To price or not to price? Thailand and the stigma of “free water”

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Abstract: *In a context of closing river basins, where most water resources are allocated and depleted, there are strong incentives to place emphasis on water-demand management and to reform the water sector. Theoretically, water pricing has the potential not only to influence users' behaviors towards water saving, but also to contribute to reallocation of water towards more profitable crops or other uses. Pricing water is also a way to recover part of the costs incurred by irrigation infrastructure and its operation. The paper analyzes this rationale in the context of Thailand where the water used in agriculture is free. It investigates the reasons for, and the consequences of, this particular policy, and examines whether the current proposals to establish water fees can be expected to produce benefits that would offset the costs of the reform. It shows that water pricing can hardly be justified in the absence of a wider framework of institutional reform. The prospects for success of such a reform are briefly debated.*

1 Introduction

Despite the success of the irrigation sector in contributing to falling food prices, food security and raising farm income, it has, in the last two decades, elicited growing frustration in the community of aid agencies and development banks. The main reason is probably the low financial sustainability of the sector, which incurs recurrent rehabilitation expenditures that add to the already significant initial investment costs. The second reason is that agriculture both accounts for 70% of the use of water and, despite growing shortages, is seen to be marred by very low levels of efficiency (the water effectively used is only a small fraction of the water diverted). In addition, farmers often apply large quantities of water to irrigate crops that have both high water requirements and a low return (typically, rice in Asia).

These problems of low efficiency, poor management and financial unsustainability have been addressed by a wide range of actions, including rehabilitation, modernization, improved technical management, participatory management, turnover, etc. The limited benefits obtained have spurred a plethora of proposals about the possibility of tackling these problems with some economics-based intervention, particularly in the aftermath of the Hague and Dublin meetings (Rogers *et al.* 1997; UNESCO, 2002). The pricing of water and the establishment of water markets are among the measures that have received the largest attention from academics and development banks. They have given rise to an abundant literature which stands in substantial contrast to the practical application, let alone the demonstrated results of these policies hitherto.

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In Thailand, the water is supplied to agriculture without charge. In an international context where cost recovery and ”getting the prices right” are principles that are supported by a large and growing constituency, this readily identifies Thailand as needing reform. The first proposal for water pricing can be found in the *General Report on Irrigation and Drainage in the Lower Menam [Chao Phraya] Valley* submitted in 1903 to the Government of Siam by H. van der Heide, a Dutch engineer.[2] If the logic for pricing water may have, at that time, been borrowed from practices in India or other Asian countries under colonial rule, it is only recently that the idea has come back to the fore.

In this paper, I will revisit some of the common axioms supporting proposals for water pricing as a possible solution to the shortcomings of the irrigation sector, using the case of Thailand to discuss their consistency, practicability and validity. In the first section, I address the question of pricing as a means to signal to users the economic value of water and hence regulate its use and avoid wastage. In the second section, I investigate whether price differentials may be instrumental in reallocating water to crops with higher water productivity or to non-agriculture sectors. In the third section, I review the links between irrigation sustainability and cost-recovery from farmers, as well as the rationale for the latter. In the last section, I briefly examine the prospects for a water reform and outline what the role of pricing in the process could be.

2 Water Pricing as an Incentive to Raise Water Productivity

2.1 Are free resources necessarily wasted?

The statement that water is wasted when it is free probably appears in one form or another in all papers and reports that address the issue of water pricing. This is consistent with economic theory for a scarce resource: if the marginal cost of water is almost nil, this induces the farmer to use the water until the marginal productivity of this input becomes zero, consuming water beyond the levels defined as efficient by economic theory. Corollary to this observation is that appropriate pricing would send the right signal about the scarcity and the economic value of water, promoting “rational” levels of use.

This simple axiom has been disseminated widely by analysts like Sandra Postel (1992), who observes that “water is consistently undervalued, and as a result is chronically overused,” by development banks and agencies (World Bank, 1993; ADB, 2000; etc.), as well as by many academics. In Thailand,

[2] "A water tax could be levied, in a manner similar to the paddy land tax, over the whole area at present cultivated and the future extension of this area, as far as the fields are benefited by the [irrigation] system… water rates could in general be assessed in some proportion to the quantity of water utilized, and would most probably be a suitable taxation for dry season crops and garden cultivation."

an endless number of observers[3] have taken it for granted, including TDRI (1990), and Christensen and Boon-Long (1994), who posit that "since water is not appropriately priced, it is used inefficiently, and consumers have no incentive to economize." There are two sets of reasons why this statement may be misleading in the Thai case, and probably many others: the first set refers to necessary preconditions, implicitly embedded in the theory that are overlooked and not fulfilled. The second set of reasons is linked to flaws in the logic of the reasoning, as I will try to show here.

That rising water fees may be conducive to water saving is shown by several experiences in the domestic and industrial water sector (Dinar and Subramanian, 1997; Dinar, 2000; Gibbons, 1987; Postel, 1992; Winpenny, 1994). Since individual meters can be easily installed on pressurized pipe networks, volumetric charging is practical and users' behavior is clearly affected by rising charges although, beyond a certain point, the elasticity of water demand falls drastically. The fact that *volumetric* charging is a prerequisite and that it is not feasible in the short run in most large-scale irrigation schemes, especially in Asia, is well acknowledged in the literature. For some reason, however, this recognition has not been effective in moderating the hopes that have been placed in water pricing as a way to elicit water saving and the potential benefits of volumetric charging are often assumed implicitly for pricing in general (see footnote 3).

Even if some kind of volumetric pricing is possible or implicit,[4] it seems that the elasticity of water demand in agriculture is generally very low. There is a whole gamut of reasons why water charges generally remain limited to a small percentage of the gross product: political sensitivity to increases in the price of food; competitiveness in international markets; the depressed level of most staple food prices as well as their fluctuating nature; and the political risks associated with increasing the water charge several fold to produce more impact on water use; all these maintain tariffs in a rather low range, where they remain ineffective (Molle, 2001; de Fraiture and Perry, 2002; Abu Zeid, 2001, Malla and Gopalakrishnan, 1995; Perry, 1996; Gibons, 1987; Ogg and Gollehon, 1989). Berbel and Gomez-Limon (2000) estimated that, in three areas of Spain, farm incomes would have to decrease by 25% to 40% before water demand starts to respond significantly to increases in water prices. Ray (2002) investigated the impact of water prices in western India and concluded that "significant price increases are politically infeasible, and feasible price increases are economically insignificant." Perry (1996) found that volumetric charges in Egypt were an unrealistic means of encouraging significant reductions in demand because the price required to induce a 15% fall in demand for water would have reduced farm incomes by 25%.

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[3] How popular wisdom emerges can be sensed from the following declarations. An official of the Ministry of Agriculture: "Water should be priced in order to increase the efficiency of its use in the farm sector" (The Nation, 2000. April 21); "Agricultural experts agree that water-pricing measures would help improve efficiency in water use among farmers" (The Nation, 1999 Feb. 17); the Director of the National Water Resources Committee: "In reality water is scarce, and the only mechanism to save water and encourage efficient use is to give it a price" (The Nation, 2000. April 23); the Resident Adviser for the ADB in Thailand: "International best practices suggest that efficiency in water management can be improved considerably through imposition of nominal water user fees" (Bangkok Post, 2000, June 11). "Currently, most farmers don't have to pay for irrigation water and, thus, have little incentive to conserve water or to use it efficiently on high-value crops. As a result, irrigation efficiency is under 30%" (TDRI, 1990); "It is the fact once a proper charge is imposed upon water users, water would certainly become more efficient" (Wongbandit, 1997), etc.

[4] Using underground water, for example, results in operational pumping costs that are approximately proportional to the volume extracted.

Since volumetric pricing at the individual farm level is unrealistic, "water wholesaling," in which water is attributed to groups of users, for example, to those farmers who are served by the same lateral canal, appears to be an attractive option. This alternative has the advantage of encouraging farmers to act collectively to achieve reduced demand within the command area of their canal, and shifts on them the burden to solve conflicts and collect a water charge. However, the effectiveness of such an arrangement rests on the possibility a) of defining and registering who the beneficiaries are; b) of designing a transparent allocation mechanism at the basin, project and farm levels; c) of ensuring water supply to groups in accordance with the agreed service; and d) for having Water User Groups that are in a position to perform all the tasks entrusted to them. Therefore, the wholesaling of water appears more like a solution that is made possible by a series of critical reforms that span technical, legal, managerial and political issues, than a measure that can be put forward in a "non-mature" context. In the Thai case, few, if any, of these prerequisites are met, especially in large-scale systems where the allocation and distribution processes are still very far from what would be necessary to define service agreements and water wholesaling (Molle et al., 2001). If bulk allocation, implemented as part of a program of management transfer, is credited with some success in countries such as Mexico or Turkey and has contributed to a better fee collection and financial situation, there is little evidence that significant water saving or gains in land or water productivity have resulted from these reforms (Samad, 2001; Murray-Rust and Svendsen, 2001).

Second, the very statement that water is wasted does not appear to be empirically grounded, despite the overwhelming rhetoric on this issue. Recently, the Director General of the Royal Irrigation Department (RID) declared on a Thai national TV channel, somewhat contritely, that water efficiency was very low in Thailand (around 30%) and that this had to be remedied in the face of the water shortages experienced by the country. International agencies (and sometimes, in their footsteps, local officials) commonly report that Thai farmers are "*guzzling*" water or are showing "*water greed*" (The Nation n.d.), furthering the general idea that efficiency in large state-run irrigated schemes is often as low as 30%, and sticking to this overall vision without questioning it any further. Yet, research conducted in recent years has shown that water basins tend to "close" when demand builds up: most of the regulated water in the basin is depleted and little is eventually "lost" out of the system (downstream requirements and environmental services taken into account). There has been widespread recognition that focusing on relatively low irrigation efficiency at the on-farm or secondary levels could be totally misleading (Keller et al., 1996; Perry, 1999; Molden and Sakthivadivel, 1999). When analyzed at the basin level, closing systems are eventually found to *operate with a high overall efficiency*.

In-depth investigations in the Chao Phraya river basin (Molle et al., 2001), most particularly in the delta, have shown that users and managers have not been passive when confronted with water scarcity but, on the contrary, have responded in many ways. Farmers have developed conjunctive use, dug farm ponds, drilled wells, closed small drains and invested in an impressive pumping capacity to access these sources. Dam managers have come under pressure to avoid dam releases that are in excess of downstream requirements and have improved management. Reuse of water along the basin and within the delta has developed to the point that in the dry season only 12% of the water released by the dams is lost to non-beneficial evaporation or outflow—effectively recycling the "losses" from excessive water diversions in exactly the way that research elsewhere has found and predicted. Industries rely on groundwater for 90% of their use and have been overexploiting the aquifer for over three decades. Because of the tendency to focus on state-designed policies, all the endogenous adjustments to water scarcity that accompany the closure of a river basin are generally overlooked

(Molle, forthcoming). Irrespective of whether they pay for water or not, farmers do have a sense that water is valuable and scarce because they are directly confronted with the consequences of its scarcity and have made significant investments in pumps, wells and ponds to tackle it (80% of farmers in the lower Chao Phraya basin have at least one pump set).

Finally, stating that water is "free" misses the point that the majority of farmers have to resort to pumping to access water in the dry season (when water saving is an issue). Because of the costs incurred by these water-lifting operations, there is little likelihood that farmers will squander water (Bos and Wolters, 1990; Srijantr et al., 1999).

2.2 From price subsidies to factor pricing

Despite these limitations there is an understandable concern on the part of the economists to see factor prices reflecting their scarcity, as a way to avoid market distortions and outright subsidization. In other words, even if the impact of pricing on efficiency is doubtful, the bottom line principle is that pricing should be instrumental in raising users' awareness about water scarcity. This can be achieved if real factor prices are allowed to reflect the scarcity of resources. This calls for the phasing out of subsidies on input and/or output prices. However, since such measures have a direct and proportional impact on farm incomes, subsidies are replaced by direct income support. Baffes and Meerman (1997) have studied such agricultural support programs in Mexico, US and EU and have shown that their application did not yield the expected benefits and that, on the contrary, the overall financial burden on the government was significantly increased, producers were exposed to a higher risk of volatile prices[5], and monitoring and enforcement were problematic in the case of Mexico. While results are disappointing in countries where agriculture is subsidized, the need to compensate for the losses incurred is all the more pressing in a context where, on the contrary, agriculture appears to be heavily taxed. Ironically, while income support schemes are crucial in the developed countries to counterbalance the losses incurred by reduced subsidies, the principle of compensation is often not even mentioned in developing countries, where farm incomes are much lower and more precarious, and where it is not possible to squeeze both ends.

Whereas in many markets a change in input prices is readily passed on to the consumers, albeit partly depending on the structure of the market, this does not easily occur for commodities, where producers operate as "price takers," for example because of links to international markets. In the case of rice, the farm-price elasticity relative to the world-market price is 0.8 (Sombat Saehae, personal communication). It follows that farm gate prices are predominantly driven by the world market and that internal balancing mechanisms to reflect changes in factor prices are critically constrained, to the detriment of producers.

Overall, it emerges from this evidence that both the empirical and theoretical justifications commonly advanced to support the use of water pricing as a regulatory tool for saving water are unfounded. On the one hand, water is not squandered, the overall efficiency of water is high and most farmers incur costs to access water that is, therefore, neither free nor wasted and on the other, the theory does not

[5] The study clearly demonstrates that trade reforms that are 'Pareto-improvements,' i.e., those that lead to a more efficient *overall* resource allocation, are likely to be detrimental to equity and to poverty-alleviation. This seems to be the accepted price to "transform agriculture into a fully liberalized sector that helps resources to be allocated in a more efficient manner."

hold if volumetric pricing cannot be established, and even if volumetric pricing is possible, a) water demand appears to be inelastic at the low range prices that are politically feasible, and b) in closing basins where water scarcity is an issue, what is "lost" in a particular location is eventually used by a downstream user who is reusing the return flow[6]. All this suggests that the heavy transaction costs incurred by the establishment of some form of water pricing would far outweigh the meager, and at least hypothetical, gains in economic efficiency.

This conclusion applies to the Thai case but might be of wider validity, as far as water use for agriculture is concerned. Exploring the literature on water pricing yields a disquieting paucity of cases in which the introduction of water pricing has successfully induced water savings.[7] The claims by Johansson (2000) that water pricing is a "primary means… to improve water allocations and to encourage conservation" does not seem substantiated by the literature, especially for unmetered gravity irrigation in developing countries on which this paper focuses. In addition, a more general contradiction might lie in the facts that basins where pricing policies are advocated are those where water problems are severe, and that these basins are precisely those which have closed, reducing the scope for water saving.

3 Prices as a Means of Reallocation to Less Water-Intensive Crops

Improving irrigation efficiency is only one aspect of better using scarce water resources. Another potential benefit from water pricing could be to encourage a shift towards crops that are less water-intensive and/or that display a better water productivity ($/m^3), or towards nonagricultural use. Volumetric pricing would directly penalize crops with high consumption of water but it could also be possible to establish water charge differentials that would encourage farmers to grow crops with lower water requirements. This runs into the same difficulties exposed in the preceding section, regarding the elasticity of water use, the impact on farm income and the difficulties of metering volumes. It is compounded by costs in monitoring effective land use. From this rationale on crop selection it is often *inferred* that farmers do not diversify into field crops, vegetable or fruit crops because water is cheap or free. This is one of the most enduring misconceptions, as the Thai case well illustrates.

In Thailand, the possibility of achieving water conservation by inducing a shift away from rice to field crops, which consume (ET) only 40-60% of the amount of water needed for rice has long been underlined by policy makers and has formed the cornerstone of public projects aimed at fostering agricultural diversification (Siriluck and Kammeier, 2000). This was already a recommendation of the FAO as early as the 1960s as well as the alternative that "received the most attention" from Small in his study of the delta (1972). Such a concern has been constantly expressed for at least four decades.

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[6] The exception could be for those located in the lower portion of the basin (see Saktivadhivel et al,. 2001) because return flows may be lost to the sea. In the Chao Phraya Basin this does not occur because the delta is "closed" and water is retained in what is called the conservation area.

[7] A review of some studies on several countries (Dinar and Subramanian, 1997; Tsur and Dinar, 1997; Johansson, 2000; Dinar, 2000; Bhatia *et al.*, 1994) and other isolated case studies show no evidence of cases where pricing was specifically used as a means to elicit water conservation in gravity irrigation with surface water and did achieve some result. Even when water happens to be metered (Jordan, Brazil, Australia, Tunisia, etc), this was not the case, as fees were too low to have any impact.

Even nowadays, it is not rare to hear officials complaining off record that “farmers are stubborn,” that “they lack knowledge and only know how to grow rice,” and that “they oppose any change described by outsiders as beneficial to them.” Crop selection, however, is a more complex issue than merely choosing the crop with higher return to land or water.

First, the rationale for induced shifts in land use is generally implicitly based on average farmers’ income, overlooking the aspects of risk, which are crucial in shaping farmers’ decision making. Scott (1976) has shown that the sustainability of peasant economies was more closely governed by variations in yields than by average values, and it was also shown that people resented smaller fixed taxes much more than larger taxes indexed on real yields. Even for irrigated agriculture, where yields are deemed to be more secured, risks in production are not negligible and include both agronomic hazards (diseases, pests, etc.) and a higher risk in marketing, further compounded by the higher requirements of cash input demanded by commercial crops. As a general rule, the potential return of capital investments is strongly correlated to the level of risk attached to the undertaking (Molle et al., 2001b). This is clearly exemplified by Szuster et al. (forthcoming) in their comparative study of rice and shrimp farming in the Chao Phraya delta. In other words, while cash crops may generate higher average returns, they are also subject to more uncertainty, either in terms of yields or farm-gate prices. Thus, only those farmers with enough capital reserve to weather the losses experienced in some years can afford to benefit from the average higher returns; others go bankrupt or become indebted. Shrimp farming, again, provides a good example of such a situation.

It could be argued, however, that the price of rice is also highly uncertain and that rice production suffers from uncertainty as much as other crops do. If the rice price does fluctuate, its crucial importance for the rural economy brings it under more scrutiny. Despite recurring complaints, echoed in newspapers, that rice farmers lose money when producing rice, the political impact of possible low prices in reality largely shields them from dropping under the subsistence threshold. Ad-hoc public interventions are always implemented when such a risk arises (even though their impact generally falls short of expectations and benefits tend to be captured by millers and other actors in the rice industry). This does not hold, however, for secondary or marginal crops (that invariably include the desirable “cash crops”), and complaints of scattered producers have little chance of being heard in case of depressed prices. A typical example of such a cash crop is chili, a rather capital- and labor-intensive crop, which can fetch 25 baht/kg in one year (providing a high return) and 2 or 3 baht/kg in the following year (with a net loss for farmers).[8]

In addition, there are several other constraints (agro-ecology: heavy soil with little drainage, not favorable to growing field crops; labor[9] and capital requirements, skill-learning, development of proper marketing channels, limited total demand, etc.), which impact on the process of diversification, and it is doubtful that "pushing" for it is eventually beneficial. The study of a large-scale public program by Siriluck and Kammeier (2000) aimed at encouraging crop diversification shows that such interventions are met with mixed success and are not flexible enough to adapt to different physical

[8] This situation differs significantly from that of western agriculture, where floor prices or “intervention schemes” are generally established to compensate for economic losses when these occur. In addition, western farmers generally benefit from insurance (against exceptional yield losses) that comes with stronger cooperative and professional structures.

[9] For example, the harvest of mungbean, a typical supplementary crop with no additional water requirements, is often a problem because of labor shortage.

and socioeconomic environments. In many instances, the attempt by extensionists to meet the "targets" ascribed by the project has led to inadequate investments and choices, sometimes resulting in debts or bankruptcy.

Farmers are expected to behave as rational profit-maximizers and they are not directly concerned with water productivity ($/m^3) but, rather, by their net income ($ return to the total set of resources – land, labor, capital, machinery – at the farmer's disposal) as well as by the risk attached to a given crop or activity (Wichelns, 1999). There are several alternative crops to rice. A first group—vegetables, fruits or flowers—fare better in terms of income, water productivity and absolute water consumption. A second group—field crops, such as groundnut, mungbean or corn—use less water, and may have better water productivity, but are generally less profitable and/or riskier with regard to selling prices. A third group includes crops with better income and water productivity but higher consumption of water (fruits in raised beds, aquaculture). Considering these various options it is clear that water productivity is only one of a range of interrelated issues that a rational farmer considers when choosing his crop pattern. An example of this complexity can be found in Egypt where rice appears as a productive and profitable crop, while being water-intensive, presenting a "headache issue" (El-Kady et al., 2002) to managers.

These contradictions are apparent in the attempts to model the impact of policy changes on land use (see for example Diao and Roe, 2000; Doppler et al., 2002; Johnson, 1990; Cai et al., 2001). Since the assumption is that typical diversification crops provide better income (and generally better return to water or labor), models consequently point to beneficial shifts in cropping patterns but do not explain why "best" crops are not widely and readily adopted, with or without "better" pricing policies for inputs. As there is a need to avoid an unrealistic sweeping shift to the "best crop," which price elasticities or constraints on factor availability are often not able to ensure, modelers are generally led to putting a cap on the areas allowed under such crops. This illustrates the difficulty of representing the complexity of farmers' decision making, most notably with regard to risk taking, and with the evolution of output prices, especially for those strongly linked to world markets.

Economically non-optimal allocation of water is blamed on price distortions and on the absence of water pricing. This assumes that farmers use water until its marginal product is zero and choose crops with no attention to their water needs. This line of reasoning assumes implicitly that water is available to users without restriction. If such is the case, there is no sense of water scarcity, and saving water is usually not an issue. In the opposite case, effective water scarcity translates into insufficient access to resources and the above framework does not apply. However, this effective scarcity impacts on farmers' decisions regarding crop choice. As reckoned by Wichelns (1999), farmers respond to water rationing or changes in water allotments "by modifying crop choices and input decisions, just as they would respond to changes in explicit water prices." It is not clear, therefore, why water pricing would be so essential to communicate the scarcity of water and influence crop choice if water scarcity produces such adjustments by its very nature.[10] A problem arises when scarcity is not evenly distributed and when local scarcity is the result of wastage occurring in other parts of the system, which have unlimited access to water. Such a situation may also be more effectively tackled by an adequate rationing policy designed to "spread scarcity" over the whole irrigated area.

[10] This discussion refers to the choice of a given user facing a shortage of water relatively to land. It does not address the wider question of the allocation of water among all agricultural users within the same basin or irrigation area.

Evidence of the dynamics of diversification in the delta (Kasetsart University and IRD, 1996) points to the fact that farmers display great responsiveness to market changes and opportunities (a point definitely confirmed by the recent spectacular development of inland shrimp farming [Szuster and Flaherty, forthcoming]). Good transportation and communication networks allow marketing channels to perform rather efficiently. Contrary to widespread belief, farmers do not need to have their water priced to shift to other productions. *They will increasingly do so if the uncertainty on water and commodity prices is lowered.* Time and again, they have shown dramatic responsiveness to constraints on other production factors, such as land and labor for example (Molle and Srijantr, 1999), and have already sufficiently experienced the scarcity of water to adapt their cropping patterns, should conditions be favorable (notably regarding the existence of markets for their products). Inducing crop shifts by raising differential fees to the level where they might be effective would substantially impact on farm income and critically raise economic risk, which is already the main factor that hinders diversification. In addition, there is no direct relationship between crops that have a high return to land and those with a high return to water, pointing to a possible conflict in objectives.

The reallocation of water towards more beneficial uses can also occur across sectors. The issue is somewhat simpler as few object to the fact that domestic and industrial uses are to receive priority with regard to irrigation. Here again, differential prices could theoretically help reallocate water, although water markets are generally seen as being more efficient. This question pervades the literature, perhaps as a result of the gridlock experienced in the western US due to the prior appropriation right system, but is rarely an issue in developing countries. While the impact of the transfer of water out of agriculture is an important question (Rosegrant and Ringler, 1998), leaving open the question of compensation, its realization through central allocation *does* occur, implemented, or imposed, through political decisions that are usually close to what economic rationality would suggest. There is little role for water pricing in this shift, except that it might be instrumental in controlling domestic use, thus reducing the magnitude of the transfer (or delaying it).

4 Pricing and Cost-Recovery

Small (1990) questions the rationale for Development Agencies' frequent concern about cost recovery. It seems hard to link it to the repayment of loans, as governments guarantee payment regardless of the fate of the project. It may be related to a dominant view that irrigators form a segment of society that has benefited from a specific capital investment by the state and, as such, is expected to channel back to the nation a part of the profit generated. This is forcefully advocated for operation and maintenance of irrigation systems, but also often extended to capital cost-recovery (sunk costs of construction). If this logic of "reimbursement" is often justified by notions of equity (redistribute part of the profits of those benefited), or ideology (state involvement should be limited and activities turned autonomous), shifts in public policy are generally motivated by more mundane reasons of "financial drought".[11] I will examine here the rationale for "reimbursement", as applied to the Thai case.

[11] In fact, a review of the literature (see footnote 7) clearly shows that the emphasis is on cost-recovery and financial autonomy of providers and utilities. This is confirmed by the World Bank (1993), which reckons that "prices reflecting opportunity costs are desirable, but cost-recovery fees that ensure financial viability of water entities are a more realistic immediate objective."

4.1 Public investment vs. capitalistic investment

A first debate revolves around the question of whether investments in irrigation differ from other social overheads or public investments. First, there are numerous public investments intended to boost a particular sector of the economy, which are not directly refunded by beneficiaries. The government also creates industrial parks with infrastructure, invests in commercial fairs or tourism promotion campaigns, in roads or port facilities, etc. Is an irrigation scheme different from a road, for which users are generally not requested to pay a fee for the benefit they draw from it? Certainly, there is a sense in that the spillover benefits from roads are more widely shared than those of irrigation. This, however, is not so clear if we consider both the linkages of irrigation, backward (construction, input provision, etc.) and forward (post-harvest, food-processing, transportation, marketing channel, etc.), as well as the benefits of lower food prices that accrue to the whole population, especially the urban dwellers. Second, since a major objective of irrigation is to contribute to ensuring a degree of food security, achieving this objective may be considered a national priority that requires investments (just as national security provides the rationale for financing the army) (Sampath, 1992; Abu Zeid, 2001).

Placing emphasis on return to capital fails to recognize that many public investments made in developing countries are aimed at trying to correct, or limit, socioeconomic imbalances or disruptions (in particular avoiding push-driven migration flows to cities), and not just at generating financial benefits. The crux of the matter for developing countries is to maintain a relative balance between poorer and richer regions, the agriculture and the non-agriculture sectors, so that the transfer of labor from the former to the latter follows a pull rather than a push process. In other words, the issue is one of maintaining the respective basic profitability of the two sectors during this transfer process, in order to avoid major social and political disruptions, be it in accordance with economic orthodoxy or not. This does not mean that this objective is always achieved, and that the judgment of what is a desirable equilibrium is necessarily objective (in practice, urban bias has generally been significant and agriculture discriminated against; see Schiff and Valdés, 1998), but recognizes that political considerations, rather than mere aspects of return to capital, dictate priorities in state investments in developing countries.

4.2 Is agriculture a net beneficiary of public policies?

A second line of debate is about whether, indeed, irrigated agriculture can be said to have benefited from a preferential treatment within the nation economy and, thus, whether water pricing as an additional government tax is justifiable on such ground.

Comparative studies on water pricing generally come up with tables, which compare the different water charges in absolute terms and relatively to the gross or net crop income (Small et al. 1986; Dinar and Subramanian, 1997). Such tables are useful for assessing the weight of water in production costs but are misleading with regard to the contribution of farmers to cost-recovery that they are supposed to indicate. Agricultural production, as mentioned above, involves numerous activities that all come with tariffs, taxes, subsidies, price controls, quotas, and varied government expenditures. In addition, because agricultural growth is affected by resource flows between sectors and the consequent changes in factor prices and return, there are complex linkages between sectoral policies that make the determination of the cost/contribution of farming to the nation anything but straightforward (Schiff and Valdés, 1998).

Indirect taxation through the control of market prices, export taxes or exchange rates often significantly accrues to the government revenue as, for example, in Egypt or in Vietnam. In the Thai case, the revenues siphoned by the State off rice cultivation through the mechanism of the rice premium between 1952 and 1986 have been estimated at 25% of all rural income (Phongpaichit and Baker, 1997; see also Silcock, 1967; Ingram, 1971; Motooka, 1978) and it is clear that rice-farmers have indirectly paid back more than any realistic water fee. It was estimated that in 1980 these indirect revenues amounted to three times the operation and maintenance (O&M) costs (Small et al., 1989) and capital cost recovery has reached uncommon levels.[12] Because declining food prices in the last two decades (driven, in large measure, by the increase in reliable production from irrigation investments) have depleted the surplus that could be extracted from agriculture, these indirect revenues have now dwindled down, being captured as consumer surplus. Schiff and Valdés (1992) showed how governments are caught up in a web of contradictory goals, including protecting farmers, protecting consumers from high food prices, raising revenues through taxation and ensuring the competitiveness of economic sectors in the world market. In their study, Thailand appears as a country where agriculture has been heavily taxed. This may serve to show that agriculture has been a contributor, not a beneficiary of subsidies—though, of course, this effect has been across the board on the agriculture sector, not targeted at irrigation.

All in all, if the overall situation in developing countries can be described, following Schiff and Valdés (1992), as the "plundering of agriculture", and if producers are often heavily taxed while consumers are subsidized (Jalbani, 1995), the cost recovery to the nation appears as an ironical principle, and the "free water" subsidized as a small compensation for this situation. This point serves to question the rationale used by ADB to support cost recovery: "Thai taxpayers are paying Baht 35 billion a year to run RID. If this is worthwhile to the farmers then why should the taxpayers have to pay for RID?" (Halcrow, 2000c). This question stems from a limited understanding of what "taxpayers" pay for and ignores the more global and interlinked arithmetic of sectoral taxes, subsidies, and cross-subsidies, as well as the other objectives behind irrigation policies mentioned earlier.

Last, there is the international dimension of subsidies, as many of these commodities, notably rice, are traded in international markets. The insistence on having farmers pay the "real" cost of water can first be questioned when European and American agriculture is admittedly heavily subsidized (Sarker et al., 1983; Baffes and Meerman, 1997; Binswanger and Deininger, 1997; CRS, 2002). This applies specially for crops that compete in international markets—here the price is substantially set by the lowest (net)-cost producers—and it is not clear why developing countries should adopt policies, which are not part of the agenda of their western or East-Asian competitors. The US Congress, for example, has provided US$24 billion since October 1998 to shield growers against low prices and crop disasters and is considering expanding its interventions (The Nation, 2001). Complying with orthodoxy (full operational cost recovery and "real" factor prices), on the one hand, but disregarding it entirely, on the other, through intervention when benefits get squeezed by declining prices, illustrates that a real-cost regulated market is not yet in place for issues that are far broader than water pricing. It also casts doubt on the interest to withdraw today what might have to be given back

[12] According to Motooka (1978), "most of the rice premium is borne by the rice-growing farmers of the central plain, and it is here that the Thai government has invested most public funds since 1950, in the Greater Chao Phraya Irrigation Project. Without the tax revenue from the tax premium the Greater Chao Phraya Irrigation Project could not have been carried out."

tomorrow, even if the alleged rationale is to allow prices to reflect factor scarcity (see section 2). In Indonesia, recent trade liberalization has proved effective in reducing the budgetary burden from government food imports but it has increased dependence on rice imports, threatened national food security and reduced farm incomes (Tabor et al., 2002). All these impacts may (or may not) be entirely appropriate to Indonesia's situation—in either event they are real and must be included in the socio-political rationale for policy change.

4.3 Redistribution and equity

Another justification for cost-recovery is that the irrigated sector has benefited from exceptional public investments and should therefore, out of a concern for equity, a) return part of its value added to government coffers, b) allowing in particular further investments in the non irrigated agriculture sector (FAO, 1986).

The first point is countered by the evidence discussed above that more wealth has been transferred out of agriculture than injected into it (in developing countries), even in the case of irrigation. In addition, beneficiaries of irrigation are usually not consulted when the decision is made to construct a scheme, nor are their obligations defined at that time. Therefore, it might be unfair to ask them to repay investment costs decided by bureaucracies and that sometimes date back to half a century[13]. Additionally, when O&M cost-recovery is considered, it also does not appear to be fair having the users bear the part of the costs incurred by political decisions to allow over-staffing, poor management and corruption (FAO, 1986; Bhatia, 1991; Gulati and Narayanan, 2002). The costs of line agencies should first come under scrutiny, before shifting the financial burden onto farmers, even though the latter may sometimes seem to be easier than the former.

The argument for equity across irrigated/rain-fed sectors can also be questioned. First, indirect taxation through rice prices is proportional to the quantity of rice produced, which implies that the more productive irrigated areas have contributed more than rain-fed areas. Second, there is no direct linkage between particular state revenues and expenditures and, therefore, no reason why increased taxation of irrigation would result in improving the lot of farmers in rain-fed areas. Third, the argument implicitly assumes that rain-fed agriculture has been deprived of public investment *because* irrigation has absorbed most of the state-investment capacity, while there is no clear evidence of such discrimination in the Thai case (it can be argued that public investment opportunities in rain-fed areas are much more limited by nature).

4.4 O&M expenditures, scheme deterioration and financial drought

The pressing need of cost sharing is generally derived from a concern to reduce government expenditures and is associated with a deterioration of irrigation facilities that both impinges on productivity and farm income and gives way to costly recurrent rehabilitation programs. Such deterioration appears relatively slight in the present case (RID's maintenance, especially in the Central Region, can be considered quite good if compared with other countries), and there is no evidence that financial squeezes, even after the 1997 economic crisis, have drastically altered RID

[13] Even when repayment has been made clear by law, such as in the US, this disposition has not been applied. It has been estimated that only 5% of the investment costs of the projects funded by the Bureau of Reclamation has been levied.

budgets or its capacity to carry out maintenance work. In Thailand, O&M costs are said to correspond to a "huge drain on the national budget" (Halcrow, 2001) but the potential gains from the cost-sharing policies proposed represent only 0.16% of the Thai national income, not considering the transaction costs attached to them. More generally, it is unclear whether the post-crisis administrative reform driven by international agencies will be implemented and RID forced to revise its role, which may be interpreted as a sign that the pressure for change generated by the crisis is not as compelling as often believed.

Raising fees that only contribute to the government income is a measure that is not conducive to internal improvements and is, therefore, a decision pertaining to the design of the tax system as a whole: making users bear a part of O&M costs is helpful in internalizing costs from the point of view of the government, but shifting this financial burden has to be reasoned based on wider public objectives of poverty alleviation and wealth redistribution, sectoral policies, possible treasury difficulties, and political risks, which are all dependent upon the context of each particular political economy.

An important distinction must be made between cost recovery, that goes to the government coffers, and irrigation financing, that is the provision of funds that are actually used for irrigation costs (Small, 1990). Surprisingly, the Royal Irrigation Act of 1942 recognized this fact early and made it legally possible to charge users for water (despite fixing unrealistically low limits), but stipulated that collected money could not be considered as state revenue and should constitute a special fund to be put back into the development of irrigation. If this is the case, and if users are granted partial or total control on the allocation of these funds, then incentives to pay and limit degradation are created and a sense of "property" may emerge.

One step further, it is the potential role of pricing at the interface between line agencies and users, which deserves emphasis. When fees also contribute significantly to the salary of the officials of the agencies, or are used to pay field staff who are selected by the users themselves, then the financial contribution of users creates a virtuous circle between water supply and the quality of service (Small and Carruthers, 1991; Abu Zeid, 2001). On the other hand, if water management is diagnosed as poor and if an increased financial burden is imposed on users *without* this being compensated by some kind of clear new benefit, pricing will not be successful and quickly undermined by widespread defaulting. Such benefits must come from local reinvestments in maintenance and improvements in water distribution. Only then can the reliability of water delivery be improved and its benefits realized in terms of increased investment, production and income, although this point is less crucial for rice cultivation and individual mobile pumps now allow for compensation for uncertainty in canal water.

5 Prospects for Reform

Devolving the responsibility of local maintenance and the management of a water fee to the users has not yet been considered in Thailand. Modifying the status of public agencies and civil servants in order to link their salary to the payment of users requires a much more ambitious reform and is generally not regarded as a realistic option. Downsizing the RID and having users contracting their own field staff for water management could be considered within the framework of a wide reform but the government has so far taken no unequivocal steps in that direction.

Present reforms still consider water management at the tertiary level and maintenance as crucial issues but these may actually have lost importance in the eyes of farmers. As a result of the ongoing decentralization process, local administrations have seen their budget increasing and are now using the resources under their control to fund maintenance (notably mechanical ditch dredging). Likewise, the organizational needs of water management have been radically changed further to the introduction of direct seeding in lieu of transplanting, the development of secondary water sources and the spread of pumps. On the other hand, the issue, which has gained prominence in a context of water scarcity is the allocation of water in the dry season. The process towards involving users in management should be initiated by allowing a transparent allocation process in which users would have representatives at each level (main canal level, scheme level, plus the delta and basin levels for farmers in the Chao Phraya delta). The definition of (seasonal) entitlements in which users have a say (as a first step to defining water rights) is the preliminary step to the definition of service agreements.[14] Such agreements must be accompanied by a technical capacity to operationalize them, to monitor distribution and to assess whether the actual and agreed supply match. A water charge managed by users can allow local maintenance and the hiring of staff and can thus be a "glue factor" in a wider process of transfer. This has technical, managerial, legal and political implications and requires a very thorough reform that needs the combined support and pressure from the government, the political class and the society. There is no clear indication that such a conjunction is to be found in Thailand at the moment.

6 Conclusions

Pricing mechanisms are often held as a potential tool to help "rationalize" the use of water in ways that economic theory sees as beneficial. Applications of such measures have been met with some success in the domestic/industrial water sectors but have so far failed to produce convincing examples in the large-scale public-irrigation sector of developing countries.

The idea that water waste would be a consequence of the non-pricing of water was little supported by evidence from Thailand. The closure of river basins, most notably the Chao Phraya basin, is accompanied by reductions in losses, with only 12% of dam releases in the dry season lost to non-beneficial use—a reality that contrasts sharply with what is usually conjured up to justify pricing as a way to induce water savings. The technical impossibility to establish volumetric water deliveries as well as the wholesaling of water in the present context removed the possibility of influencing users' behavior through pricing. Even if and when this is possible, there are indications that the elasticity of water use is very low at the range of prices that are financially required to meet appropriate cost-recovery objectives, or indeed economically and politically feasible. While it is recognized that non-volumetric pricing has little or no impact on water use and agricultural water productivity, except in exceptional conditions (FAO, 1986)[15], it is not clear why it is still invoked as a basic good practice on such grounds.

[14] This process must also be an opportunity to better take into consideration the water to be reserved for environmental services.

[15] A more general contradiction might lie in the fact that basins where pricing policies are advocated are those where water problems are severe, while these basins are precisely those which have closed, reducing the scope for water saving.

The possibility of inducing land-use shifts towards crops with higher water productivity runs into the same difficulties and it was shown that farmers' decision making gives much emphasis to risk, and that land and water productivity objectives do not necessarily coincide with income maximization. Assuming that there are substantial gains to be expected from shifts in cropping patterns if water is priced largely misunderstands the dynamics and constraints of diversification. If much higher profits can be made through diversification, farmers would do it anyway, and unprompted by water-price increases. It is not suggested here that no gains can be derived from a better allocation, but rather that water is only one aspect of crop selection, and that scarcity itself induces such adjustments in land use. Pricing alone is unlikely to help in that respect. To penalize rice because of its higher water needs would only raise the vulnerability of the main crop without making alternatives more secure or removing the other constraints to diversification, particularly the need of markets. Likewise, few economic gains can be expected from inter-sectoral reallocation of water, as non-agricultural sectors are already given de facto priority.

The principle of cost-recovery is generally propped up by an image of irrigators who have unduly benefited from government largesse and are expected to pay back the "tax payers." This was confronted with the net transfer of wealth from agriculture to other sectors, symbolized in Thailand by 30 years of rice premium, and with the multifaceted benefits of irrigation accruing to the society. It was also recognized that political considerations and national challenges, such as food security, rather than mere aspects of return to capital, dictate priorities in state investments.

A water fee would be akin to a flat tax that would decrease farm income without effectively sending a signal of water scarcity, and decrease international competitiveness, especially with regard to western countries that continue their policy of subsidy, while it would not be easily passed on the consumer because of the strong linkages between domestic and world rice markets. It was noted that while reductions in price subsidies in developed countries were compensated for by adequate income policies, the latter was generally omitted in developing countries. Shifting, even partly, the O&M costs to the users is helpful in internalizing costs from the point of view of the government and signaling to all concerned the real cost of system operation, and may help ensuring financial sustainability if public budgets happen to be lacking, but has socioeconomic and political implications that need to be addressed.

Water pricing in the gravity irrigation sector, when taken in isolation, is likely to result in a drop in farmers' income, increased risk exposure and inequity, and frustration due to the cost of collection and defaulting, rather than to the gains in irrigation and economic efficiency envisioned by proponents of the approach. It will be unpopular without producing much benefit, especially when transaction costs are likely to be higher than the fees themselves,[16] unless it is balanced by clear gains for users.

Beyond "the obsessive traditional concern on the part of resource economics with correct pricing levels for irrigation water" (Svendsen and Rosegrant, 1994), water pricing is made more attractive when it is construed as a mere binding element of a wider mechanism that redefines relations between

[16] An example in point is the recent policy implemented in Pakistan "aimed at ensuring transparency, equity, and efficiency to ensure cost recovery for the irrigation service," but which ended up being a demonstration of "how an inappropriate policy can jeopardize the sectoral performance" (Prathapar et al., 2002).

users and the agency (Bromley, 2000[17]; Small and Carruthers, 1991). It gains sense if a full reform is implemented, that includes a degree of turnover and financing of a water-delivery service in which payment is linked to the quality of service. Service definition includes definition of the allocation of resources and on the timing of the distribution of allotments, both processes in which users should have a say given their prominence in a context of scarcity. In that, benefits from thorough reforms are to be expected in terms of equity, empowerment and improved service rather than primarily in terms of water saving, economic efficiency or cost recovery, which are given prominence in the justification of pricing reforms.

Emphasis, thus, should rather be placed on paving the way for a gradual but thorough reform, ensuring, in particular, the capacity to define and operationalize services, as well as the legal framework and the political and public support for changes in line agencies. In most cases, the numerous technical, managerial and political difficulties faced by such plans jeopardize this objective and reforms remain generally restricted to isolated components, backed by arguments that are turned invalid. It is not clear, therefore, whether "half-measures" provide "half-benefits", and must be seen as "second-best" options, as economic parlance suggests, or if they are likely, because of the absence of linkages and invalid supporting assumptions, to fail and lead to an overall negative impact, rather than to the theoretical gains envisioned. All in all, it appears unwise to propel water pricing to the fore of the reform, as a symbol of restored economic orthodoxy, when it is expected to play a more crucial and later role in a wider and longer reform process.

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[17] Bromley states that "until irrigation systems are comprehended as common property regimes, and until they are organised and managed in such a way that the co-owners of the system (and its annual tranche of water) create incentive-compatible behavioural rules, the advocacy of water pricing will be both inadequate and misplaced."

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