

***Mekong Region Waters Dialogue: Exploring Water Futures Together***

Regional Dialogue Event: 6-7 July 2006, Vientiane, Lao PDR

***River basin development: A few lessons to be learned from history***

François Molle, IRD/IWMI

**Introduction**

The topic of this presentation, as given by the organizers, may sound overambitious. It is obviously not my intention to attempt here an examination of the long history of river basin development in the world. I will limit myself to reviewing four important and distinctive features of the development of water resources: I will first comment on water resources development as a manifestation of human desire to subdue nature; then examine why and how river basins tend to get overbuilt and water scarcity generated; further discuss the danger of meta-justifications in water resources development; and finally reflect on past governance patterns and how they might be changed. Obviously, there are many other important lessons to be drawn from the history of river basin development, not least the environmental and human costs that have been addressed by numerous studies, but they cannot be discussed in such a short paper as this.

**Subduing nature**

If the history of river basin development can be traced back to antiquity, the emergence of the river basin concept as a means to marshal nature for human benefit appears in the second half of the nineteenth century. Utopian schemes to organize societies or their production activities along river-basin boundaries were promoted by scientists and political leaders in countries such as Spain (Costa), France (Thomé de Gamond), or the US (Powell). Rivers became pivotal resources of the industrial revolution and a tenet of productivism. Subduing nature and marshalling water became part of the mission of western countries, inebriated both by their colonial adventures and by the scientism of the time. Industrial and mechanical arts were thought to herald the civilizing blessing of European culture (Molle 2006b). The founding father of American geography, George Perkins Marsh, considered in 1847 that "America offers the first example of the struggle between civilized man and barbarous uncultivated nature."

In 1908, Winston Churchill, referring to planned reservoirs in the lower Nile basin, emphatically announced that "these giant enterprises may in their turn prove but the preliminaries of even mightier schemes, until at last nearly every drop of water which drains into the whole valley of the Nile..." (McCully 2001). Likewise, the Guezira scheme in Sudan would remain in history as a "great romance of creative achievement" (Ertsen 2006). The French thought "the El Dorado would be at reach once irrigation is developed" in the inner

delta of the Niger basin (Schreyger 1984), and sought to restore the "Rome granary" in Morocco. In the Soviet Union, Gorki would support the plan to "make mad rivers sane" (McCully 2001), while Mao declared a "war against nature." Most countries with nontemperate climates followed suit. In South Africa, scientists called for rivers to be "tamed and domesticated" so that "deserts [could be] turned into gardens" (Turton et al. 2004). In Brazil, engineers and politicians drew inspiration from the Bureau of Reclamation in the US and launched massive construction of reservoirs in the northeastern region of the country under the banner of the "hydraulic solution" (*solucao hidraulica*) (Guerra and Guerra 1980). Mexico proclaimed its plan to "win over nature" (*vencer a la naturaleza*).

The ideology of domination of nature would fully blossom with the advent of new dam technologies allowing construction of high dams. Inaugurating the iconic Boulder dam, Theodore Roosevelt declared that "pridefully, man acclaims his conquest over nature." In the 1930s, the development of the Tennessee Valley Authority also heralded 40 years of large-scale river-basin development. With its democratic ethos, the TVA was made "a new export commodity" in Cold War politics (Ekbladh 2002) and many leaders tried to capture the symbolic power of the TVA's success story. Nehru famously spoke of dams as the "modern temples of India," but later reckoned that the country had been affected by the "disease of gigantism." The 1958 Report of a Panel of Experts on "Integrated River Basin Development" defined "integrated" as meaning "the orderly marshalling of water resources of basins for multiple uses to promote human welfare" (UN 1958). This technocratic and construction-biased approach would not be altered in later revised versions (UN 1970) and conferences (UN 1976) (Saha and Barrow 1981).

None of the accomplishments alluded to above must of course be belittled. They have indeed been the conjunct realization of much enthusiasm, ingenuity, labor and idealism, and have contributed to material progress and comfort based on electricity, water supply or irrigated food production. With hindsight, however, there is little doubt that the glorification of human triumph over nature has contributed to fuelling a process by which we have, by the same token, indiscriminately and negatively altered our environment: by picturing Nature as an enemy to be subdued we have been blind to our interdependence with ecosystems and we have undermined our own resource base. President Zemin's (1997) recent celebration of the "ancient Chinese people's indomitable spirit in successfully conquering nature," reminds us that this ideology may be alive and well.<sup>1</sup>

### **Why basins get overbuilt (the political economy of overconstruction)**

A critical yet often overlooked aspect of river basin development is the tendency to "overbuild" basins and to overcommit water resources. This process leads to overextended facilities which are more vulnerable to hydrologic variability and which do not realize their full economic potential. But why is enough never enough, and why do basins get overbuilt? (Molle 2006a).

---

<sup>1</sup> See President Zemin's (1997) celebration of the Three Gorges dam of the Yangtze river. After reviewing "examples of the ancient Chinese people's indomitable spirit in successfully conquering the nature," Zemin referred to the dam, "the scale and overall benefits of which have no parallel in the world... [and which] embodies the great industrious and dauntless spirit of the Chinese nation and displays the daring vision of the Chinese people for new horizons and a better future in the course of their reform and opening-up."

The above account suggested that river basin development was attractive to governments because it was part of nation building and embodied national pride and faith in modernism, while bringing legitimacy to the state. In some cases, it embodied a strong ideological drive to prove the superiority of communism, as in the USSR (Pearce 1992) and in China (Shapiro 2001), or of grassroots democracy in the US (Lilienthal 1944). More generally, development of water resources has been fuelled by a peculiar convergence of interests.

First, state line agencies, notably those involved in construction, see the unending continuation of projects as a professional necessity and as a way to perpetuate themselves and secure their budgets. Politicians affiliated to the ruling party consider subsidized projects as a means to "create a powerful supportive constituency that will ensure political control over many years" (O'Mara 1990). Private construction companies and consultants take them as business opportunities and often have the political clout and linkages to push for such projects (Scudder 1994). Last, for development banks, big projects hold the promise of concrete and large-scale changes, while minimizing project management costs. Lack of sanction for under-optimal projects and rewards for enlarging the loan portfolio have fostered what has been called the "lending culture," which gives incentives to project development.

While there is nothing inherently wrong in having different actors joining forces towards a common goal, the financial and political private benefits and rewards of such projects have often fostered rent-seeking behaviors, as cogently illustrated by Repetto (1986). In the US, the so-called "iron-triangle" linking state politicians, federal agencies and private companies has long been famous for blurring the frontier between private and public benefits (Gottlieb 1988; Worster 1985; Briscoe 1999). While such coalitions help explain the dynamics of water resources development, they do not necessarily explain why basins get overbuilt. Several additional factors come into play.

A first important aspect of basin overbuilding is the imprecise or faulty nature of hydrologic knowledge, which lends itself to a degree of manipulation, when not simply overlooked. There is no shortage of projects with optimistic assumptions on basin runoff and dams which have not stored as much water as expected. Conflicts between cities and irrigation show that many cities reappropriate surface water or groundwater used by farmers either surreptitiously or with purposive omission of hydrological impacts on third parties: diversions invariably concern "surplus water" and "preserve" the needs of existing users, even when this is clearly not the case in practice. Double accounting of available resources is a common feature; in Algeria, for example, the World Bank supported both irrigation projects and urban water supply networks in competition for the same scarce resource (Winpenny 1994).

The malleability of hydrology is paralleled by that of cost-benefit analysis. Categories of cost, benefit, life duration, discount rates, etc., can be manipulated so as to obtain very contrasting results (Ingram 1971; Tiffen 1987). While some acknowledge that the cost-benefit analysis is easily "corrupted," others consider the variable results as a product of incompetence or bias, not a weakness of the method (Williams 1972). It provides scientific support and legitimization, a sense of "mechanical objectivity" that seems to override the passions and interests that inform political debate (Porter 1995), but may serve as a powerful tool "to clothe politically desirable projects in the fig leaf of economic respectability" (Marshall 1965). History shows that several devices were used to "push back the frontiers of cost-benefit analysis so that there would always be a manageable supply of economically approved projects" (Porter 1995): "accounting inventiveness" consisted in computing ever-inclusive secondary or derived benefits, while "river basin accounting" addressed multipurpose water

resources development projects and was used to justify projects which would not make economic sense if considered in isolation (Reisner 1986).

Overbuilding of river basins is also frequently promoted by political and socioeconomic concerns for poorer regions, which often lag behind and display higher levels of poverty. Politicians from these regions are likely to stress that other regions with stronger comparative advantages (for example in terms of soil, water or linkages with markets) have benefited from earlier priority investments and that concern for equity or poverty alleviation demands similar investments to be extended to poorer areas of the country. Such demands are often attended to when local politicians are associated with the ruling party, as a reward for their support. If these regions are located upstream of areas that have benefited from earlier investments (typically large plains and deltas), then the development of new (often marginal) land will tend to be based on resources that are partly appropriated by downstream users (Molle 2003). Benefits are spread and equity enhanced but at the cost of basic economic principles, since late developments reduce the return to downstream investments; benefits are merely shifted. A variant of this situation can be found in federal countries where states sharing the same river basin rush to develop water resources before other states do, or where upstream states develop infrastructures which use water that is already (at least in part) used by downstream areas. Typical cases of such a situation can be found in the Krishna and Cauvery basins in India.

Overdevelopment also occurs when governments are faced with prospects of famine or social unrest and secondary and tertiary sectors unable to absorb growing rural populations and find themselves in a situation where the main way out is massive investment in water and other rural infrastructures. In such situations, economic or hydrologic rationality is neither here nor there and infrastructures are designed to benefit the larger number of people and are therefore often overextended.

This situation will increase the likelihood and impact of coming shortages. As large tracts of these projects will remain uncultivated, parched fields and cracked soils will hit the news and trigger calls for more water resources development. This self-sustaining vicious circle of overdevelopment thus includes mechanisms which tend to overbuild basins and overextend irrigation areas, setting the scene for forthcoming shortages and crises which will reinforce the call for more development of water resources (dams, interbasin transfers, etc.) which, in turn, will foster further expansion of facilities.

### **The danger of meta-justifications**

Much of water resources and irrigation development in the 1950-1980 period has been justified by overriding national policies. Concerns for enhancing national security, maintaining political stability, alleviating rural poverty, food security, self-sufficiency or export-substitution, have been pervasive. "Modernization" has also been a compelling and emblematic flagship of policies. Other strategic or geopolitical objectives, such as the struggle against the spread of communism in Asia, have also fuelled infrastructural development.

These objectives must be put in context; they were often compelling and allowed for political criteria to override considerations of economic efficiency or environmental sustainability. Taken, and accepted, as national priorities (at least by decision makers), they made subsidies and the contribution of the general public acceptable (Abu-Zeid 2001). Yet, precisely because these objectives were considered as compelling, these meta-justifications also made it easier for poor projects like bad dams or irrigation of marginal land to be passed. Because of the

historical decline in the price of food products, the vanishing spectrum of famine in most countries and continued urbanization/industrialization, the justifications for large investments in irrigation—and for the massive subsidies that came together—have largely disappeared (Berkoff 2003). Fiscal stringency and growing awareness of environmental impacts have shifted emphasis on demand management and pollution control.

Obviously, new candidates for meta-justifications keep on arising. The centrality of poverty alleviation in the discourse of development banks and aid agencies may have several roots but it constitutes a powerful overarching objective that is unlikely to be dismissed (nobody is likely to be against poverty alleviation). However pressing and legitimate, this objective runs the risk of serving as a meta-justification that could be used to override local contexts and governance, and to sideline considerations (or objections) of a hydrologic, environmental, social or economic nature.

The recent efforts by the World Bank to reengage in water infrastructural projects have borrowed from such logics (Grey and Sadoff 2006): Geographic determinism is used to show the importance of water in the development of societies; the need for "harnessing hydrology," and taming a resource which, in its "natural unmanaged state," has a "destructive quality" are also reminiscent of the concept of mastering nature. Emphasis is placed on "water security" and on poverty: "There is a re-emerging consensus that water resources development and management are essential to generate wealth, mitigate risk, and alleviate poverty; that poverty *demands* that many developing countries will need to make large investments in water infrastructure at all levels... (emphasis added)." Again, the objectives are obviously laudable and the intention unquestionable, but it is the risk of seeing the poverty rhetoric instrumentalized in the pursuit of large-scale projects which must be stressed here.<sup>2</sup> These projects may be sound or not (which is another question) but meta-justifications make it possible to withdraw them from public scrutiny and increase the risk of getting it wrong.

The example of the water grid project proposed by the Thaksin administration in 2003 provides perhaps a fair example of a project which is supported by political considerations anchored in vague and generic "positive" objectives: the fight against floods and droughts and the mission of bringing irrigation water to farmers in water-short areas in order to "turn Thailand into an agricultural powerhouse" (The Nation, 14 September 2003 Not referenced). Nothing is said on how scarcity is defined, and on whether it is a result of climatic variability or, perhaps, lax management and overbuilding. Focus on benefits rather than on cost/benefit ratios was exemplified by the Prime Minister, who was reported to say "it would not be a problem if the (water grid) project required a lot of money because it would be worthwhile eventually," and by the Deputy Prime Minister in charge of the project, who saw the project as "a worthwhile investment because it will benefit 30 to 40 million people nationwide" (The Nation, 23 June 2003). With an irrigated area expected to treble in 15 years, it is not clear how sufficient labor could be mobilized (Pednekar 1997), whether markets would be ready to absorb the resulting excess production without collapsing, and where the water would come from.

---

<sup>2</sup> As an illustration, during the session at the World Water Forum discussing the topic Water for Growth and Development an Indian official explained why, with so many poor people waiting for the government to do something for them, we could not afford to lose a single day in the implementation of the river interlinking project.

Such projects are highly political and insulated from economic logic: they do not explore alternative options for water resources or agricultural development, or the relative advantages of investing in agriculture, as opposed to other sectors or activities.

### **Can lessons be learned? What about governance shifts?**

It would be foolhardy to dismiss the benefits drawn from water resources development in the last 50 years. Yet, Grey and Sadoff (2006) take the example of the US as a country which has spent hundreds of billions of dollars in flood protection and reservoirs but which, at the same time, is now spending many more billions to restore the environment or abate pollution. This obviously prompts the question of whether, and how, we can avoid infrastructure that will carry such externalities into the future.

This forms the basis of the challenge of “Responsible Growth” as conceptualized by the World Bank. “Responsible Growth” is to grow while at the same time embracing both environmental sustainability and social development. Simply stated it is about keeping the good side of things, while avoiding the bad side.

This fails to explain why future decisions should be expected to be taken on sounder grounds than in the past, and why the "lessons learned" would necessarily be incorporated in future decision making. It presents past failures as if they were linked to some lack of technical knowledge which would have now been acquired by responsible parties: *"there is no fundamental constraint to designing water development investments to ensure that local communities and the environment share real and early benefits while still allowing the economy and society at large to benefit from the growth made possible by these investments."* The sentence is reassuring but glosses over the antagonistic nature of many of these goals, as well as the different political economy factors which have contributed to poor decisions in the past, as detailed earlier: to be sure these constraints are *"fundamental"* in the sense that they are pervasive and not easily dealt away with.

This paper offers a way out in acknowledging the negative impact of poor management and governance and in proposing that *"investments in institutions and infrastructures must be made in concert... Once conceptualized as complementary, it is most effective to integrate investments with institutional development and reform programs and ensure they are mutually reinforcing."* This argument suggests that past shortcomings can be avoided through... more investments (in institutions); it tends to depoliticize the debate, drawing attention away from the multiple causes of poor planning, design, implementation and management, and suggesting that they can be overcome by more training, capacity building, or sustainable governance. Stressing that *"all investment, whether public or private, should be complemented by robust regulatory and monitoring frameworks, designed with the active participation of water users and civil society"* may sound like wishful thinking, since multilateral institutions have few means to ensure genuine participation and accountability, and since it is this very rise of the civil society which has been pivotal in reducing large-scale projects.

As stressed by Briscoe (1999) *"rent-seeking behaviour is deeply embedded in the social and political fabric of all major irrigating countries and thus changes only slowly and usually because of major exogenous threats."* This point of view contradicts the idea that goodwill, better studies, or training will change the root of the rent-seeking problem. Much the same could be said about the governance of projects. The World Commission on Dams has shown that significant progress has been made in project design and execution in terms of

anticipating negative impacts, disclosing information, or involving/compensating the affected population. Yet, in almost half of the projects these issues are still not considered properly, if at all. What could be then, to borrow Briscoe's words, the "external threats" which could induce decisions that favor public rather private interests, and transparent/participatory rather than bureaucratic and secretive planning?

Changes, on the one hand, can be *pushed* by development of the civil society, better political representation, and overall democratization of the society (something that obviously lies beyond the water sector itself); they can also, on the other hand, be *pulled* by initiatives from development banks, donors, or governments to allow or elicit projects where benefits are better shared, affected populations largely compensated, and alternatives duly discussed in concert with the population concerned.

This, of course, may sound a bit rhetorical too and will not solve the dilemma of international banks and donors:

- Participation of civil society is called for but what will happen if these new actors are adamantly against the construction of any (large-scale) infrastructure? Bluntly put, what will happen if the blind drive to build dams in any natural site suitable for a dike is paralleled by a corresponding inflexible and uncompromising opposition to any water project, blocking even needed ones?
- On the other hand, if bank policies overtly support a "principled" reengagement in large-scale projects, what will happen if governments do not apply principles of strictly assessing social, economic and environmental costs, as well of public participation? Or if they do not accept the bank's safeguards and turn to financial partners with little concern for social and environmental issues?

## **Conclusions**

Large-scale water projects have long been fuelled by motives that go beyond mere economic rationality: they are infused with other symbolic, political and geostrategic dimensions, reveal the human drive to subdue nature, and include a fair amount of rent-seeking because of positive incentives to bureaucrats, politicians and private business. This has fostered projects that were detrimental to certain categories of people and to nature, but also antagonistic to economic and hydrologic reality.

If economic rationality can be overridden by political will, hydrology is more inflexible. Projects that are overoptimistic in terms of economic impact will yield poor internal rates of return at ex-post assessments; projects that are overoptimistic in terms of hydrology will produce artificial scarcity and more frequent water crises. This will further strengthen the case for more supply development which, to be made profitable, will be associated with new development of facilities such as irrigation schemes; the result is overbuilding of river basins, continued man-made scarcity, and poor economic returns to public investments.

Countering such a tendency is not easy: meta-justifications are counterproductive and can always be used to override dissent and to withdraw projects from public scrutiny. Politicizing the debate and opening decision making is a hard way to go; but depoliticizing it and pretending that proper governance can be ensured by investments are unlikely to ensure that "lessons are learned," and projects are "well designed," in short, to usher in a new era of

“responsible” infrastructural development. The World Bank<sup>3</sup> and the ADB, however, are probably in a unique position to show the way forward by designing stringent and innovative project cycles which could become a reference. Their emphasis, it is suggested, should be more on the *process* of deciding whether a *particular* project is sound, rather than on an *a priori* policy that more projects are needed; and more on making sure that externalities are all identified and dealt with, rather than building up largely ad-hoc supportive arguments.

## **Literature Cited**

---

- Abu-Zeid, M. 2001. Water pricing in irrigated agriculture. *International Journal of Water Resources Development* 17(4): 527-538.
- Berkoff, J. 2003. A Critical look at the irrigation sector. Paper Presented at the World Bank Water Week on 4 March 2003.
- Briscoe, J. 1999. The financing of hydropower, irrigation and water supply infrastructure in developing countries. *Water Resources Development* 15(4): 459-491.
- Ekbladh, D. 2002. "Mr. TVA". Grass-root development, David Lilienthal, and the rise and fall of the Tennessee Valley Authority as a symbol for U.S. overseas development, 1933-1973. *Diplomatic History* 26(3):335-374.
- Gottlieb, R. 1988. *A life of its own. The politics and power of water*. New York: HBJ Publishers.
- Grey, D. and Sadoff, C. 2006. Water for growth and development: A framework for analysis. A theme document of the 4th World Water Forum, Mexico, March 2006. World Bank. [www.worldwaterforum4.org.mx/uploads/TBL\\_DOCS\\_46\\_55.pdf](http://www.worldwaterforum4.org.mx/uploads/TBL_DOCS_46_55.pdf)
- Guerra, P. and Guerra, T. 1980. *Seccas contra as seccas*. Collection Mossoroense, No 29. Mossoro, Brazil 313p.
- Ingram, Helen. 1971. Patterns of politics in water resources development. *Natural Resources Journal* 11:102-118.
- Lilienthal, D. E. 1944. *TVA: Democracy on the march*. New York: Harper and Brothers.
- Marshall, H. 1965. Politics and efficiency in water development. *Water Research* 294.
- McCully, P. 2001. *Silenced rivers: The ecology and politics of large dams*. London: Zed Books, Limited; New York: St. Martin's Press.
- Molle, François. 2003. Development trajectories of river basins: A conceptual framework, Research Report No 72. Colombo: International Water Management Institute. <http://www.iwmi.cgiar.org/pubs/pub072/Report72.pdf>
- Molle, François. 2006a. Why enough is never enough: The societal determinants of river basin overbuilding. Paper prepared for the World Water Week 2006. Stockholm, August 2006: SIWI.

---

<sup>3</sup> An internal review by the Bank's Operations Evaluation Department found that "there is an urgent need for the Bank to review quality control procedures, including the adverse effects of water management, to ensure that reviews are transparent and independent" (Pitman 2002).

- Molle, François. 2006b. Planning and managing water resources at the river basin level: Eemergence and evolution of a concept. Comprehensive Assessment Research Report. Colombo, Sri Lanka: International Water Management Institute. (Forthcoming)
- O'Mara, G. T. 1990. Making bank irrigation investments more sustainable (It is time to rationalize policy guidelines on bank irrigation projects). Agriculture and Rural Development Department. Working Paper. Washington, D.C.: The World Bank.
- Pearce, F. 1992. *The dammed: Rivers, dams and the coming world crisis*. London: The Bodley Head.
- Pednekar, S. S. 1997. Resource management in the Thai Mekong basin. Working Paper No. 71. Murdoch University, Asia Research Center.
- Pitman, George Keith. 2002. Bridging troubled water: Assessing the World Bank water resource strategy. World Bank Operations Evaluation Department. Washington, D.C.: The World Bank.
- Porter, Theodore. 1995. *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton: Princeton University Press.
- Reisner, M. 1986. *Cadillac desert: The American west and its disappearing water*. New York: Penguin.
- Repetto, R. 1986. *Skimming the water: Rent seeking and the performance of public irrigation systems*. Research Report 4. Washington, D.C.: World Resource Institute. p. 47.
- Saha, S. K. and Barrow, C. J. 1981. Introduction. In *River basin planning: theory and practice*, ed. S. K. Saha and C. J. Barrow. New York: John Wiley & Sons. pp. 1-7.
- Schreyger, E. 1984. *L'Office du Niger au Mali 1931 à 1982. La problématique d'une grande entreprise agricole dans la zone du Sahel*. Wiesbaden: Steiner.
- Scudder, T. 1994. Recent experiences with river basin development in the tropics and subtropics. *Natural Resources Forum* 18(2):101-113.
- Shapiro, J. 2001. *Mao's war against nature: Politics and environment in revolutionary China*. Cambridge and New York: Cambridge University Press.
- The Nation. 14 September 2003. National water grid: Holes in pipeline projects.
- The Nation. 23 June 2003. Infrastructure project: Tap water grid planned by '05.
- Tiffen, M. 1987. Dethroning the internal rate of return: The evidence from irrigation projects. *Development Policy Review* 5(4): 361-377.
- Turton, A. R.; Meissner, R.; Mampane, P.M. and Seremo, O. 2004. A hydropolitical history of South Africa's international river basins. African Water Issues Research Unit (AWIRU). Report to the Water Research Commission, University of Pretoria.
- United Nations. 1958. Integrated river basin development: Report of a panel of experts. UN Department of Economic and Social Affairs, New York.
- United Nations. 1970. Integrated river basin development: Report of a panel of experts. Revised edition, UN Department of Economic and Social Affairs, New York.
- United Nations. 1976. *River basin development: Policies and planning, vol. I. Proceedings of a UN Interregional Seminar on River Basin and Interbasin Development September 16-26, 1975, Budapest*. UNDP/National Water Authority of Hungary, Washington, DC.

Williams, A. 1972. Cost benefit analysis: Bastard science? And/or insidious poison in the body politick? *Journal of Public Economics* 1(2): 199-226.

Winpenny, James. 1994. *Managing water as an economic resource*. Development Policies Studies. London: Routledge and Overseas Development Institute. 133 p.

Worster, D. 1985. *Rivers of empire: Water, aridity and the growth of the American west*. New York: Pantheon Books.