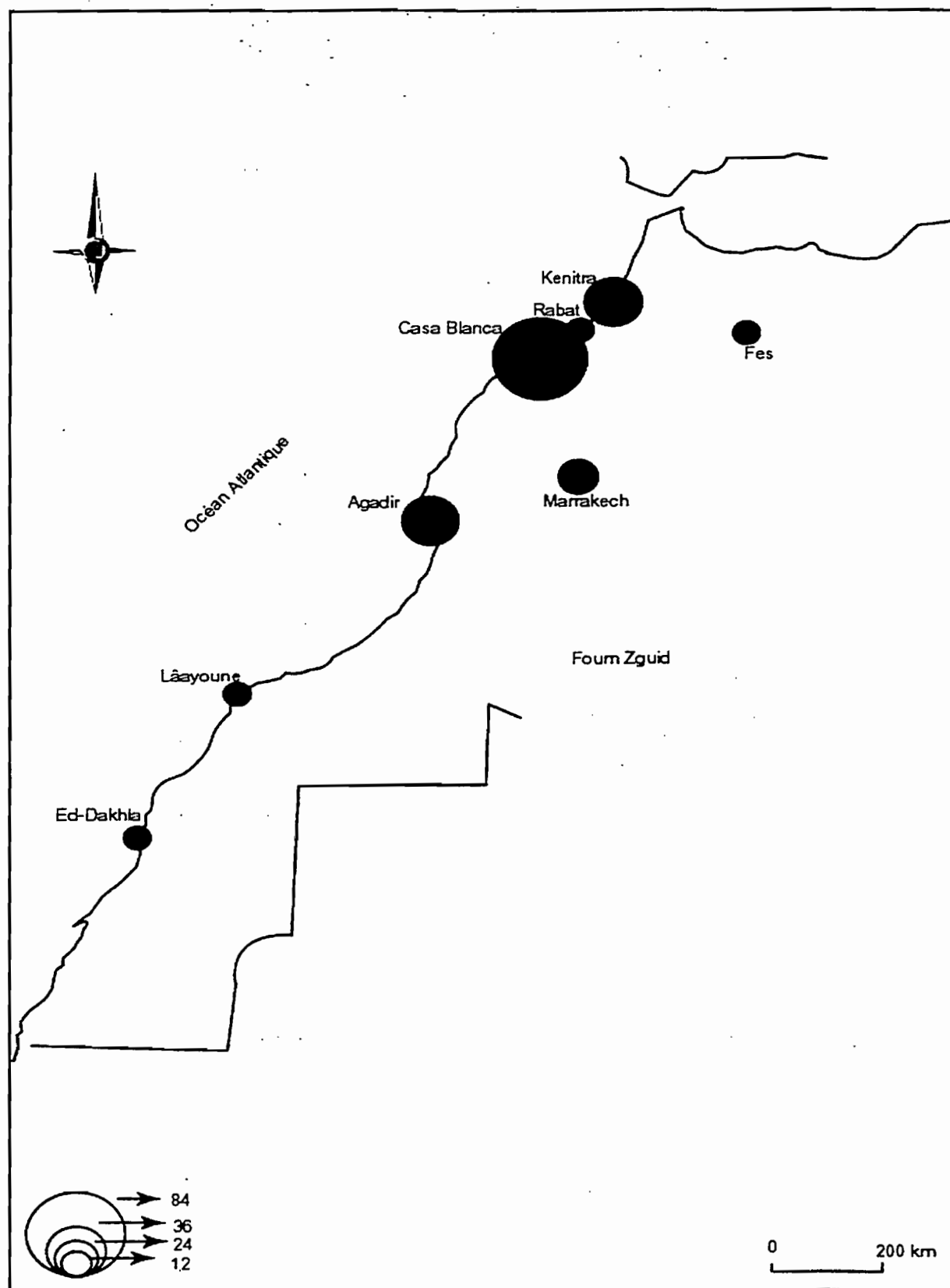
En 2002, on dénombrait dans l'oasis de Foum-Zguid 948 puits, parmi lesquels plus de 96% concentrés en amont.

L'essor de ce mode d'irrigation a engendré une surexploitation des eaux en amont, d'autant plus que les nouvelles cultures qui y sont développées sont très demandeuses en eau, comme le henné. Par ailleurs, aucune réglementation de la gestion de l'eau n'a été instaurée dans l'oasis. En effet, en dehors du coût de fonçage et d'équipement des puits, l'accès à l'eau est gratuit et sans réserve.

Ce passage brutal à la motopompe a généré une crise écologique avec le tarissement de la nappe phréatique en aval et par ricochet une crise sociale avec l'assèchement, la mort de l'oasis en aval et le déplacement de sa population.

Celui-ci se manifeste au travers des 4% de la population de Foum-Zguid qui en 2000 avait émigré pour 55% à l'étranger et pour 45% au nord du pays. Cette frange représente des membres isolés de famille qui partent tenter leur chance ailleurs, alors que parallèlement en 2003 79 familles, soit près de 11% des familles implantées en aval du foum avaient quitté définitivement la région. (Figure 5)

Figure 5 : Les principaux centres d'attraction de la population émigrée de Foun-Zguid



Source : Enquête personnelle - M.Oudada - 2003

Figure 6 : La mort des palmiers et l'abandon des parcelles en aval de Foum-Zguid



Source : Mohamed OUDADA (2003)

Dans cette région où les ressources en eau sont très inégalement réparties, l'eau devient un enjeu de pouvoirs. Alors que les habitants de l'amont ont accès à l'eau sans contrainte et sans limite, les habitants de l'aval assistent à la mort de leur oasis. Cela ne va pas sans s'interroger sur l'apparition de rivalités d'usage et de contrôle de l'eau entre terroirs.

Verra-t-on bientôt la revendication de l'aval à l'accès à l'eau souterraine en provenance de l'amont ? Verra-t-on le développement de groupes en amont réclamant le droit de vendre « leur » eau à l'agglomération urbaine de Foum-zguid et aux villages aval ?

Dans le but d'améliorer la condition des habitants, de maîtriser et de réguler les eaux pour l'irrigation, la construction d'un barrage au niveau du foum s'impose désormais. Il permettrait à la fois de capter les eaux des crues, de recharger la nappe et de réguler l'apport amont-aval.

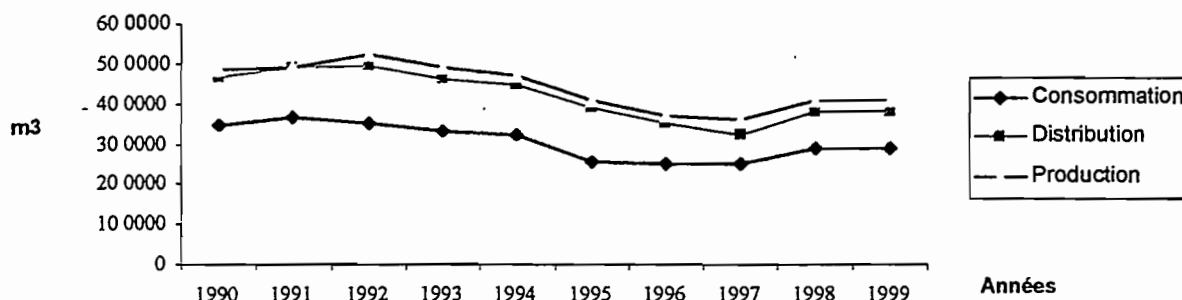
Tata : un modèle de gestion intégrée de l'eau potable

La vallée de Tata encadrée par les montagnes se présente sous la forme d'une succession de petites oasis tout le long de l'oued Tata, et compte plus de 30 000 habitants. Promu chef-lieu de province en 1977, ce statut a généré l'installation d'administrations et d'équipements, base du dynamisme spatial de la ville.

Le réseau de distribution en eau potable inadapté

Avant 1977 la gestion et la distribution de l'eau étaient prises en charge par la Daïra. Les moyens techniques se résumaient à un réseau limité à l'alimentation des services administratifs, notamment les casernes militaires. Ce réseau était approvisionné par un seul puits situé au nord du centre de Tata à proximité de oued Tata, dont l'exploitation a débuté en 1971. En 1977, la production de ce puits ne permettant pas de répondre aux besoins croissants de la population, l'ONEP (Office National en Eau Potable) est intervenu pour l'approfondir. Puis en 1982, l'ONEP s'est associé au Ministère de l'Équipement, afin de forer et d'exploiter deux nouveaux puits sur l'oued Tigmet, laissant à l'abandon le premier. Aujourd'hui ces deux puits alimentent deux châteaux d'eau, d'une contenance de 500 m³ chacun ; un troisième est en cours de construction. Le réseau de production est composé de 2410 m de canalisation contre 45748 m pour celui de distribution.

Figure 7 : Evolution de la production, de la distribution et de la consommation de l'eau à Tata entre 1990 et 1999



Source : ONEP - Tata - 2001

Comme l'illustre la figure 7, les quantités produites, distribuées et consommées sont significativement différentes. Cela est dû à l'état du réseau, ancien (il date de 1971) et vétuste, ce qui engendre des pertes importantes. Les travaux entrepris par l'ONEP pour réhabiliter le réseau commencent à porter leurs fruits, puisque l'on constate que ces pertes avoisinent les 20% à partir de 1997 contre près de 30% en milieu de la décennie.

Après 1992, des travaux sont entrepris mais restent insuffisants pour réhabiliter la totalité du réseau ; cela se mesure entre la différence d'eau distribuée et celle consommée.

En ce qui concerne la répartition de la consommation de l'eau, il apparaît que la consommation domestique est majoritaire : 64,9% en 2000, contre 27,9% par les administrations et services publics, et 7,2% par d'autres secteurs (hôtels, commerces...). Un indicateur important pour mesurer la couverture de la zone urbaine de Tata par l'ONEP est l'évolution du nombre d'abonnés.

Figure 8: Evolution du nombre d'abonnés au réseau d'eau à Tata entre 1990 et 1999

Année	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Abonnés	1 170	1 419	1 576	1 655	1 695	1 806	2 019	2 129	2 229	2 311
Habitants					12 549					14 062

Sources : ONEP Tata -2001 ; RPG - 1994 et 1999

En dix ans le nombre d'abonnés a quasiment doublé. De plus le ratio nombre d'abonnés/habitants, qui était de 0,13 en 1994, a atteint en 1999 0,16, traduisant ainsi la proportion croissante d'habitants raccordés au service public de l'eau.

Cependant, l'ONEP ne couvre pas la totalité de Tata, seul le centre est desservi, les quartiers périphériques distants seulement de quelques kilomètres étant exclus.

La multiplication des lotissements et l'apparition de nouveaux quartiers en direction de l'est et du nord a provoqué l'accroissement de la demande. En effet, la population urbaine de Tata a augmenté de plus de 12% entre 1994 et 1999, tout comme entre 1982 et 1994. De ce fait la politique de distribution de l'eau potable est vécue inégalement par les habitants de Tata et conduit à de fortes disparités.

Est-ce le résultat d'une sélection des quartiers, voulue par l'ONEP pour des motifs de rentabilité, ou l'absence de moyens de ce dernier qui n'a pu répondre à l'expansion de la ville ?

La création de réseaux d'eau potable sous l'impulsion d'acteurs locaux

Devant le désengagement de l'Etat en matière d'infrastructures d'accès à l'eau potable, des quartiers périphériques comme Agadir Lahna instaurent un réseau parallèle, avec une gestion autonome de la distribution.

Ce phénomène nouveau supplante le travail collectif, ancestral, dirigé par la Jmâa.

La population locale s'est regroupée en associations, légitimées par des dispositions législatives, se fixant des objectifs de développement économique et social.

L'accès à l'association est conditionné au paiement d'un droit d'adhésion. Les fonds ainsi récoltés, complétés par des dons d'émigrés originaires de la région, permettent le démarrage de projets. Ceux-ci peuvent se poursuivre grâce à l'intervention d'ONG ou de l'Etat sollicités par l'association.

Nous pouvons citer quelques exemples de réalisation positifs où l'ensemble de la population de quartiers périphérique de Tata a accès à l'eau, dans la mesure où la totalité de ces quartiers est couverte par le réseau parallèle développé.

Figure 9 : Exemples de réalisation d'alimentation en eau potable

Localité	Habitants	Foyers	Dépenses par mois en DH	Recettes par mois en DH	Nature des réalisations
Igni	1 030	145	3 500	7 000	2 puits
Intzat	925	210	5 000	8 000	2 puits
Taourirt	223	47	2 900	5 000	2 puits

Source : Enquête de terrain - M.Oudada - 2003

Après la réalisation des projets, l'association locale s'engage à en assurer le bon fonctionnement. Dans cet objectif, l'association emploie en général deux agents, un pour l'entretien des installations, un autre pour le relevé des compteurs et la facturation. Les recettes proviennent donc du paiement, par les ménages, d'un abonnement au réseau et de

leur consommation mesurée par compteur individuel, alors que les dépenses, quant à elles, concernent le fonctionnement et l'entretien des installations. Recettes et dépenses connaissent des fluctuations au cours de l'année, avec des périodes de plus forte consommation en l'été.

La gestion de l'eau source de tension entre Etat et société civile

Dans la région du Bani, comme dans tous les milieux arides la plupart des conflits relève de l'eau avec souvent comme enjeu le contrôle des ressources dans un contexte urbanistique mal maîtrisé. Après la réussite de la mise en place d'un réseau parallèle d'accès à l'eau potable par les autochtones, les inégalités entre les quartiers sont pour partie levées. Cependant les tensions sont vite apparues dans la mesure où les quartiers périphériques ont accès à l'eau à des tarifs moindres que les quartiers desservis par l'ONEP.

Figure 10 : Prix du litre d'eau selon le fournisseur en 2001 à Tata

	ONEP			Association d'Igni		
Vol en m3	0 à 24	25 à 60	> 60	1 à 20	21 à 40	> 40
Prix en DH/l	2,30	6,42	9,54	2	3	4

Source : Enquête personnelle - 2003

Les différences de prix trouvent une explication dans la prise en compte par les associations locales du pouvoir d'achat et des ressources de la population en zone rurale, alors que l'ONEP quant à elle dessert essentiellement les villes urbaines. Par contre, des villages en limite de ville peuvent opter pour un raccordement à l'ONEP, ou pour une gestion locale de l'eau. Du fait de la différence de prix, c'est cette dernière solution qui est le plus souvent choisie, créant parfois des litiges avec l'ONEP. Ce fut le cas à Agadir Lahna où l'ONEP a tenté de s'approprier la distribution de l'eau au détriment de l'association. Le projet a été rejeté par la population locale qui a maintenu sa confiance en son association.

Conclusion

L'eau, richesse du Bani, car rare dans cette région aride, demeure un enjeu de part son mode de gestion. Elle peut-être, à l'origine de la disparition d'une organisation sociale et spatiale quand les modes d'irrigation modernes supplantent les techniques ancestrales et que les plus démunis voient leur accès limité et réduit à cette ressource.

Mais d'autre part l'eau dans le Bani développe des synergies lorsque la population locale se regroupe et organise un mode de gestion collective autour de cet élément précieux.

Dans les deux cas l'absence de l'Etat ne pourra perdurer. Il pourrait permettre une réglementation de l'accès à l'eau en intégrant les considérations environnementales, en diminuant les disparités sociales.

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La politique hydraulique marocaine à l'épreuve : secheresse et crise des identités rurales

* IHAZRIR Abdelmalek

Faire du Maroc la Californie de l'Afrique était l'une des préoccupations majeures du jeune Roi intronisé en 1962. Dans ses discours et interviews, le choix d'une agriculture d'exportation du modèle californien était une nécessité pour un pays sans atouts technologiques.

Le monarque chérifien fait de l'agriculture irriguée le centre de sa politique. En sa qualité de commandeur des croyants, il évoque éloquemment devant les foules paysannes le verset sur-médiatisé de la sourate des prophètes « ... et nous avons tiré de l'eau toute la vie » Il a toujours le mérite de commander aux Oulèmas du Royaume de prier avec rectitude en vue de supplier Dieu d'envoyer la pluie bienfaisante au moment où les hommes désespèrent. Il reprend le contenu de sourate de la Choura . L'eau, par les prières de rogations intègre l'espace du sacré au Maroc.

Ce projet tourné vers l'hydraulique avec mécanisation de la grande culture permet l'équilibre de la balance commerciale, talon d'Achille du gouvernement Balafrej. Mais on ne saurait en effet réduire ce dessein à cet effort du développement. Outre, le facteur économique, il importe de rendre compte de la portée de la politique barragiste lancée par le plan triennal 1963 – 1965 et les recommandations du Colloque Mamora en 1964. L'eau des barrages est considérée comme un enjeu politique, on cherche le consentement préalable des notables qui acceptent leur sujestion en échange de l'immobilisme agraire et de la prospérité de leurs exploitations agricoles.

Au Maroc, la terre, l'eau et la politique sont souvent étroitement imbriquées, la corrélation et les liens de réciprocité entre ces trois composantes demeurent prédominants. Ils sont révélateurs d'une réflexion sociale voire anthropologique datant du 19ème siècle. La terre et l'eau sont l'enjeu d'une compétition au sein du Makhzen et la communauté rurale. C'est pourquoi les rapports makhzen et ruraux ne sont pas exempts de tensions (1)

- Professeur des sciences politiques à l'Université Caddi Ayad – Marrakech et à l'Université Sidi Med Ben abdellah – Fes . Il est auteur de plusieurs travaux sur l'agriculture et le développement rural au Maroc.

(1) Les révoltes d'origine rurales s'accroissent surtout au 19ème S. On trouve ce que l'on peut appeler « la fronde des caïdes qui cherchent à assouvir leurs ambitions. Il s'agit des luttes entre les chefs locaux pour obtenir l'influence auprès du pouvoir.

Ce n'est pas un hasard de trouver que la question hydraulique a focalisé l'attention des pouvoirs publics. En plus de l'engagement pris par le monarque cherifien depuis 1963 : l'édification d'un barrage chaque année. Un programme monolithique basé sur l'irrigation a monopolisé les efforts du gouvernement. Tous les plans devraient traduire cette volonté puisque la part des crédits mobilisés par les barrages et équipements ont représentés en moyenne plus de 60 % des crédits affectés dans l'agriculture.

Mais voici qu'un peu partout, sous l'effet de la sécheresse et du déficit hydrique, on conteste l'orientation primeuriste et le modèle agro-exportateur de l'agriculture marocaine. Les investissements consentis par l'Etat surtout en matière hydraulique n'ont pas malheureusement des effets notables pour le monde rural. La campagne demeure à l'écart de véritables progrès. L'eau des barrages et la sécheresse ont chassé la paysannerie et ont provoqué une disparité croissante entre les ruraux.

Il n'existe plus ce pacte social intégrateur et fédérateur qui constitue pour les ruraux la grande force de l'idée rurale. Au fond, il y a une crise identitaire perceptible et une panique généralisée.

Mais peut-on les faire obéir à la relation mécanique et simple de cause à effet entre sécheresse et crise des campagnes ? notre analyse ne se cantonne pas dans une vision réductionniste selon laquelle le déficit hydrique handicape la dynamique sociale en milieu rural. La situation actuelle est le résultat de plusieurs facteurs : Nous retenons surtout que les projets de développement hydraulique ne sont pas de grande posture car leur fondements ne sont pas tirés des exigences concrètes du monde rural mais de politique ayant vu le jour sous d'autres raisons.

A- L'eau des barrages et la concrétisation de la vieille vision coloniale du million d'hectares.

A- La politique hydraulique : un grand dessein royal

Le Roi prend le soin de réaliser le rêve californien tant ressassé par le Protectorat pour le développement d'une agriculture moderne centré sur les grandes plaines (le gharb, le saïs, Le Tadla et le Haouz) . A l'instigation de la chambre d'Agriculture de Casablanca, les autorités résidentielles ont drainés des crédits pour mettre en place le dispositif californien déjà opté en Algérie dès 1920. De 1929 à 1937, plusieurs barrages réservoirs sont construits, dans la région de Sidi Maâchou et Oued Melih ; dans le Beht apparaissent les premiers grands vergers d'agrumes en 1936. L'agriculture spécialisée émerge, produisant pour l'exportation des produits maraîchers et des agrumes, pour lesquels on crée le label Maroc (à l'instar du Sunkist californien) (1)

... Aussi la préférence accordée à l'agriculture primeuriste, quoique traumatisante pour les propriétaires fonciers (le Melk) – car il implique le remembrement, offre un potentiel permettant de rentabiliser les capitaux et de fournir des produits de consommation demeurant dans leur grande partie importés (sucre, céréales).

De plus, la grande irrégularité des précipitation suffit pour expliquer le choix du million d'hectares irrigués (2) . Le déficit hydrique qui s'estime à 57 % pour la campagne 94

– 95 interpelle les esprits sur l'efficacité de la politique des barrages et renforce la conviction des partisans de cette option (3).

Le secteur irrigué, qui représente moins de 10 % de la SAU, apporte pendant les campagnes agricoles de faible pluviométrie une solution à la dégradation de l'agriculture souvent vulnérable sans la présence des réservoirs.(4)

L'effort financier consenti est d'une ampleur exceptionnelle : 4 milliards de DH seulement en 1981 et 1985. Cette politique est soutenue par les plans 1973 – 1977 , 1978 – 1980, environ 56 % des crédits du budget de l'agriculture sont allés aux projets d'irrigation. (5).

A partir de 1975, les pouvoirs publics en respectant le schéma séduisant de la grande hydraulique, ont donné la priorité aux productions stratégiques. Ils sont arrivés à élaborer le plan sucrier, le palm laitier, le plan oléagineux. Neuf ORMVA dotés de puissants moyens furent créées en 1966 (Tadla , La Doukala, Gharb, Haouz, Moulouya, Ouarzazate, Tafilalet, Sous Massa et Loukous) relais de l'ONI, furent créées.

(1) cf Prefol P Prodiges de l'irrigation au Maroc le développement exemplaire du Tadla 1936 – 1985 – Paris – Nouvelles éditions latines, 1986. P.266 « la politique Hassanienne de l'eau et des barages » Editorial de Moulay Ahmed Alaoui 'in ' le temps du Maroc ', n° 73 du 21 Mars 1997 p4

(2) cf Jean Jacques Perennes « le Maroc à portée du million d'hectare irrigués – élément pour un bilan » Maghreb n° 137 juillet – septembre 1992 . p26

(3) Enjeux, n° 72 Mars 1995.

Les périmètres irrigués des ORMVA du Maroc (début 1982)

ORMVA	Superficie Irriguée 19825 (en HAS)	Observation	Superficie en phase finale (en ha) (1)
Tadla	110000	Grande hydraulique	117500
Rharb	86000	Grande hydraulique	246150
Basse –	62000	Grande hydraulique	70900
Moulouya	43000	Grande hydraulique	102300
Doukkala	39000	83000	154500
Houz	21000	89000	94510
Sous Massa	21000	37000	43400
Tafilalt	19000	26000 avec PMH	26500
Ouarzazate	18000	Grande hydraulique	41040
Loukous			
Total	419 000		896 800

Source : Jean François Troin « l'eau : atout et limite pour le développement » in le Maghreb Hommes et espace – A Colin, 1985

Le corps des ingénieurs est intervenu largement dans la conduite des cultures proposées au goût du Roi. Cette bureaucratie agricole forme une véritable corporation qui a pesé d'un grand poids dans la mise en oeuvre de la politique hydraulique. (6)

Par ailleurs, la politique renforce le pouvoir de l'Etat, son image de marque. Ce n'est pas un hasard si les barrages portent souvent des noms d'anciens souverains ou des batailles historiques, ce qui témoigne de la sollicitude particulière, mais aussi de la recherche constante des racines rurales dans le développement moderne. (7)

Parallèlement à la politique hydraulique, un code sur les instructions du Roi est finalisé en juillet 1969. Il s'agit d'un corps volumineux donnant au dessein royal force de loi. La commission chargée de le préparer a suivi de très près les recommandations de la mission de la Banque Mondiale, qui ont depuis cette date constitué la politique officielle du pays. (8)

B – Un modèle agro – exportateur

La gamme d'activité par la BM s'était élargie depuis 1965. Selon Najib Aksbi, les experts ont préconisé un modèle agro – exportateur dont les objectifs déclarés sont la modernisation de l'agriculture par les procédés de la révolution verte et l'édification des ouvrages hydraulique pour irriguer la terre et intensifier la production, la promotion des cultures d'exportation (argumes, fleurs, primeurs). Le système agro- exportateur ainsi créé, devaient rapporter au pays des devises nécessaires à l'équilibre de la balance de paiement, et pour faire face au service de la dette que l'ont projetait de contracter de plus en plus massivement pour financer les investissements hydro – agricoles. (9)

(4) cf Jean François Troin « l'eau : atout et limite pour le développement » in le Maghreb

Hommes et espace – A Colin – collection U Paris, 1985, p94

(5) cf A. Bouami et Med . Raki « Politique agricole et développement de l'agriculture marocaine » RJESM op cit p 133.

(6) f JJ Pérée « les ingénieurs et politique hydro – agricole au Maroc » in l'ouvrage collectif dirigé par E Longunesse " Bâtisseurs et bureaucrates, ingénieurs et société au maghreb et au moyen orient " Lyon Maison de l'orient 1990 – p215 – 230

sur la dimension économique de l'extension des zones irriguées, voir Belhacen Abdellatif 'l'Etat et les paysans au Maroc ' Thèse de Doctorat de 3ème cycle en économie rurale – université de Paris I juin 1985 – 319 pages + annexes

(7) cf JF Troin ' l'eau : atout et limite pour le développement ' opcit, p.100

(8) Will D. sweanringer ' Terre, politique et pouvoir au Maroc ' Revue occident musulman, n° 45 1987 p 49

Les deux acteurs (BM et Etat), promoteur de ce modèle de développement, ont signé plusieurs protocoles, en vue de mettre toutes les structures de politique financière et sociale susceptibles d'entraîner des effets positifs au niveau du secteur, c'est à dire celui de la grande paysannerie. Des investissements publics considérables, destinés au secteur irrigué ne représentent que 8% des superficies agricoles utiles du pays. Ainsi, entre 1965 et 1983, la part réservée au financement des barrages s'est élevée à 243,2 millions de dollars sur 485, 7 millions, soit 50% du total.

Malgré les difficultés budgétaires (début des années 80), l'investissement dans le domaine hydraulique se poursuit. Les efforts de l'Etat s'inscrivent dans l'engagement pris en 1986 par le Roi : « l'édification d'un barrage chaque année jusqu'à l'an 2000 ». les plans de developpemnt devraient traduire cette volonté royale puisque la part des crédits mobilisés pour les barrages et les équipements d'irrigation ont représenté en moyenne plus de 60% des crédits affectés au secteur agricole (11).

En plus des faveurs importantes accordées à certaines spéculations, le prix de l'eau, fixé en 1969 à un niveau très bas par rapport au prix de revient laissant l'essentiel du coût à la charge de l'Etat. Cette politique.

Cette politique a largement marginalisé plus de 90 % des terres bours abritant plus des autres cinquième des ruraux. (12).

De nombreuse équilibres socio – économiques en milieu rural sont menacés par l'introduction des périmètre irrigués. L'Etat n'a pas veillé à intégrer les agglomérations paysannes dans ses plans d'irrigation. Les forces politiques critiquent la politique hydraulique. Celles –ci n'a pas débouché que sur l'aggravation des inégalités sociales, sur la concentration de la propriété foncière et des richesses d'un côté et paysannerie effrénée de couche de plus en plus élargie de l'autre. En effet, la construction des barrages tend à ruiner la petite propriété paysanne et par voie de conséquence à faire baisser le niveau de l'emploi dans l'agriculture et accroît « le chômage déguisé » (13)

Par ailleurs, il serait injuste et inefficace de faire peser la charge intégrale des équipements hydrauliques sur le budget général de la nation sans toucher l'écroulante majorité paysanne. (14)

(9) Najib Akesbi ' Dépendance alimentaire et vérité des prix : mythes et réalités in la crise et l'endettement du tiers monde ' opcit 375.

(10) Discours de SM le Roi lors de l'ouverture de la session parlementaire d'octobre 1986.

(11) Najib AKSBI et Driss GUERAOUI ' Enjeux agricoles ' opcit, p 34.

(12) p Ibid p 376

(13) cf Libération 31 Mai 1981 p.5 Will d. Swearing « Terre, politique et pouvoir au Maroc op cit p.52.

(14) cf André Tiano ' Le Maghreb entre les mythes ' puf, Paris 1967, P.178.

II - La politique hydraulique à l'épreuve

Dès le début des années 80, le Maroc connaît des difficultés financières, le grief adressé à la politique agricole basée sur l'hydraulique est d'avoir accentué les inégalités sociales : dépression des petits fellahs au profit de l'oligarchie foncière. l'Etat, aidé par BM développe une nouvelle approche basée sur l'encouragement de l'agriculture en bour.

A – les griefs des financiers à la politique hydro – agricole.

Le vieux clivage agriculture traditionnelle et agriculture moderne s'accroît, cette dernière étant assimilée à une sorte d'îlot de relative richesse dans un océan de misère. C'est précisément sur des inégalités inhérentes à ce déséquilibre que les forces politiques de l'opposition fondent leurs propagandes les plus actives. Si l'on sait que même la BM avait estimé que le nombre de paysans absolument pauvres, entre 1960 et 1977 avait sensiblement augmenté de près d'un million de personnes, représentant 45% de la population rurale. Avec la politique hydraulique, on ne peut assurer un équilibre social dans les campagnes. Un tel état de choses constitue une grave menace de subversion pour les systèmes politiques en place. (1).

La dette extérieure est passée de 9,6 à 20,9 milliard de dollars entre 1980 et 1987, ce dernier montant représentant 124% du PBB. Les équipements hydrauliques et les crédits réservés aux Offices constituent deux chapitres budgétivores. Les études confiées aux sociétés étrangères alourdissent la facture en devise. Bien que, les tarifs de l'eau qui sont parmi les plus élevés du monde, ils ne permettent pas de couvrir les coûts des entretiens et de maintenances.

Le refus des fellahs d'adhérer aux plans d'assolement préconisés par les Offices, et de payer de l'eau accroît le déficit de l'Etat. (2)

A partir de ce constat la Banque Mondiale rectifia son intervention en matière hydraulique et proposa un programme d'amélioration de la grande irrigation (PAGI) qui vise à promouvoir l'autonomie juridique et financière des Offices « de manière à les inciter à fonctionner davantage comme des entreprises de service (3) ; de même, la Banque Mondiale porte son appui à la paysannerie par le développement des projets dits " intégrés".

B – Les projets intégrés : l'expression du statu quo en difficulté.

L'aspect social que la BM veut donner à la politique agricole s'est concrétisé dans la version des projets intégrés. On ne peut mettre fin aux inégalités flagrantes dans les campagnes sans engager des mutations des structures.(4).

Quant à la situation sociale de la paysannerie, elle reste des plus alarmantes, 45% des ruraux " vivent d'un revenu inférieur ou égal au seuil de pauvreté absolu. Le tableau que dresse la BM sur l'économie marocaine est donc sombre. selon la même source, le nombre de pauvre absolu aurait atteint 7.4 millions en 1984 (5). Cet organisme estime qu'il serait souhaitable que la stratégie de développement agricole tienne compte de projets visant des groupes de population bien définis au lieu de mettre aussi fortement l'accent, comme par le passé, sur les grands périmètres irrigués. C'est dans ce contexte que l'on note un regain d'intérêt pour les terres bours où l'on cherche à promouvoir des méthodes et des techniques permettant de relever la production vivrière en privilégiant désormais la mise en valeur des terres semi – arides.

(1) BIRD – La Banque et réforme agraire – 1974 pp 6 – 11 – 1974

Le projet Karia Tissa, le projet Moyen Atlas (Khénifra), le projet Oulmès et le projet Meknès II sont en liason avec la nouvelle politique de la Banque Mondiale, mettant l'accent sur la vulgarisation, la formation professionnelle, le contrôle de l'érosion, le développement de l'élevage extensif ... cela se fait principalement par l'octroi de crédit agricoles à conditions de garantie plus avantageuses. Les trois projets engagés bénéficient des financements suivants :

Projet	Coût total (million de Dh)	Origine financemnt extérieur	Durée	Montant (en million de Dh)
El Hajeb – Moyen	134	AID	1976 – 83	14
atlas Fès – Karia –	694.5	BIRD	1979 – 84	65
Tissa				
O u l m è s	4	BIRD	1983 – 84	30
Rommani	577.2			
	4			

La BM s'opposera à long terme à la stratégie des pouvoirs favorables au développement de la grande hydraulique. Elle a décidé de ne plus centrer son action sur le financement de grands projets d'irrigation, mais sur des projets d'agriculture destinés à des groupes de population déterminés.

La Banque participera également à des opérations de petite et moyenne hydraulique et à des projets de petites entreprises agro – industrielles, pour compléter l'action menée en faveur de l'agriculture en bour. Pour ce qui est des projets d'irrigation, la Banque continuera de mettre explicitement l'accent sur la perception de redevances suffisantes pour recouvrer les coûts, avant d'envisager de participer à d'autres projets, il conviendrait de trouver une solution au problème posé par le fait que l'Etat ne respecte pas à la lettre les projets financés par la Banque. Celle – ci concentrera désormais ses efforts dont l'objectif sera de réduire les secteurs de pauvreté. (6)

II Le monde rural face à sa crise d'identité

Le bilan de deux décennies démontre l'ampleur de la crise. Le médiocre développement de l'agriculture marocaine fait que le nombre de fellahs ne croit plus. Bien au contraire, la mécanisation des travaux entraine une régression très nette de la population rurale. Par le développement de l'agriculture sous des formes diverses (sericulture, agro-industrie) le paysan conserve son extérieur de paysan, mais tout en entreprenant des fonctions d'ouvrier.

(2) cf Jean Jacques Pérennes " Le Maroc à portée du million d'hectares irrigués " opcit, p39 – 40

(3) Ibid p41

(4) Cf KHROUZ Driss " La politique agricole du Maroc " AAN, 1986 p492

(5) Cf Najib AKSBI – Driss GUERAOU " Enjeux agricoles " opcit p116.

(6) Rapport de la Banque Mondiale du mois d'octobre 1979 P 40 intitulé " Le secteur agricole du Maroc, problème du secteur et stratégie de la Banque. "

Quelle est place que conserve aujourd'hui l'idée de la défense du monde rural comme unité organique ? les termes villes et campagnes ont vieilli. Ils ne recouvrent plus les mêmes réalités sociales qu'au début de l'indépendance. Les campagnes sont actuellement transformées dans tous leurs aspects. L'idée d'un antagonisme fondamental entre villes et campagnes ne peut survivre. (7)

Il est vrai que l'exode rural constitue un exutoire dont on mesure l'importance. C'est pourquoi le gouvernement veille à établir un lien entre la politique agricole et la politique sociale (emploi, logement , éducation...) Les transformations des rapports de production met de plus en plus les fellahs face à des industries agro – alimentaires qui les assujettissent. En résulte – t – il une transformation de la prise de conscience politique de la paysannerie, soudain confrontée à plusieurs partenaires que l'Etat et découvre que celui-ci est "inféodé" aux accords internationaux.

Les valeurs morales elles – mêmes et le genre de vie que la paysannerie évoquent apparaissent assaillis et démantelés. L'attitude à l'égard de la propriété foncière change. La nécessité d'une appropriation terrienne est de moins en moins admise. Le perpétuel problème de la succession oblige encore le nombre de jeune agriculteur à vendre leur part, ceci est ressenti par eux comme une libération et non plus comme une contrainte.

Cette situation intraduit un malaise qui envahit l'ensemble de la vie sociale, pèse sur le fonctionnement des institutions traditionnelles mettant le statu quo en difficulté.

A – Le cap des années quatre vingt

Au début des années 80, l'avenir du monde rural s'annonçait au même titre que le milieu urbain, sous le signe de l'ajustement structurel, le désengagement de l'Etat et de la libéralisation. Or cette nouvelle stratégie laisse prédire un approfondissement des inégalités entre les catégories sociales.

La croissance démographique dans les campagnes est l'une des causes profondes qui expliquent le plus les transformations sociales. Elle faisait ressortir des déséquilibres entre les ressources et les besoins de la population, acculant une large frange rurale à l'exode rural. Le Souverain dans son discours du 12 mai 1995, qualifie la situation du monde rural de catastrophique. " la sécheresse fait que toute l'économie souterraine ne circule plus ...] s'il a une facture pour l'instant et elle existe, c'est une facture concernant les bienfaits de l'Etat. Jusqu'à présent l'Etat n'a pas versé que dans un sens, car comme vous le savez, le développement et l'équipement appelle l'équipement, et nous avons versé trop de l'eau sur le monde citadin et nous avons privé le monde rural " (8) les intérêts des ruraux se trouvent sacrifiés, c'est ce qui s'est produit, de l'aveu même de la plus haute autorité du pays ; depuis, les pouvoirs publics réfléchissent sur une nouvelle approche globalisante en s'attendant à la mise sur pieds d'un programme touchant en profondeur les maux de la paysannerie notamment l'exode rural et l'émiettement de l'espace.

(7) l'intervention de Med Naciri " Le développement rural son nouveau cadre et sa problématique in le colloque organisé par l'USFP sous le thème " Le monde rural trente ans après " AL ITIHAD AL ICHTIRAKI – 20 Décembre 1995

(8) l'interview accordé par SM à la chaîne de télévision, TV5 El Bayane n° 6277 du 19/9/1995.

1 – Un exode généralisé

L'exode rural apparaît plus ancien, mais le phénomène des flux s'amplie au cours des deux dernières décennies. Il n'est pas étonnant de remarquer que la population rurale tend à descendre au dessous de 50% dans de nombreuses régions agricoles. Les villes ont dû supporter les charges de l'exode rural, plus de 394 000 personnes auraient quitté annuellement le milieu rural. En effet, selon les résultats de l'enquête nationale démographique, pour la seule année 1987, les départs de la campagne auraient touché 400 000 ruraux, c'est à dire au rythme moyen quotidien de 1100 personne et quelque 46 émigrés par heure.(9)

Ces flux font de nos campagnes un théâtre de migration incessante où " se produisent chaque jour quelque 1800 mouvements migratoires de tous genres, abstraction faite bien sûr des déplacements à caractère locaux . (10)

La sécheresse reste un alibi sans aucune raison valable, l'année 1987 étant, à cet égard une année de vache grasse. Pourtant, le Centre d'Etudes et de Recherches Démographiques (CERED) a constaté un déversement sans précédent des populations rurales en direction des villes et de l'étranger . (11) .

Cet exode entraîne également un gonflement des villes moyennes et un engagement des villes littoral.

Afin de donner une illustration aussi exacte que possible du phénomène, une enquête est réalisée en octobre 1977 limitée à un douar type. Il s'appelle chaâba el Hamra (Région d'Azilal). Pour une population de 56 foyers entre 1970 et 1976, 35 % ont quitté leur douar. (12)

D'après les quelques témoignages relevés, la seule solution face à la crise qui s'annonce dans les campagnes c'est la fuite vers les villes :

- *Mustapha, 20 ans paysan, célibataire.*

- *" Que fera le père d'une famille de cinq enfants qui avec les récoltes catastrophiques de 1977, sont mal nourris et mal vêtus "*

" Je n'ai rien à faire ici au douar, je ne travaille même pas un mois par an, mes parents ont vieilli "

- *Med petit paysan, de 28 ans, travaille la terre, c'est très dur et peu rentable, beaucoup de labour pour rien, c'est l'enfer " (13)*

Ce sont surtout les jeunes qui plaignent, ils s'inquiètent de rester là où ils ne peuvent pas travailler. Ils sont de moins en moins attachés à leur région et ne partagent pas les héritages idéologiques locaux comme auparavant " ils rejettent les traits de leur propres culture, notamment les costumes et l'artisanat traditionnels (14)

(9) l'exode rural trait d'évolution, rapports avec les milieu d'origine " Ministère chargé de la population – Direction de la statistique CERED 1995, P 55.

(10) Ibid, p 556.

(11) On admettant le départ de 71 000 personnes vers l'étranger en 1987 dont 26 000 des campagnes malgré la fermeture des frontières de la part des pays européens.

(12) Cf El Ghalabi Lahoussaine " l'exode rural l'exode rural l'exemple de Chaâba el hamra " in lamalif n° 92 novembre 1977 p25.

(13) Ibid, p 25 une grande enquête sur les jeunes ruraux en France est effectuée par Galland et Lambert, les deux auteurs ont constaté chez les jeunes ruraux le manque de sociabilité, face aux nouvelles contraintes, ils rejettent leur milieu – Galland et Lambert " Les jeunes ruraux " Ed d'harmattan 1993 , 256 pages.

(14) Driss Guerraoui " Le paysan quel avenir ? Essai sur l'approche structuraliste " opcit, p73

2 – Un espace agricole fini et émietté

Dans les régions arides, les effectifs des ruraux sont infiniment plus nombreux que dans les régions atlantiques aux potentialités agricoles plus importantes, les ruraux s'entassent dans des espaces cultivables trop réduits.

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Cette situation se complique davantage par les fréquents problèmes de succession. La disponibilité de la terre se raréfie constamment et débouche sur le gonflement des sans terre : 1.908.000 foyers ruraux en 1984, 1400 000, 73,3% sont pauvres contre 1.100.000 dans les années 70 (17) La trame agraire paraît éclatée donnant l'image d'un espace rapiécé. (18)

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Ces propriétaires qui ont acquis ces terres, pour une bouchée de pain préfèrent garder sur place les anciens propriétaires qui deviennent à ce moment de véritables métayers " le retour du Khemassat " dans les campagnes marocains a été accentué dans zones irriguées où ceux qui ont accumulé le capital foncier, continuent d'être assistés par les services techniques.

C'est encore une mission de la Banque Mondiale qui avait estimé que la paysannerie absolument pauvre, au terme de l'année 1977, avait augmenté d'un million de personnes, représentant alors cinq millions d'habitants soit 45% de la population rurale. (20) . l'Etude du CERED qui s'appuie sur les résultats de l'Enquête Nationale sur la famille (1995) fait une nouvelle lecture sur la base d'une nouvelle approche de seuil de la pauvreté. Ce seuil de pauvreté relative s'est situé, en 1990 – 1991 à 1694 dhs par an, et par habitant dans les villes et à 2348 DH pour les ruraux. En 1995, la population socialement marginalisée est estimée à 1,4 millions de personnes (5,4% de la population et la vulnérabilité à la pauvreté relative à 1,3 millions.

16) " Le temps du Maroc " n° 62 du 3 Janvier 1997 p 43.

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Paradoxalement " ce n'est pas dans les zones montagneuses, que l'on observe le gros de l'exode c'est dans les plaines, le pays plat et sédentarisé que le taux d'émigration est le plus élevé. Il n'est pas question de pauvreté à elle seule. Elle est plutôt conjuguée à une faiblesse au niveau de l'enracinement celui – là même que l'on remarque dans les zones montagneuses ou présahariennes. L'exode est d'autant plus massif que les paysans sont plus proches des pôles d'attraction. Depuis plus de trente ans, l'émigration la plus forte a commencé dans les plaines centrales et les plateaux intérieurs. (15)

Les migrants sans niveau d'instruction arrivent difficilement à améliorer leur sort, selon les statistiques du Centre d'Etudes et de Recherches Démographiques, sept sur dix chez les hommes et neuf sur dix chez les femmes restent sans niveau d'instruction, ce qui risque d'être un handicap majeur à leur intégration sociale et économique dans les villes.

Population migrante d'origine rurale selon le sexe et le niveau d'instruction au moment de l'enquête 1991

Niveau d'instruction	Masculin	Féminin	Total
Sans instruction	45,71	85,39	66,24
Préscolaire ou coranique	7,36	0,52	3,84
Primaire	18,41	6,82	12,43
Secondaire 1	12,07	4,01	7,87
Secondaire 2	7,61	2,18	4,79
Supérieur	4,82	0,84	2,75
Non, déclaré	4,02	0,25	2,98

Source : L'exode rural : Traits d'évolution profils rapport avec les milieux d'origine CERED, opcit, p158

Les chiffres sont désormais connus malgré " les 25% du budget global consacré au secteur, l'analphabétisme [.....] le taux de scolarité atteint péniblement les 50% des enfants.(16)

Pour mieux cerner la réalité du monde rural, il va sans dire que la charge démographique est généralement lourde. Les ruraux sont estimés à quelques 4,5 millions au moment du protectorat ce qui, serait aujourd'hui de l'ordre de 13 million . Ne faudrait – il pas rapporter cette population triplé au cours des huit dernières décennies, à la surface agricole utile ? ce qui témoigne du degré de densification du peuplement des campagnes avec une pression forte que cela exerce sur la terre et les ressources locales, et ce en dépit de l'intense mouvement d'exode vers les villes.

B – des villes ruralisées

La ruralisation des villes pourrait vider le monde rural de ses bases sociales. L'attrait qu'évoque les ruraux pour la vie urbaine risque de se traduire par leur paupérisation, ou au moins un coup d'arrêt à leur existence en tant que masse rurale, alors que celle-ci apparaissent comme les soutiens potentiels des partis agraires dans le jeu du pluralisme. De plus, face à des indices tangibles d'insécurité, les ruraux peuvent être attirés vers des solutions autoritaires : les émeutes de Fès en 1991 ont bien signifié l'étroitesse de l'idée du confort urbain.

Mekki Bantahar a analysé l'enquête réalisée par l'Institut National de la Statistique, sur 30700 douars du Maroc. Cette enquête permet de mesurer le degré de pauvreté des campagnes en matière de confort. C'est la raison pour laquelle " La ville est le bonheur idéalisé " elle est plus attirante que le douar.

La ruralisation des villes est le résultat d'une mauvaise évaluation de la réalité rurale, par les gouvernements qui se sont succédés depuis l'indépendance.

Les fonds débloqués pour la mise en valeur des terres (irrigation, engrais, mécanisation) restent sans effets. Mais c'est à partir du partage inégal que les ruraux ont connu la misère des petites parcelles inexploitables qui les ont transformés en journaliers.(21).

Le vécu quotidien est aujourd'hui en milieu rural le miroir où se reflètent les multiples paradoxes et freinent en même temps le développement. Les campagnes présentent les signes avant – coureurs de l'explosion qui fermente depuis quelques décennies. Cette situation débouche sur une crise autour de laquelle un consensus est né d'emblée : l'initiative nationale pour le développement humain lancé par SM Mohamed VI on est une illustration frappante.

L'eau des barrages et la sécheresse ont chassé les fellahs aux mains calleuses vers les villes. Le Maroc rural d'hier ne garde plus ses stigmates. Les ruraux sont atteints d'une certaine schizophrénie puisqu'ils foncent de plus en plus dans une urbanité malheureuse. L'eau, au lieu de garantir le bien être social des ruraux a fait d'eux des homo pauper. Cette situation est accentuée par la sécheresse qui a mis en crise « l'ordre éternel des champs »

.....
(19) cf Abdellatif Aziz « Le retour des Khammes » Maroc Hebdo international n° 224 du 4 au 10 Mai 1996, p 31.

(20) cf Najib AKESBI « Dépendance alimentaire et vérité des prix mythes et réalités – in la crise et l'endettement du tiers monde, op cit 382.

(21) cf Ben Tahar Mekki « Villes et campagnes au Maroc » opcit, p 65.

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GESTION PAUVRETE HYDRIQUE AU MAROC, L'IRRIGATION LOCALISEE AU MAROC, CAS DU GHARB

El Hasnaoui A, Hilali A, Raki M

RÉSUMÉ

La fréquence de la sécheresse durant ces deux dernières décennies a poussé l'Etat à inciter les agriculteurs à mener une gestion plus rationnelle de l'eau en utilisant des techniques économes tel que le goutte à goutte. Le diagnostic du programme d'encouragement de l'irrigation localisée réalisé dans le périmètre irrigué du Gharb en 2003 a révélé que cette technique s'implante dans les zones où les cultures rentables (banane, fraise et maraîchage) se développent le plus. Cette technique est utilisée par une grande variété d'exploitations agricoles bien qu'elle concerne essentiellement les agriculteurs les plus aisés. Aussi, le développement de cette technique devra être conçu dans le cadre d'une politique agricole globale qui intègre la problématique d'une utilisation économe de l'eau dans celle du développement des filières qui valorisent le plus les ressources hydriques tout en profitant au plus grand nombre d'agriculteurs.

Introduction

Depuis les années 60, l'agriculture marocaine a été fortement influencée par la politique de l'irrigation. Cette politique a été caractérisée par le développement des ressources en eau pour faire de l'irrigation un levier de développement économique et social et assurer par conséquent la sécurité alimentaire du pays. A partir de 1967, l'Etat a concentré ses efforts sur la construction des barrages et l'aménagement hydro agricole des grands périmètres irrigués.

Au milieu des années 80 et dans cadre de la politique d'ajustement structurel, l'Etat décida de réorienter sa politique agricole afin de réduire les charges financières dues au remboursement de la dette extérieure dont une grande partie avait été affectée au financement de la politique de la grande hydraulique. De plus, le décalage persistant entre les superficies dominées par les barrages et celles effectivement irriguées a contribué à réduire la rentabilisation des capitaux investis. L'Etat a par conséquent décidé de désengager progressivement de ses domaines d'intervention notamment en associant davantage le secteur privé au développement de l'agriculture irriguée. Il a ainsi procédé à l'amélioration du Code des Investissements Agricoles et à la création en 1986 du Fonds du Développement Agricole qui est considéré comme le pivot de l'incitation de l'investissement privé dans l'agriculture.

La fréquence de la sécheresse durant ces deux dernières décennies a poussé l'Etat à inciter les agriculteurs à mener une gestion plus rationnelle de l'eau en utilisant des techniques économes tel que le goutte à goutte. C'est dans ce cadre, qu'un projet national a été adopté en l'an 2000 prévoyant d'équiper 114.500 hectares en irrigation localisée en cinq ans. Le coût global de ce projet s'élève à 3,8 milliards de dirhams. Il concerne principalement les plantations et les superficies cultivées en maraîchage. Cependant, malgré la subvention de l'Etat qui est 40% du coût des équipements, les réalisations restent timides puisque à titre d'exemple, la superficie équipée dans le Gharb n'est que de 3000 ha sur un total prévu de 14.000 ha. Ce retard est également observé dans le Haouz.

Tableau 1: programme national pour la promotion de l'irrigation localisée

	Superficie à équiper (en Ha)	C o û t d u programme (millions de DH)	Economie de l'eau attendues M m3/an
1-Zones ORMVA			
▪ Moulouya	18.000	900	60
▪ Loukkos	9.500	290	30
▪ Tadla	5.000	150	20
▪ Haouz	20.000	600	60
▪ Souss -Massa	23.000	690	70
▪ Gharb	14.000	420	40
Total ORMVA	89.500	3.050	280
2- Hors ORMVA	25.000	750	80
Total général	114.500	3.800	360

Source : Ministère de l'Agriculture, du Développement Rural et des Eaux et Forêts, décembre 2003.

D'autres mesures institutionnelles ont été prises tel que la promulgation de la loi n° 10-95 sur l'eau et la création des Associations des Usagers des Eaux Agricoles (AUEA).

Dans le Gharb, le gaspillage de l'eau à la parcelle est important notamment dans les secteurs équipés anciennement et qui connaissent une forte dégradation. L'irrigation gravitaire représente 80% de la superficie équipée en grande hydraulique et 20% en système aspersion. La superficie équipée en irrigation localisée ne couvre que 3000 Ha, vers la fin 2003, soit 1,5% de la superficie totale irriguée. Trois séries de raisons majeures expliquent cette situation : l'inadaptation des aménagements hydro-agricoles étatiques aux exigences des cultures les plus rentables, le rôle du secteur privé dans la naissance de l'irrigation localisée et la faiblesse de la rentabilité de l'irrigation dans les exploitations familiales de la région.

1-Inadaptation des aménagements hydro-agricoles étatiques aux exigences des cultures les plus rentables

La totalité de la superficie équipée en irrigation localisée est occupée par des cultures dont les besoins en eau ne peuvent pas être couverts d'une manière satisfaisante par les modes d'irrigation gravitaire ou aspersion. Il s'agit principalement des plantations de banane et de la culture de la fraise. Ces productions exigent une disponibilité permanente de l'eau en tête des parcelles. Les puits permettent de garantir cette possibilité lorsque la nappe phréatique n'est pas très profonde. L'irrigation localisée est quasiment absente dans les zones équipées en grande hydraulique par l'Etat. Elle est située dans les zones non équipées. Certes, sur le plan technique, il est possible d'installer des aménagements complémentaires dans les secteurs équipés par l'Etat afin de répondre aux exigences de l'irrigation localisée. Ces aménagements consistent à réaliser des ouvrages qui permettraient aux agriculteurs d'échapper à la discipline du tour d'eau et à celle du respect des assolements qui ont été libéralisés mais qui restent obligatoires dans les faits puisque les lâchers d'eau ne sont effectués que s'il y a une demande suffisante en eau.

Les aménagements qui ont été réalisés dans le cadre des équipements en grande hydraulique ont été conçus pour des assolements définis à l'avance et qui rendent les agriculteurs dépendants d'une seule borne d'irrigation ou d'un seul canal. Ce système est adapté aux

grandes cultures. Le maraîchage demande un système d'approvisionnement qui garantit l'eau aux cultures à tout moment. Des expériences limitées ont été entreprises dans ce sens. A titre d'exemple, le maraîchage s'est développé grâce au pompage privé effectué sur le canal d'amenée de Boumaïz. Une coopérative dite de la réforme agraire a entamé un projet de reconversion du réseau d'irrigation aspersion en irrigation localisée. Dans le Loukkos, une expérience similaire est en cours de réalisation dans le secteur R'mel. Ce type de reconversion nécessite, cependant, une concertation entre les usagers qui utilisent les mêmes dispositifs d'accès à l'eau d'irrigation. Les mécanismes institutionnels mis en place dans le cadre de la gestion participative visant à organiser les agriculteurs en associations d'usagers (les AUEA) n'ont pas encore donné leur fruit. Le nouveau programme étatique destiné à promouvoir l'irrigation localisée se limite à mettre en place des subventions destinées à couvrir une partie des équipements nécessaires à l'installation de l'irrigation localisée. Il prévoit la conversion en irrigation localisée de toutes les superficies plantées ainsi que celles occupées par le maraîchage, mais il ne prévoit aucune mesure institutionnelle pour résoudre les problèmes fonciers qui sont à l'origine de la faible progression des superficies équipées en irrigation localisée. En particulier il n'est pas prévu de mesures destinées à encourager le regroupement des petits paysans irrigants autour d'un bassin d'accumulation qui permettrait de stocker l'eau en attendant le prochain tour d'eau. Il s'agit par conséquent d'un projet de modernisation qui ignore le contexte socio-économique dans lequel il s'insère. La portée de ce programme est par conséquent limitée aux grandes exploitations et aux investisseurs susceptibles de rentabiliser ces installations. Ce constat sera largement confirmé à travers le déroulement du processus historique qui a vu naître le développement de l'irrigation localisée dans le Gharb

2- Rôle du secteur privé dans la naissance de l'irrigation localisée

C'est l'initiative privée qui a été à l'origine de l'introduction de cette technique à l'occasion du développement des plantations de banane (à la suite de la décision des pouvoirs publics d'interdire en 1985 l'importation de ce fruit) et par la suite de l'extension de la culture de la fraise dans la région notamment par des promoteurs espagnols.

2-1 Historique du développement des plantations de banane et des fraisiers

Ces cultures, pratiquées sous serres, ont été introduites par de grands agriculteurs et par des citoyens aisés surtout dans la zone côtière située à proximité de la ville de Kénitra¹. Sur un

¹ «A la fin des années 80, avec un coût de revient de 4,5 à 5 dirhams et un prix de vente en gros dépassant à l'époque les 12 dh, la marge atteint 7 dh au kilo. Un bon maraîcher, qui produit 70 t à l'hectare, pouvait ainsi compter sur un chiffre d'affaires de 840 000 dh et un bénéfice de 490 000 dh à l'hectare. De quoi amortir ses installations dès la première récolte. Pour toutes ces raisons, la banane est devenue la culture de prédilection des agriculteurs du dimanche, ces citoyens, fonctionnaires ou chefs d'entreprises, qui, le week-end, viennent faire un tour rapide sur leur ferme. La moitié des exploitations de bananes sont d'ailleurs situées près de Rabat, Salé, Casablanca et Kenitra. Pour trouver une terre où s'installer, ces fermiers occasionnels ont fait flamber le prix du foncier. A la fin des années quatre-vingt, l'argent était abondant ; beaucoup d'hommes d'affaires ont investi ce créneau, louant ou achetant à prix d'or des terres à proximité des centres urbains où ils habitaient

Autour de Rabat, le prix de location à l'hectare est passé de 1 500 dh à 15 000 dh. Le prix des terres à l'achat a parfois été multiplié par cent ! La banane était alors si rentable que ces sommes paraissaient supportables. A l'abri de toute concurrence, ces pionniers bénéficient sur les marchés de prix extrêmement rémunérateurs. » Par Samuel Vallée.

échantillon de 20 producteurs de banane, 25% sont des ingénieurs, 20% des techniciens, 10% des militaires, 25% des professions libérales et seulement 10% des agriculteurs de la zone². Tous ces nouveaux venus ont bénéficié d'un financement auprès de la Caisse Nationale du Crédit Agricole. Cette belle occasion a été à l'origine d'une grande vague d'installation de bananeraie entre 1986 et 1992, époque d'or pour les producteurs sans concurrence, encouragée par la rentabilité élevée du bananier en comparaison avec les cultures des produits de base telles que les céréales, la betterave sucrière...

Le choix de la zone côtière est dû au fait que le type de sol qui est sablonneux s'adapte bien au développement de ces cultures sans oublier la présence d'une nappe phréatique peu profonde qui mobilise une eau abondante et de bonne qualité particulièrement adaptée au matériel d'irrigation localisée sensible aux eaux chargées (bouchage des mini diffuseurs ou des goutteurs).

Ainsi, le bananier et le fraisier constituent les principales cultures qui ont joué un rôle capital dans le développement de l'irrigation localisée au niveau du périmètre du Gharb. Les superficies équipées en irrigation localisée étaient faibles entre les années 1985 et 1990 et concernaient principalement le bananier mais à partir de 1992 cette technique d'irrigation a pris de l'ampleur avec une augmentation sensible des superficies de bananier et du fraisier. Actuellement le périmètre du Gharb compte une superficie d'environ 3000 Ha répartie de la manière suivante :

Tableau : Répartition des cultures dans les terres aménagées en irrigation localisée

Cultures	Superficie (ha)
Bananier	852
Fraisier	770
Maraîchage	1200
Arboriculture	224
Total	

Si les premiers équipements en irrigation localisée ont été concentrés au niveau de la zone côtière, d'autres régions situées à l'intérieur de la plaine du Gharb (régions de Sidi Slimane, Sidi Kacem et Mechraâ Bel Ksiri) connaissent une extension de cette technique sous l'impulsion des grandes exploitations qui disposent de grandes parcelles plantées en agrume, en vigne ou en maraîchage d'exportation.

Cette extension sur d'autres territoires s'explique pour deux raisons :

- l'ouverture du marché intérieur aux importations de bananes provenant de pays qui produisent à moindre coût pour une meilleure qualité s'est traduite par une forte baisse des prix et a poussé une partie des producteurs de banane à se réorienter vers le maraîchage ou à cesser cette activité;
- l'augmentation des prix de location de la terre dans la zone côtière surtout avec la concurrence des investisseurs espagnols qui ont loué une superficie importante pour la production des fraises destinée à l'export a poussé les investisseurs à rechercher de nouvelles terres.

² M.Sadio-Cissé (2000). Etude technico-économique de trois exploitations bananières dans les Menasra. Mémoire de troisième cycle. IAVHassanII.Rabat.

Au début de l'installation du bananier, les rendements étaient faibles (36 tonnes en moyenne par Ha) en raison d'une maîtrise insuffisante des techniques culturales par ces nouveaux agriculteurs. Cette faible productivité était cependant compensée par des prix rémunérateurs. L'ouverture de ce marché aux importations s'est d'abord traduite par une chute des superficies plantées en bananier (diminution de 100 ha entre 1993-94 et 1994-95) et l'abandon de cette culture par les producteurs les moins compétitifs. A partir de 1995, les superficies ont progressé mais le nombre de producteurs a baissé. Après les accords de l'OMC, des licences d'importation de banane ont été à nouveau accordées, on a assisté à l'introduction de la banane à Casablanca en provenance du Costa Rica. Ce produit a été bien accueilli par les consommateurs qui trouvèrent à leur goût ces longues bananes claires, étiquetées et mûries à point.

La culture de la fraise a également joué un rôle moteur dans l'extension de l'irrigation localisée. Elle s'est développée au nord ouest de la plaine du Gharb dans la région de Sidi Mohammed Lahmer et de Moulay Bousselham. En 1993 la superficie cultivée couvrait 93 Ha. Elle a atteint 1134 Ha en 2001/2002, pour redescendre à 770 ha en 2002/2003 au profit des cultures maraîchères. Cette culture devait approvisionner une usine de conditionnement et d'emballage des fraises construite par des promoteurs espagnols. La société produisait des fraises elle même en louant les terres voisines et en concluant des contrats avec les agriculteurs de la zone.

Les investisseurs espagnols ont joué un rôle important dans la vulgarisation des techniques d'irrigation localisée auprès des agriculteurs originaires de la zone. Ils louaient des terrains et recrutaient ces mêmes locataires en tant qu'ouvriers agricoles qui ont eu ainsi l'occasion de s'initier à cette culture. Plusieurs d'investisseurs, une fois leur projets rentabilisés, ont vendu leurs équipements à des prix abordables aux agriculteurs de la région. Ces derniers sont devenus actuellement des agriculteurs performants. Ces techniques sont devenues par conséquent à la portée des agriculteurs qui n'ont pas de gros moyens financiers. De plus, une technologie locale de fabrication d'une partie des équipements en irrigation localisée a vu le jour à des prix abordables. Cette culture a également permis de créer des emplois surtout pour la main d'œuvre féminine (cueillette de la récolte et les travaux d'emballage au niveau des usines).

2.2 Les bénéficiaires des subventions accordées à l'irrigation localisée

A quels types d'agriculteurs les subventions accordées à l'irrigation localisée ont-t-il profité le plus ? Cette question sera examinée d'une part à travers l'analyse de la répartition du montant global des subventions distribuées et la présentation d'un échantillon d'exploitations agricoles qui ont bénéficié de ces subventions.

2.2.1 Répartition des subventions par taille d'exploitation et par zone

Entre 1986 et 2003, la subvention accordée à l'irrigation localisée au niveau du périmètre du Gharb a profité à 291 agriculteurs avec un montant d'environ 21 millions de Dirhams. La lecture du tableau relatif à la répartition des subventions par taille d'exploitation et par zone permet d'étayer les observations relevées dans la première partie de cet article tout en apportant quelques nuances à cette analyse.

Les agriculteurs bénéficiaires de la zone côtière qui représentent 81 % de l'ensemble du périmètre n'ont bénéficié que de 41% du montant total de la subvention. Les agriculteurs de la zone interne qui ne représentent que 19 % ont bénéficié de 59 % du montant total de la subvention.

Ces subventions ont largement profité aux exploitations de petite dimension dans la zone côtière contrairement à la zone intérieure. En effet, plus de la moitié des exploitations

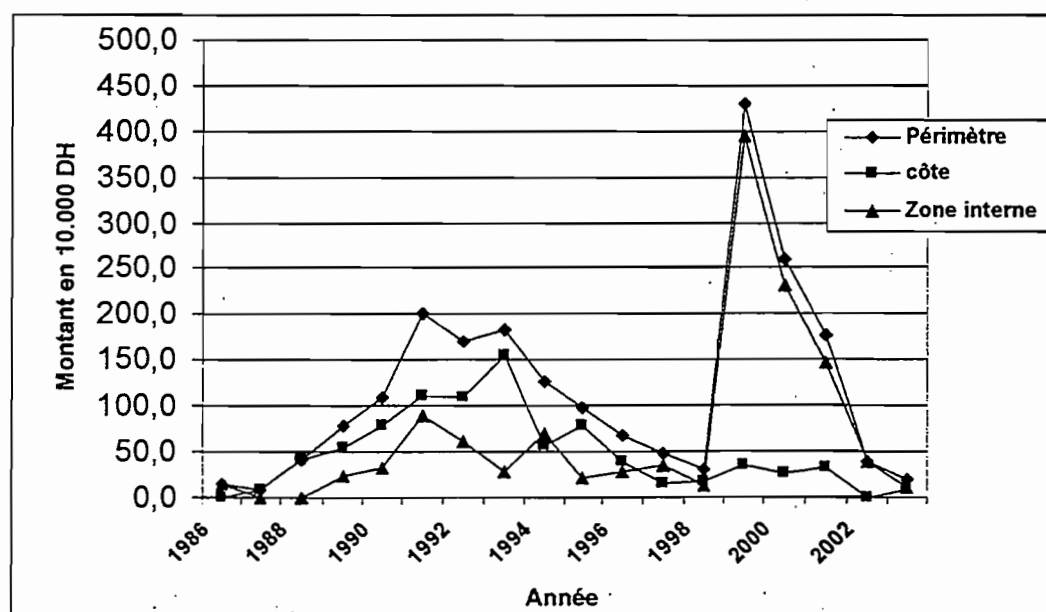
bénéficiaires de la subvention dans la zone littorale ont une superficie inférieure à 10 hectares. Ces exploitations n'ont cependant reçu que 32% de la subvention allouée dans la zone côtière. Dans la zone intérieure, les petites exploitations ont été quasiment écartées de la subvention.

Tableau n° : Répartition des subventions par taille d'exploitation

Taille exp	Ensemble du périmètre du Gharb				Zone côtière		
	Nbre d'agri	%	Montant des subv.	%	Nbre d'agri	%	Montant
0 à 5 Ha	93	32	1359997	6	90	38	1334860
5 à 10 Ha	54	19	1480694	7	52	22	1375732
10 à 20 Ha	51	18	1970598	9	41	17	1707946
20 à 60 Ha	47	16	4081309	19	33	14	2544425
> 60 ha	46	16	12158419	58	19	8	1574481
Total	291	100	21051017	100	235	100	8537444

Source: ORMVAG 2003

Graphique n° : Evolution de la subvention accordée à l'IL au niveau du Périmètre



Source: ORMVAG 2003

La procédure du montage du dossier de la subvention est relativement lourde. Un peu plus de la moitié d'un échantillon d'exploitations enquêtées (voir paragraphe suivant) aura bénéficié de la subvention, 13% ont abandonné cette procédure et 33% les dossiers sont en cours de traitement au moment de l'enquête. 87% des agriculteurs enquêtés déclarent cependant que si la procédure est difficile pour obtenir la subvention, ceci n'influencera pas le développement de cette technique d'irrigation. La preuve en est que la plupart des petits projets en cours d'installation au moment de l'enquête n'avaient pas obtenu d'autorisation pour le creusement des puits ni été précédé par une étude technique pour leur réalisation. La subvention ne

constitue pas le facteur principal de la prise de décision pour adopter le système de l'irrigation localisée. C'est la rentabilité des cultures qui justifie ou non l'utilisation de cette technique.

2.2.2 Typologie des exploitations équipées en irrigation localisée

L'enquête a porté sur un échantillon composé de 15 exploitations agricoles dont 10 sont situées dans la zone côtière et 5 aux alentours des villes de Sidi Slimane et de Sidi Kaacem (l'intérieur de la plaine du Gharb). L'échantillon retenu représente 5% de l'ensemble des exploitations en irrigation localisée et couvre toutes les tailles de superficie.

Du point de vue des caractéristiques des exploitants, cette enquête a montré qu'il s'agit d'une population relativement jeune puisque 60% ces agriculteurs sont âgés de moins de 50 ans. Leur niveau d'instruction est élevé : 47% ont suivi l'enseignement du supérieur, 40% le secondaire et 13% le primaire. C'est ce qui explique que 60% d'entr'eux continuent à habiter en ville.

Du point de vue des caractéristiques de ces exploitations, il est à souligner que près de la moitié utilisent de la main d'œuvre familiale et que les trois quarts font appel aux travailleurs salariés. Ces exploitations sont gérées directement par leur propriétaire à raison des deux tiers de l'échantillon. Le reste est géré par des techniciens et parfois par des ingénieurs.

Ces exploitations sont spécialisées où l'élevage est quasiment absent. Ce sont les producteurs de fraise qui gagnent le plus d'argent. La marge nette par hectare peut atteindre jusqu'à 350 milliers de dirhams (voir tableau en annexe : répartition des exploitations de l'échantillon par niveau de marge nette). Les producteurs de banane viennent en deuxième position, le profit par hectare peut varier entre 119 et 170 milliers de dirhams. Les cultures maraîchères arrivent en dernier avec une marge nette qui n'est plus que de l'ordre de 3 à 21 milliers de dh par ha. Ces cultures sont d'ailleurs pratiquées surtout par des exploitations familiales dont certaines disposent de terres dont la nature de leur statut foncier est de collectif, ce qui montre que ce statut foncier ne s'oppose pas toujours aux projets de modernisation.

3- La faiblesse de la rentabilité de l'irrigation dans les exploitations familiales

La faiblesse de la rentabilité de l'irrigation s'explique par les caractéristiques propres aux exploitations familiales ainsi que par les problèmes spécifiques liés à chacune des cultures rencontrées dans la région.

3-1 Caractéristiques des exploitations familiales dans le Gharb

Les petites exploitations familiales représentent 69 % des exploitations irriguées du périmètre du Gharb et détiennent 20% des superficies cultivées. Elles se caractérisent par l'importance du poids démographique qui pèse sur elles (8 à 10 par foyer), de fortes disponibilités en travail familial, la complexité des statuts fonciers (la propriété individuelle de la terre est rare), un endettement excessif, une épargne investie dans l'habitat et le bétail, un système de cultures diversifié (blé, canne et betterave à sucre, tournesol, maïs...) où les cultures fourragères et en particulier le bersim constitue le pilier du système de production de ces exploitations. D'où l'importance du rôle de l'élevage qui s'explique par le fait qu'il représente une valeur refuge plus sûre que le réinvestissement dans d'autres activités agricoles. L'élevage laitier bovin (1 à 3 têtes) est commun à presque toutes ces exploitations ainsi que celui des ovins (7 à 15 têtes). Ces deux élevages sont souvent associés. Cependant, les possibilités d'augmentation du cheptel sont faibles, en raison du manque d'espace et des

superficies qui peuvent être consacrées aux cultures fourragères. Enfin, en dehors du petit équipement, ces exploitations dépendent de la location du matériel agricole.

3-2 Problèmes spécifiques des cultures dans la région.

D'une manière générale, le coût de l'irrigation représente entre 8 à 25% des charges opérationnelles alors que les cultures sont peu voire non irriguées.

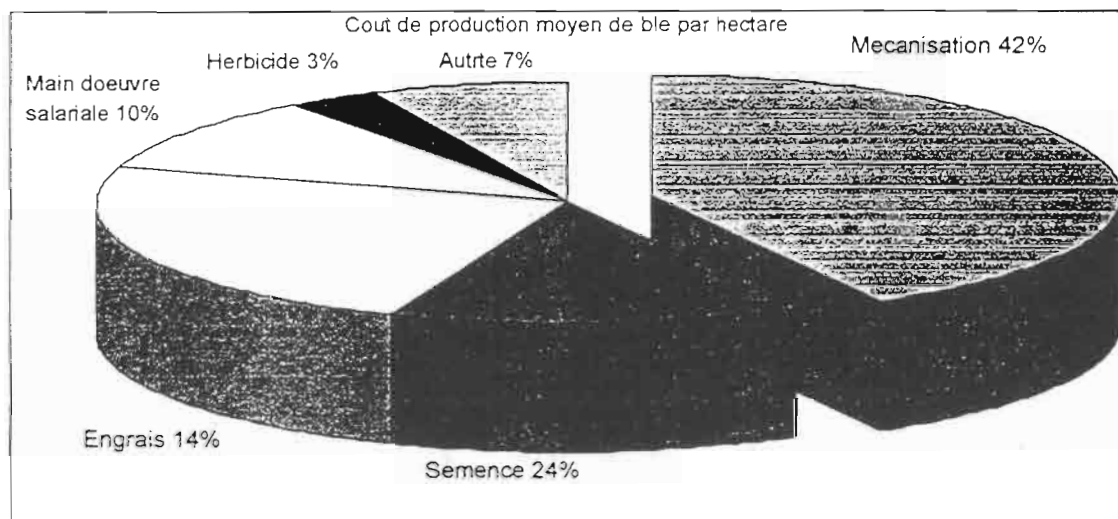
3-2-1 Le blé

Les agriculteurs continuent à ne pas irriguer le blé, probablement, par ce que c'est l'activité qui valorise à leurs yeux le moins l'eau d'irrigation en raison de la surfacturation due aux pertes d'eau qui interviennent le long du réseau d'irrigation. Cependant, ceux parmi eux qui apportent une seule irrigation au milieu du cycle du blé (stade montaison), à l'aide du pompage privé soit directement de l'oued soit à partir du canal principal, sont satisfaits du gain de productivité occasionné par cet apport hydrique. Les céréales d'automne sont également pratiquées pour échapper aux contraintes du système des cultures sous-contrat. Ainsi, ils peuvent décider librement du sort des grains et des bottes de paille.

Le coût de production moyen (CPM) du blé est estimé à 2520 Dhs/ha. La mécanisation (prestations de labour, moisson, bottelage) représente 42%, les semences sélectionnées 24%, les engrais de couverture 14%, le travail salarial 10% (7 à 10 jours par ha) et les produits phytosanitaires 3%. Un seul traitement herbicide est utilisé. Le blé ne bénéficie pas d'engrais de fond après un précédent cultural : bersim, betterave ou une culture maraîchère.

Figure 3.1. Structure du coût de production moyen d'un hectare de blé (cas d'une coopérative de la réforme agraire à Sidi Allal Tazi)

3-2-2 La betterave à sucre



Les agriculteurs sont conscients de l'opportunité de la valorisation de l'eau par la betterave. Cependant, comme les sols sont généralement lourds, les plantes risquent d'être asphyxiées si la pluie survient juste après l'irrigation. Dans ces conditions, ils cherchent à minimiser les risques en irrigant le moins possible afin d'obtenir un rendement moyen de 45 tonnes à l'hectare au lieu d'espérer plus (70 tonnes) avec une probabilité de tout perdre. La culture de la betterave est très exigeante en main d'œuvre (138 jours de travail par hectare). Elle peut entrer en compétition avec les autres activités en particulier l'élevage. Lorsque la superficie

allouée à cette culture dépasse un ha, la main d'œuvre familiale s'avère insuffisante mais le recours à la main d'œuvre salariale est tributaire de l'état de la trésorerie de l'exploitation.

Le CPM/ha de la betterave à sucre est estimé à 9870 DH/ha. Les engrais représentent 70% de ce coût et la main-d'œuvre 30%. La qualité et le prix des intrants font souvent l'objet de contestations des agriculteurs aussi bien pour la betterave que pour la canne à sucre.

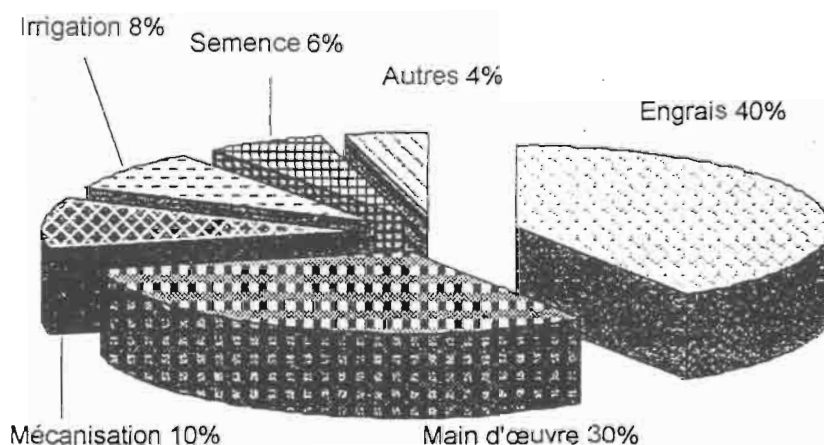


Figure 3.2. Structure du coût de production moyen d'un hectare de betterave sucrière (cas d'une coopérative de la RA Sidi allal Tazi).

3-2-3 La canne à sucre

Les agriculteurs n'ignorent pas l'importance des recettes qui pourraient être générées par une irrigation raisonnée de la canne à sucre. Cependant, les retards des lâchers d'eau constituent un sérieux risque qui peut compromettre la rentabilité de cette culture et augmenter la facture de l'irrigation sans résultat. Les agriculteurs qui en ont les moyens préfèrent se rabattre sur une utilisation plus intensive des engrais et des produits de traitement. La canne à sucre joue un rôle important au sein des systèmes de production, du fait qu'elle est peu exigeante en main-d'œuvre (sauf pour la récolte qui absorbe environ 57 jours/ha).

Selon les agriculteurs, la période de la coupe a une influence sur la productivité de la canne. La majorité d'entre eux refuse de récolter en hiver car les parcelles sont difficilement accessibles et le taux de sucre pendant cette période est faible. En été, La coupe se traduit par un faible rendement l'année suivante. Par contre la coupe de printemps est considérée comme la meilleure car elle permet d'atteindre un taux de sucre et un rendement importants l'année suivante, à condition d'avoir eu la possibilité d'irriguer juste après la récolte, ce qui est rarement le cas en raison de la longueur des délais observés dans le déroulement des récoltes et de leur transport. Une enquête réalisée auprès d'une coopérative de la réforme agraire a révélé que la durée de la récolte atteint en moyenne 30 à 45 jours entre la première et la dernière parcelle de la même sole et 60 à 90 jours entre la première et la dernière sole du même bloc. Ainsi les premières parcelles récoltées ne peuvent pas être

irriguées qu'après trois mois pour permettre aux camions d'accéder aux dernières parcelles du même bloc. Après la récolte, il faut attendre 3 à 7 jours avant qu'un camion n'arrive pour l'acheminer vers l'usine.

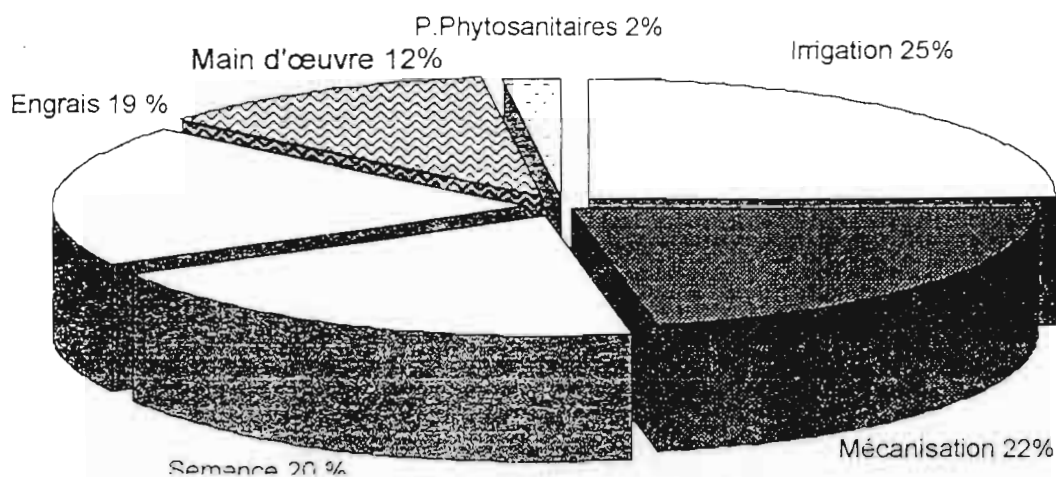
Le coût moyen d'installation de la canne à sucre est estimé à 9705 DH/ha dont plus de 60% va à l'achat des plants et aux engrais. Le CPM de la canne à sucre est estimé à 7211 DH/ha dont 27% représente l'amortissement des dépenses d'installation de la plantation (la durée est de cinq années). La récolte est souvent effectuée par la main d'œuvre salariale qui représente 38% du CPM/ha (15DH/100 mètres de canne à sucre. Les autres travaux moins pénibles sont confiés à la main d'œuvre familiale.

3-2-2 Le Bersim

Le bersim est la principale culture fourragère dans le Gharb. Les coupes et le transport du bersim donnent lieu à une intense activité. La quasi-totalité du périmètre est quadrillé par un mouvement incessant de charrettes transportant ce fourrage. Cette culture occupe une place primordiale dans les stratégies de des agriculteurs. Elle détermine en particulier le fonctionnement de l'élevage laitier qui permet d'assurer un revenu quotidien. Les cultures sous serre de la région constituent un bon débouché pour le fumier produit par ces élevages. Cette commercialisation se fait souvent au profit des femmes.

Le cycle d'exploitation du bersim qui s'étale du mois de décembre au mois de mai, peut être allongé s'il est semé à la fin du mois d'août et s'il est irrigué durant cette période. Or, l'installation de cette culture ne commence qu'après les premières pluies d'automne (fin septembre - octobre). Ce retard se traduit par une perte d'une à deux coupes par rapport au semis précoce.

Le CPM /ha du bersim après riz est estimé à 2430 DH/ha. Il est majoré de 900DH/ha (labours, recouvrement, irrigation) quand le précédent cultural est autre que le riz. Pour une seule irrigation, la facture de l'eau représente 25% du CPM/ha /ha, la mécanisation 22% (moisson et bottelage uniquement), le travail salarial 12% (les coupes et le transport sont confiés à la main d'œuvre familiale estimé à 36 journées de travail). Par ailleurs, les agriculteurs accordent beaucoup d'importance au rendement en grain du bersim (entre 4 et 7 qx/ha) puisque les disponibilités en semence en début de campagne sont insuffisantes et sont vendues à des prix élevés (800 DH le quintal). Ainsi, pour une dose de 60Kg/ha la semence représente 20 % du CPM/ha).



3-2-2 Le riz

Malgré de bons niveaux de rendement (entre 80 et 100 qx/ha), les agriculteurs sont pénalisés par des taux élevés d'agréage (entre 20 et 50 %) appliqués par les rizeries. Le seuil de rentabilité de la culture n'est atteint qu'à partir d'un rendement de 70qx /ha.

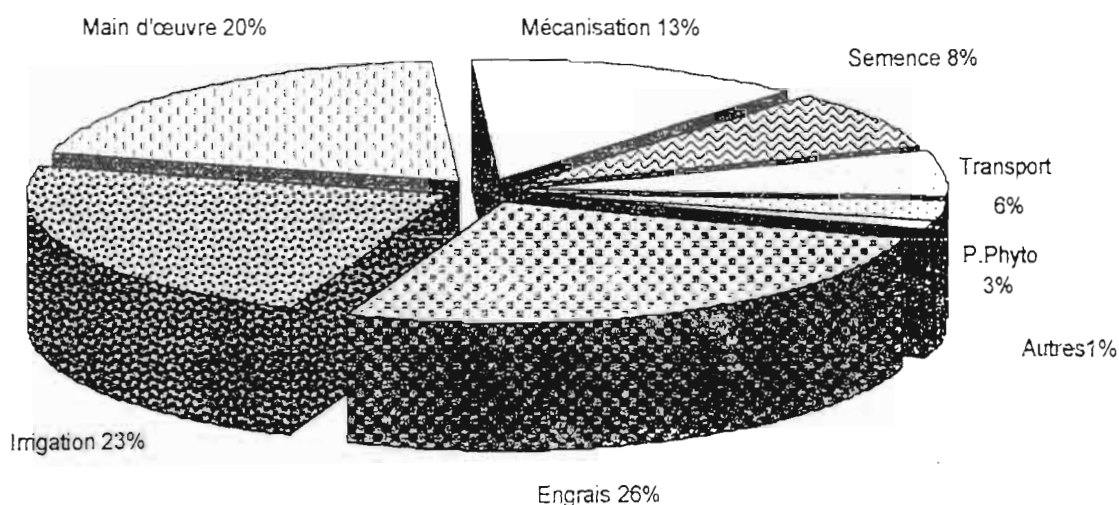
Tableau 3.3. Prix de revient d'un kilogramme de riz pour différents niveaux de rendement et selon trois taux d'agréage.

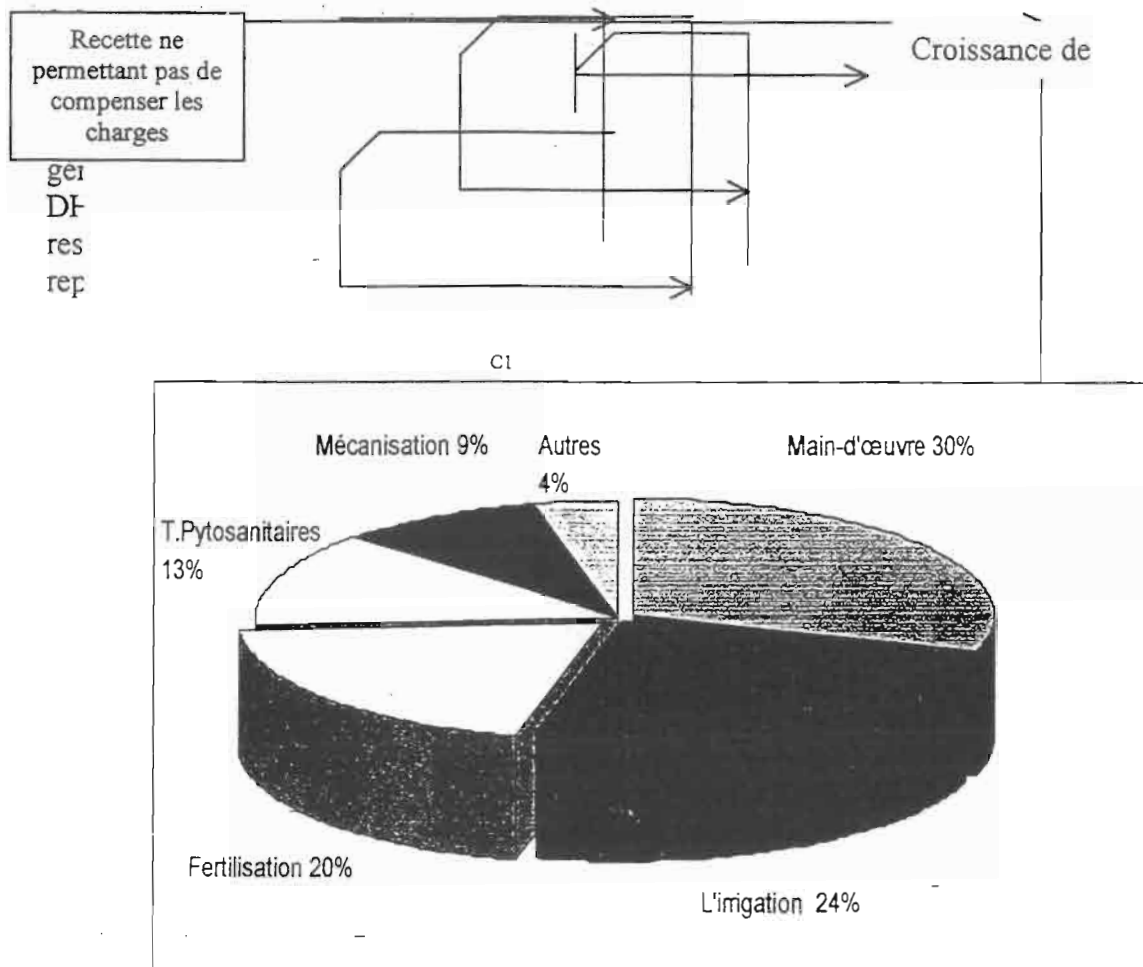
	40 qx	50 qx	60 qx	70 qx	80 qx	90 qx	100 qx
10% I 16% H TA 10 %	4,16	3,3	2.77	2.37	2.1	1.77	1.6
20% I 20%H TA 24%	4,9	3,94	3.28	2.80	2.46	2.1	1.97
30% I 24%H TA 42%	6,46	5,17	4.31	3.68	3.22	2.75	2.58

I= impureté, H= humidité, TA= taux d'agréage. Prix d'achat de l'usine = 3, 80dh/kg

Pour obtenir ce seuil de rentabilité les agriculteurs contractent des emprunts auprès des rizeries, ce qui les oblige à reconduire la culture de riz l'année suivante en espérant s'acquitter des dettes. Le retard des semis lié aux retards des lâchers d'eau compromet la productivité de cette culture.

Pour un rendement de 90 qx/ha, le CPM/ha du riz est estimé à 15950 DH/ha dont les engrais représentent 26%, l'irrigation 23%, les semences 8%, le transport de la production de la parcelle à l'usine 6%. Le coût du transport du quintal de riz peut atteindre 20 DH du fait que la récolte coïncide avec les premières pluies d'automne, ce qui rend les parcelles de riz impraticables pour les engins de transport. La culture du riz est également coûteuse en main-d'œuvre. Elle exige 122 journées de travail par hectare. Pour 92 journées de travail salarial, le coût du travail représente 23 % du CPM/ha. La qualité des semences fait l'objet de contestations des agriculteurs. Les variétés d'origine marocaine (Hayat et Maghribia) sont appréciées par les agriculteurs mais les rizeries continuent à ne pas les distribuer en raison de problèmes liés à l'usinage du riz.





E : incapacité de compenser les dépenses de campagnes (en particulier l'eau)

La valorisation de l'irrigation en grande hydraulique est conditionnée au préalable par la levée des obstacles qui s'opposent au développement des différentes cultures ainsi que des contraintes qui s'opposent à l'amélioration de l'irrigation de ces cultures. Dans ce contexte, l'irrigation localisée continuera à connaître de sérieuses limites tant que ces obstacles ne seront pas levés. Cette technique connaît cependant un succès réel au niveau de la zone côtière du Gharb car les investissements sont bien valorisés par la rentabilité des cultures qui y sont pratiquées. La rentabilité des cultures conduites sous irrigation localisée est meilleure en comparaison avec celles conduites sous irrigation gravitaire ou aspersion, mais cela n'exclut pas son adaptation à l'ensemble du périmètre au niveau des secteurs de la grande hydraulique. L'adoption de ce système d'irrigation est cependant conditionnée par une série de facteurs dont l'accès au crédit, la résolution des problèmes fonciers (qui pourrait débloquer la situation de stagnation des investissements dans le Gharb et dans bien d'autres périmètres) et un encadrement rapproché dans le domaine de la conception des projets, du choix du matériel d'irrigation, d'installation du matériel d'irrigation, d'exploitation et de maintenance du matériel. L'Etat devrait en outre faciliter la procédure de constitution des dossiers de subvention, encourager la construction des bassins d'irrigation (en terre ou en béton armé) et autoriser le creusement des puits et forages (lorsque la nappe le permet) car le tour d'eau au niveau du réseau public n'encourage pas l'installation des cultures d'été. L'autorisation d'utiliser les eaux de

pluies retenues dans les canaux de drainage constitue également une mesure destinée à favoriser l'installation précoce des cultures et à améliorer ainsi le taux d'intensification culturale. Enfin, le développement de l'agro-industrie devrait contribuer à accroître les débouchés et à les rendre plus attractifs. Dans ce contexte, la dynamisation des associations des usagers agricoles et le renforcement du tissu associatif pourrait servir à renforcer la capacité de négociation des agriculteurs.

ANNEXE

