Economic Tools for Water Demand Management in Thailand: Conventional Wisdom and the Real World

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Abstract

This paper first examines a few axiomatic statements that are generally accepted as basic tenets of conventional wisdom on water management in Thailand, most particularly in the Chao Phraya River basin. The confrontation of these theoretical assertions with real-world observations shows that blueprints based on such rationales poorly fit the Thai technical, institutional and political context. Most arguments put forward to support the introduction of water charges or water markets are proven to be weak, flawed or unconvincing. In particular, water-use efficiency at the basin level is shown to be high and reflects how water management and access to water resources have been changing in the last two decades, as the basin has gradually closed. A scenario for working towards the definition of water rights and integrated management is outlined, but emphasis is placed on the wide gap existing between the prerequisites to such a reform and the current situation.

TO the layperson, a monsoonal tropical country is associated with the image of land made luxuriant with plentiful water. The stark reality, however, is that Thailand has joined the host of countries currently facing water shortages. With the exception of the southern region and some forest areas along the border, hydrologic data show that the yearly average rainfall in Thailand varies between 1100 and 1600 mm, (ESCAP 1991). A somewhat attenuated monsoon provides water in excess for about half of the year, while for the remainder of the year there is little rainfall and the only available water is that which is released from 28 storage dams. After World War II, Thailand's water resources were largely untamed and lacked storage capacity to regulate the seasonally contrasting water regime. The population was less than 18 million, and most of the uplands were still covered with forests. The second half of the century, however, would witness dramatic changes in population (62 million inhabitants by 2000), urbanisation (10 million people in the Bangkok Metropolitan Area [BMA]), water resources storage development (28 main dams comprising a volume of 66 billion m^3 [Bm^3]), cultivated area (52 to 130 million rai [1 rai _ 0.16 ha]) and irrigated area (32 million rai, or 25% of the total agricultural land). However, only 15% of the 200 Bm^3 annual run-off remains trapped in the dams (ESCAP 1991).

Gradually, through the concomitant development of irrigated and urban areas, constraints on water resources started to be felt, particularly in the Chao Phraya River basin, where irrigated areas have been developed beyond the potential defined by the available water resources. The expansion of BMA led to the gradual extraction of a significant share of the basin resources for urban and industrial water uses. Increasing competition for water materialised through recurrent water shortages, occurring principally in the dry season and mostly affecting rice cultivation, but also prompting restrictions in water supply for the capital (in 1994 and 1999). With gloomy prospects for the Thai water sector, we may distinguish four schools of thought which have emerged in response to the water challenges posed.

The first school of thought on water resources, promulgated by NGOs and social activists, considers water as a social good, the free use of which is a human right. As expressed by a scholar at Thammasat University 'natural resources—such as water—are essential to all, and should not be managed by market mechanisms. Otherwise, water would not flow by gravity but by purchasing power. Commodification

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of water should not be allowed because the right to natural resources is a basic right all human beings have'. This view is echoed by some farmers, who inquire why they should 'have to pay for the water that Mother earth and the forest give us' (Petipong calls for 'national agenda', The Nation, 11 June 2000).

A second viewpoint is spearheaded by international donors, notably the Asian Development Bank (ADB 2000), together with some segments of the public administration who, willingly or not, seem to have rallied to the cause. They have voiced support in favour of the introduction of economic incentives and demand management. Water savings, they argue, must come from water pricing (so that users will inevitably be encouraged to reduce their consumption), and improved management. Conflicts between users, in particular different economic sectors, are eventually best regulated by market-based mechanisms.

A third attitude, favoured by most of the Thai public sector, supports an administrative solution rather than one based on demand management. New laws aim at giving more control and power to the various administrative bodies concerned with water issues, orientations quite evident in the two drafts of the 'Water Law' which have been elaborated in recent years (Christensen and Boon-Long 1994). Emphasis is also placed on coordination between agencies and on the idea of basin agencies. The possibility of creating a Ministry of Water has also been debated for a few years.

Finally, the somewhat 'traditional' view put forth by technical bodies (and consultants) holds that the problem of water shortage can be solved by increasing supply through further water resource developments. These efforts include new dams and transbasin water transfers from the Salaween and Mekong rivers. This solution faces growing opposition from environmental activists and is loosing its attractiveness for donors because of the increasing costs of tapping each additional cubic metreof water. However, it tends to be preferred by some governmental agencies for well known reasons, ranging from the dominance of an engineer-oriented culture, to political and financial interests, both direct or indirect, to certain actors (Repetto 1986; Christensen and Boon-Long 1994).

While discussions on the opportunity to levy a water charge are an old story, the conflicting views presented above have recently been put in sharp relief. The issue entered the limelight following the announcement that the granting of ADB funds to the country (presented as being crucial to the country's economic recovery following the crisis) would be conditional on its subscribing to, and applying, the overall principle of water pricing. The public debate has been obfuscated by the different nature of the economic tools envisaged and of the arguments which can be raised in favour or against such policies. The conflicting, and often confusing, views on water charges appear clearly in newspapers articles, interviews, consultants' reports and NGO literature.[1] It has also been obscured by the recourse to a series of axiomatic statements, which tend to become common wisdom as they are repeated, and by the proposal of measures and policies of very general scope which may not have been sufficiently confronted to the 'real world', i.e. the Thai context as presented in this paper.

This paper focuses on proposals for water demand management in Thailand and first reviews a series of misconceptions that are commonly encountered. In the second part, proposals for reform of the irrigation sector are briefly outlined and examined in the light of some peculiarities of the Thai context. One of the difficulties for reform is to cover the wide range of social and ecological situations found in Thailand and, in particular, the necessary distinction between small and medium/large scale irrigation projects. The former is often epitomised by the traditional muang fay systems of northern Thailand, while the latter are best represented by the Chao Phraya Delta. Except as otherwise mentioned, what follows refers to medium/large scale projects, which make up two-thirds of the country's irrigated area. The reflection also centres on the dry season, when water scarcity is an issue, rather than on the rainy season.

Conventional Wisdom on Water Use and Other Widespread Fallacies

'Water greed', or farmers as 'guzzling' users

International agencies (and sometimes, in their footsteps, local officers) commonly report that farmers are 'guzzling' water or are showing 'water greed' (The Nation, n.d.). Based on common knowl-

1. An examination of official declarations reported in national newspapers gives a measure of the fluctuating argumentation, reflecting both the unsettled nature of the negotiations, the general nature of the arguments and the lack of consensus even within a given administrative body.

edge that efficiency in large state-run irrigated schemes is often found to be as low as 30%, there is a tendency to stick 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, and that little water is eventually 'lost' out of the system. There has been widespread recognition that focusing on relatively low water efficiency at the on-farm or secondary levels could be totally misleading (Keller et al. 1996; Molden and Sakthivadivel 1999; Perry 1999). When analysed at the macro and basin level, many systems—river deltas accounting for the most significant of them—are eventually found to operate with extremely high overall efficiency. Thus, the scale of analysis of water use efficiency is crucial.

The Chao Phraya Delta in the dry season provides the most illustrative example of such a closed system. Most of the return flow from fields or canals is re-used downstream and the majority of the drains have been gated in order to capture or retain superficial and sub-superficial flows in the dry season. Several tens of thousands of tube-wells have been dug to tap shallow aquifers. Water releases at Bhumipol and Sirikit dams, as well as in Chai Nat diversion dam, are nowadays attuned to user requirements and give way to little waste. If we consider the efficiency of irrigation at the macro level, we see that the only 'wastewater' (i.e. not used for production purposes) is water that evaporates from waterways or fallow land, or which eventually flows out of the delta system into the sea. As this flow is hardly sufficient to control pollution and salinity intrusion into the river's mouth (in the dry season), it follows that very little water is lost.[2] The second component of water loss is that of infiltration. Such a loss is channelled either to shallow or deep aquifers. In the first case, it is tapped again through tube-wells (forming secondary water sources) or soon returns to the drainage system where it is re-used. In the second case, it reaches aquifers which flow to the Bangkok area where they are notoriously over-exploited, resulting in land subsidence and horrendous costs for upgrading of flood protection and in flood damage.[3] We may therefore venture to state that infiltration losses in the delta are not sufficient to offset the depletion of the aquifers. A water balance of the basin (Molle et al. 2001a) shows that, in the dry season, the overall efficiency of controlled[4] water use in the basin is around 88%.

Even when we carefully examine plot irrigation, it is hard to find the decried pattern of wasteful practices. The main reason is that most farmers access water through pumping. This is true for all the farmers located in the lower delta (in this so-called flat conservation area, water is integrally and individually pumped from a dense network of waterways) and for approximately 60% of the farmers in the upper delta. Altogether, it follows that about 80% of farmers are resorting to pumping, the great majority using low-lift axial pumps. Although the Chao Phraya and Mae Klong schemes were designed to supply water by gravity, RID experienced difficulties in managing reduced flows in the dry season. To offset this constraint, farmers have, over the years, developed an impressive individual pumping capacity allowing them to tap whatever little flow might appear in the canal. It follows that, because of the costs incurred by these water-lifting operations, there is little likelihood that farmers may be squandering water.[5] This is consistent with recent estimates of water use in the delta, which also show that efficiency is remarkably high (60%), with only 1500 m^3 used per rai, including rainfall (Molle et al. 2001a).

More generally, what has often escaped the attention of many commentators is that such actors in the system have not been indifferent to growing water scarcity. On the contrary, they have been extremely responsive in recent times and have gradually developed flexible ways to access water in all places where it can be found. Currently, few conventional gravity systems are functioning as they have been designed

2. In past years, EGAT may have released water only for the purpose of energy generation, thus resulting in freshwater being lost to the sea. However, this has been extremely rare in the last 10 years during the dry season. Whether this should still be permitted by EGAT, even in the wet season, is discussed in Molle et al. (2001a). In all cases, such losses are controlled and deliberate, and therefore cannot be considered as reducing efficiency.

3. It is estimated that the cost of the damage of the 1995 flood amounted to 50 billion baht, that is, US$2 billion!

4. Includes water released from the dams, diverted from The Mae Klong basin and extracted from shallow and deep wells.

5. In some cases, the costs of pumping may even discourage farmers to grow a second (or third) crop. These costs, combined with poor levelling, also explain the low use of water in sugarcane cultivation.

Box 1. Water allocation in the Chao Phraya Basin.

The Chao Phraya Basin can be conveniently divided into three parts. The upper part (upstream of the two main storage dams: Bhumipol and Sirikit dams), the middle part (from the dams to Chai Nat), and the lower part, or the Delta proper. The dams are operated by the Energy Generation Authority of Thailand (EGAT). In the dry season, depending on the year, between 2 and 8 billion m^3 are released to be distributed by the Royal Irrigation Department (RID) among 25 sub-units called 'Irrigation Projects'.
Water goes in priority to Bangkok, then to the control of saline intrusion, the supply of orchards and shrimp ponds, and last to inland transportation and rice cultivation. While, in the past, EGAT could manage some slack and release water in excess of these uses, it can now afford it only in emergency cases. Thus, the irrigation sector, despite receiving the largest share on average, has to cope with a high interannual fluctuation of the amount of water apportioned to it. Allocation is a top-down process where the shares of the Projects are centrally defined. Water abstraction in the middle basin cannot be fully controlled by RID and has been increasing dramatically (to 35% of dams releases).

Figure 1. The Chao Phraya Basin, Thailand.

to. Considering this evidence, it appears that harking back to the picture of the farmer as a wasteful villain is thoroughly flawed, unfair, and at the least misleading in terms the debate under consideration here.

Poor efficiency generates water shortages

The idea that shortages are due to poor efficiency is another misleading and enduring misconception. Because it is believed that the efficiency of use is low (which itself is incorrect), water is supposed to be lost and some users end up lacking water. This is wrong not only on a purely hydrologic basis but also because it fails to understand the nature of shortages: the amount of water released for dry-season cropping is adjusted according to the changing water stock in the dams, while all other requirements are supposed to be met. When a shortage occurs, it is because cropping areas have expanded in an uncontrolled manner beyond what is possible to irrigate; or because insufficient carryover stocks have been kept in the dams and a succession of exceptionally dry seasons depletes water reserves beyond what is necessary to meet minimum needs. Such shortages are therefore caused by management failures and not by the lack of water per se. These failures are due to insufficient control, in terms of: (a) hydraulic facilities; (b) land-use planning in terms of cropping areas; and (c) political interference. Altogether, this results in poor scheduling. The shortage in itself is also independent of whether it has been possible to irrigate, say 2–3 million rai in the

Delta with the water released. Even with better efficiency, demand would remain far above supply, especially in years of drought when pressure on water is highest.

Farmers waste water because it's free…

The third main misconception is generated by juxtaposing the alleged water wastage and the fact that water is free, as typified by the refrain 'water is consistently undervalued, and as a result is chronically overused' (Postel 1992). This is echoed in Thailand by many observers[6] (e.g. Christensen and Boon-Long 1994) who believe that 'since water is not appropriately priced, it is used inefficiently, and consumers have no incentive to economise'.

Asserting that farmers in the Central Plain have never paid for the irrigation system or for water use is true only in a narrow sense. If we consider the revenues siphoned by the State from rice cultivation through the mechanism of the rice premium between 1952 and 1984, it becomes clear that rice farmers have indirectly paid back more than it could ever be dreamt of levying through a water fee. 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.

On the other hand, deficiencies in water management have compelled farmers to make considerable investments in pumping devices in order to access water. This, together with the corresponding operational costs, is a financial burden for farmers and shows that usually 'they don't get it free'. Field observations show that, in some cases, farmers may even resort to up to 3 or 4 successive pumping operations, from a remote drain, 'step-by-step' up to their plot! Even in the western part of the delta, which is irrigated by a more modern system constructed on the Mae Klong river and is part of an opened water basin, studies of water use at plot level have shown that conjunctive use and pumping are widespread (Molle et al. 1998). In addition, the same case study has shown that half of the investments on-farm had been done by the farmers. This is enough to invert the statement considered here: most farmers pay to access water because they have to pump it onto their fields; in order to limit their expenditures they pay great attention to not use water in excess.[7]

… therefore pricing water would lead to water savings

Despite no logical evidence,[8] the reciprocal of the above statement leads some to assert that pricing water would lead to significant water savings. This seems to be taken as indisputable fact and is incorporated even in official declarations.[9] It is already apparent that this constitutes an abusive extrapolation of what may apply to domestic and industrial main water use. The main mechanism of such economic regulation is the capacity to charge water use volumetrically, which is beyond consideration for the

6. '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; emphasis added).

7. And even if they don't, such as can often be observed in the Mae Klong irrigation system, it is because the system is still 'open' (supply exceeds demand) and this is of little consequence. In addition, return flows are re-used downstream (those of the Mae Klong are used to supply the West Bank) and there is no scope for water saving at the macro scale.

8. Formally, it does not follow from 'A implies B' that 'non-A implies non-B'.

9. The weight of common wisdom can be sensed from the fact that the DG of RID himself recently acknowledged on a national TV channel that irrigation efficiency is low in Thailand (30%). Note also the declarations of an official of the Ministry of Agriculture: 'Water should be priced in order to increase the efficiency of its use in the farm sector' (Groups against farmers paying to use water, The Nation, 21 April 2000); 'Agricultural experts agree that water-pricing measures would help improve efficiency in water use among farmers' (Government to consider ADB terms, The Nation, 17 Feb. 1999); 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' (Water-pricing test project to start soon, The Nation, 23 April 2000); the resident advisor 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' (Farmers say no to water burden, Bangkok Post, 11 June 2000). '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) etc.

context of smallholders in gravity schemes with poor regulation facilities. Therefore, the only change in behaviour which can be expected is that of farmers using more water, because they will tend to think that by paying for it they are entitled to fully use it (Moore 1989). Volumetric wholesaling to groups can be an option, but prerequisites are huge, as will be discussed in the second part of this paper.

In any case, it is the very principle and objective of achieving water savings in the agricultural sector which may be a nonsense. Real water savings per rai can come only from the reduction of soil/crop evaporation; that is from the adoption of non-rice crops (or from micro-irrigation) (discussed later). Other interventions on current cropping patterns may only disturb the 'water chain' which links superficial and underground water use at different locations of the basin.[10]

Water needs to be reallocated to economically more beneficial uses

Another conspicuous and widespread argument is that centralised water allocation in Thailand has reached its limits and that water rights and a water market would provide a flexible mechanism to allow the reallocation of scarce resources towards the most economically profitable uses. This is strongly reminiscent of the deadlock experienced in the western US, where water rights[11] are locked into uses of low-productivity and where market mechanisms constitute one of the ways out of the stalemate (see Huffaker et al. 2000). The claim that central agencies have failed in properly allocating water has become a refrain supporting the idea of markets as an alternative.

In the Thai context, commentators do not hesitate to incorporate this concern into their rationale, asserting that the State has proven inefficient in centrally allocating water to the most beneficial uses.[12] It is intriguing to see the ubiquity of this argument, even outside its 'original' context, and how it permeates debates even in settings where this problem has been handled relatively successfully. Contrary to the alleged government failure in allocating water resources, sectoral allocation in Thailand has been driven by a clear priority in use, which mirrors the economic return of all activities. Cases of industries with activities that would have been constrained or impeded by the lack of water are unheard of and it's hard to see how criticism of central allocation can fly in the face of such evidence. The deadlock experienced in western US is unknown here and establishing a water market might create exactly the kind of problems it is assumed to solve, should, as is apparent in the US, the rural sector be reluctant to relinquish its established right.

Central allocation may appear as a problem to farmers, who are effectively gradually dispossessed of their 'unwritten' right as other uses grow, but is not a problem to other economic sectors which are served at low or no cost[13] and in priority.

10. See the example of the Snake River, in which such improvement eventually proved adverse by drying up the water used by use-dependent appropriators (Huffaker et al. 2000). More generally, Keller et al. (1996) have shown how 'attempts to increase irrigation efficiency at the micro level often lead to reduced irrigation efficiency at the macro level'.

11. There is some irony in the evidence that, if the Thai legal system had been based on prior-appropriation rights, like in the western US, the Delta would have been granted senior rights on water since the 1960s or earlier and Bangkok would now be trying to buy these rights from farmers. *In such a case, farmers would at present not be being asked to pay but, on the contrary, would be being courted to accept money as compensation!*

12. A typical example is provided by Christensen and Boon-Long (1994): 'a concern which could raise problems in the area of basin management involves the authority of the basin authorities to impose allocation priorities… The burden of proof for such an initiative is to show that command and control could result in better allocations and less market failure'. Israngkura (2000), for his part, considers that 'the returns on the irrigation dam investment have been low due to the lack of effective water demand management that could prevent less productive water utilisation'. This suggests that irrigation and its assumed low return has deprived other potentially more productive uses, whereas irrigation is in fact allocated the leftover in the system (after the prioritisation of water to BMA and energy production). TDRI (2001) posits that 'the current command and control system is unable to meet structural and cyclical changes in the demand and supply of natural resources, including water', while for Kraisoraphong (1995) 'Past experience has shown the government's role to be ineffective and thus an alternative proposed by economists and the academic circles has been to use economic instruments such as water pricing'.

13. Non-agricultural users pay for the cost of production (abstraction, treatment, transfer) but not for water itself.

Finally, there are practical considerations that relegate water transactions to the category of fancy mind-games. Re-allocation of water is difficult to achieve because it requires not only accurate definition of individual rights, but also a very high degree of control on water and transportation facilities required to transfer water from one user to the other. The assertion that 'if the price of rice is low, [Thai] farmers would be happy to cede their right to industrialists' (Wongbandit 1997), runs counter to the most basic evidence. Industrialists or cities are served first and would do nothing with more water attributed to them when the price of rice is low, let alone the fact that the physical constraints of the distribution network make such a reallocation impossible. How would the 'rights' of a group of farmers in, say, Kamphaeng Phet (middle basin) be transferred to a given golf course or factory in the suburbs of Bangkok?

Farmers get the 'lion's share' of water, despite their low economic return

The oft-repeated argument that farmers use 80% or more of water resources for irrigation is commonly used to suggest that the farmers' share is (1) too large, hence the shortage; (2) undeserved because the economic return per cubic metre is low; and (3) more vaguely, that if so much water is used, then efficiency must be low.

To present the agricultural sector as the spoilt, unrepentant and ungrateful child of the nation does little justice to the fact that farmers are in fact served with the (fluctuating) leftover water in the system. This share happens to be the largest one only because other uses have not yet developed to a wider magnitude (and also because the government has invested in infrastructures allowing the use of this water for irrigation). The argument glosses over the facts that (1) this share will decline in the future (as agriculture is usually deprived of its water when other sectors grow);[14] (2) the unwritten 'right' of farmers being limited to the leftover water, the farm sector has to cope with a very fluctuating supply, which also generates severe difficulties for management and for ensuring equity in allocation (see Molle et al. 2001a).

14. As experiences from Israel, United States, India or China indicate (Postel, 1992); in all cases agriculture's share was decreased to the benefit of cities.

Rice farmers' water use is economically untenable and they should shift to field crops

Rice is admittedly a water-consuming crop. The possibility of achieving water conservation by inducing a shift away from rice to field crops, which consume approximately 40% 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 and is the alternative which 'received the most attention' in Small's (1972) study of the Delta. Australian and Japanese cooperation engaged in agronomic tests in the late 1960s and 1970s in order to propose field crops for irrigated areas. 'In recent years, low export prices for rice, and the difficulties encountered by Thailand in maintaining her export markets have further intensified the interest in stimulating the production of upland crops' (Small 1972). Such a statement, issued in 1972, has been a recurrent refrain for at least four decades.

Planting crops with lower water consumption would, ideally, allow more farmers to benefit from a second crop in the dry season. Evidence of the dynamics of diversification in the Delta (Kasetsart University and IRD 1996) shows that farmers display great responsiveness to market changes and opportunities (a point clearly evidenced by the recent spectacular development of inland shrimp farming [Szuster and Flaherty 2000]). Good transportation and communication networks allow marketing channels to perform efficiently. The main weak point remains the risk attached to the higher volatility of field crop prices, which discourages farmers from shifting significantly to non-rice crops. As long as the economic environment of field crop production remains unattractive and uncertain,[15] there is little incentive for farmers to adopt such crops and limited basis to sustain criticism of their growing rice, as

15. It can be argued that rice marketing is also uncertain. However, the political sensitivity of rice production is such that there are limits that cannot be easily trespassed. In contrast, no one is really concerned (other than the farmers) if the price of chilli (a very intensive cash crop with heavy capital investment) swings from 30 to 2 baht/kg in one year and scattered growers have little means to voice their distress and limit their loss.

many have incurred losses by growing field crops (either by will or suggestion from extension services). Inducing shifts in cropping patterns to achieve water saving by means of differential taxes is believed to be unrealistic while such risk remains.

In addition, there are several other constraints (agro-ecology: heavy soil with little drainage, not favourable to growing field crops; labour[16] and capital requirements, skill-learning, development of proper marketing channels etc.), which characterise the process of diversification, and it is doubtful that, in addition to public policies aimed at fostering it, its pace may be increased much beyond what is already observed. Contrary to common rhetoric, farmers do not need to have their water priced to shift to other crops. They will increasingly do so if the uncertainty on water and prices is lowered. They have time after time shown dramatic responsiveness to constraints on other production factors, such as land and labour for example (Molle and Srijantr 1999), and have already sufficiently experienced the scarcity of water to adapt their cropping patterns, should conditions be favourable.

Thai taxpayers cannot pay any more for O&M costs and infrastructures

A declared objective of water pricing is its contribution to cost recovery, which can cover either the cost of infrastructure or that of the water supply. The first objective is not consistent with the Royal Irrigation Act of 1942 which makes it legally possible to charge users for water, but also stipulates that the money collected cannot be considered as state revenue and must constitute a special fund to be injected back into the improvement and maintenance of irrigation. Emphasis on investment cost-recovery appears misplaced when one considers the past indirect recovery through the rice premium and when one recalls that, even in the United States, recovery of public irrigation schemes is estimated at 4%. It also does not make clear, for example, how investments in irrigation differ from other social overhead or public investments. Such investments include those aimed at boosting economic activity as a whole (the government also creates industrial parks with infrastructures, invests in commercial fairs or tourism promotion campaigns, or in port facilities etc. favouring—or subsidising—other particular sectors of activity).

A water fee is more easily justified by the necessity to cover the cost of production of water. The alleged 'huge drain' that operation and management (O&M) expenditures impose on the national budget, however, amounts to only 0.16% of the national income and it would probably not be too difficult to find larger 'drains' whose plugging would have much less economic and social impact on the Thai population.

The argument of cost recovery can also be questioned within the context where taxation, subsidies, and government interventions are tools of a global policy based on antagonistic objectives. Schiff and Valdés (1992) showed how governments are caught up in a web of contradictory goals, including protecting farmers and protecting consumers from high food prices, and raising revenues through taxation and ensuring the competitiveness of economic sectors in the world market. Thailand appears in their study as a country where agriculture has been heavily taxed. This shows that, in the overall game, agriculture has been on the giving end rather than on the receiving end, which implies that the 'free water' subsidy can be seen as partial compensation for this situation.

Lastly, a water charge corresponds to an increase in production costs which cannot easily be passed to the consumer (because of the tight dependence of rice prices on the world market) and which, as a fixed tax, would raise economic risk in a context of relative instability of income (rice prices) and production (reliability of water supply).

Institutional Constraints and Opportunities for Water Reform

The different arguments questioned in the preceding section are often called upon to justify proposals for demand management or, more generally, for reform of the water sector. Unfortunately, they offer limited guidance in the Thai context and building reforms on weak tenets is not a good starting point. This section first outlines a possible option for a global reform of the irrigation sector, including participatory irrigation management (PIM), and then shows how the different components of reform are faced with major constraints that preclude over-enthusiasm and lead us to envisage changes occurring over the long term.

16. For example, the harvesting of mungbean, a typical supplementary crop with no additional water requirement, is often a problem because of labour shortage.

Baseline scenario for the definition of water rights

Because of the intricacies and complexity of small-scale rice farming in large, gravity-irrigation schemes, there is little scope to define individual water rights in such settings. Even levying a water fee per unit of land is doomed to face severe difficulties in situations where access to water is highly heterogeneous. This is the case, for example, in the upper delta, where some farmers may access water all year long while elsewhere others receive very uncertain supply. In addition, this access can be partly provided by gravity, partly through pumping, and their respective shares can vary greatly from year to other. Therefore, quantifying the real benefit of irrigation water for hundreds of thousands of farmers, when this benefit is highly heterogeneous in space and time, is deemed impracticable.

One must therefore turn to the alternative of 'water wholesaling' in which water is attributed to groups of users ['water management blocks' for TDRI (2001)], for example to those farmers who are served by the same lateral canal, on whom would fall the burden and the responsibility to allocate water, solve conflicts, and collect a water charge. What would be expected is that binding farmers together by granting them a collective right could be a way to 'force' them to act collectively in order to (a) achieve greater efficiency/equity within the command area of their canal; (b) to constitute a form of bargaining power to demand from RID the water supply they are entitled to; (c) to internally solve the problem of differentiated qualities of access to water and define individual charges accordingly; (d) to instil some formalised notion of water rights that could later be conducive to some form of tradability; (e) to constitute autonomous bodies that could take over a part of the managerial tasks attributed to RID and could further federate at the Project or basin level; and (f) to foster, in return, a corresponding improved performance on RID's (and EGAT's) part. The potential benefits are so sweeping that one might be tempted to gloss over the prerequisites to such moves.

We must first investigate what is meant by 'improved performance', what are the constraints experienced by RID and EGAT, both those which may lie beyond their jurisdiction, and those which offer significant possibility for progress. At the other extreme, it must be determined whether farmers are able or willing to respond as expected. Such an overall analysis, to be fair, would require much more space than available in this paper. Only a few points will be briefly mentioned here [for a full discussion on the issue, see Molle et al. (2001a,b)].

Water rights and water control

At the basin level, a first constraint is the coordination of dams management and irrigation supply. In the past 10 years, contrary to common criticism, the right of EGAT to release water in excess of users' requirements has not resulted in widespread water waste. Water allocation and distribution in the dry season are faced with two difficulties. The first one is the partial lack of control of RID on the system. This includes: (a) a growing uncontrolled water abstraction in the middle basin (representing up to 35% of releases from dams), which impacts on the water available for the delta; (b) a difficulty in ensuring proper hydraulic conveyance with low flows, and a low/fluctuating upstream water level at the Chai Nat diversion dam; and (c) a loss of control over the cropping calendars of farmers, who may use secondary water sources (e.g. groundwater pumps) to start planting crops which must later be supported by canal water. In order to deliver water with certainty, RID needs to increase control over the inflow at Chai Nat, at the apex of the delta. What must be stressed here is that regaining control over water use is far from being a problem of a purely technical nature. It goes together with identifying users and controlling their use, but it also goes with the setting and enforcement of institutional arrangements for sharing and managing water at the various levels applicable.[17]

Achieving equity in allocation is also made difficult by the fact that available water stocks (from storage dams) vary, for each dry-season, between 2 and 8 Bm^3. As a result, it has proven unsustainable to stick to the 'rotational' allocation policy established in the early 1980s in which half of each Project was to

[17] Molle et al. (2001a) distinguish six different levels of water allocation in the Chao Phraya basin: (1) the basin level (upper, middle and lower basin); (2) the delta level (share of each main canal); (3) the main canal level (share of each Project along a given main (or trunk) canal); (4) the Project level (share of each lateral within the Project); (5) the Lateral level (share of the different canal reaches); and (6) the ditch level (farmers sharing water at the ditch level).

receive water one year out of two, because this 'right' could not be ensured. In some years, water was not sufficient, while in others, relatively abundant supplies triggered cultivation in larger non-target areas.

In short, it is far from certain that infrastructure and management skills would allow RID to significantly respond to a growing demand for better performance. Several sweeping technical and institutional improvements must be achieved beforehand and simultaneously.

Decentralisation of water resources management necessarily rests on increased participation of users: this takes us to the question of the participation of farmers—under what conditions it can be achieved and how it relates to the preceding reforms. The past experience of the failure of water user groups (WUG) shows there is no room for over-enthusiasm on this matter. Contrary to the *muang fay* systems in the upper part of the basin, there is no congruence between the hydraulic units and the administrative or social spatial units.[18] For large irrigated schemes, it is another matter. In the basin, these schemes are best known for the wide-scale failure of past attempts to set up WUGs. There are a number of anthropological and cultural considerations that can be raised to explain the perceived difference between the Central Plain and other regions, and the failure of these groups (Molle et al. 2001b). However, the failure can also be ascribed to the weakening of the exigency for collective maintenance of tertiaries (mechanical means are now available at low costs), the drastic strengthening of individual water-use strategies permitted by the spread of wells and of cheap, private and mobile pumping devices, and the irrelevance of pre-existing organisational patterns in a context of fluctuating inflow and uncertainty.

It is less than certain that the establishment of groups along hydraulic boundaries would be sufficient to ensure the homogeneity of strategies within them. Social groups are constituted by several interwoven collective networks (based on kinship, politics, administration, religion etc.) with different spatial spread, and are far from uniform, in particular regarding leadership. The possible reaction of head-enders, in particular, who are widely favoured under the prevailing conditions, brings in much uncertainty. Social cohesion has been weakened by the transformation of the village economy, where widespread pluri-activity and off-farm employment entails heterogeneities in the interests of villagers in agriculture, and in their willingness to commit to, or participate in, collective action. The 'wholesaling' of water to groups of farmers is tantamount to shifting the burden of quantitatively determining the benefit to the different individual farmers (i.e. the fee, the amount, together with its collection) to communities or groups supposed to be homogenous and responsive, after having 'their interest' defined for them.

An important consequence of the above difficulty is that the assumption that the hypothetical right attributed to a group of farmers could change each year blithely ignores the fact that this group will have to find a way to establish a socially acceptable allocation of water. It is not clear how the burden of achieving basic equity in a context where there is variation in the group's 'right' can be handled by farmers. This also applies to the collection of the water fee which may lead to widespread disagreements if all farmers do not receive the same standard of service (which is likely to occur if the water allotted serves only part of the group or if it tends to be less than expected or required). This shows that it is of paramount importance to establish allocation 'rights' which allow the full irrigation of the different hydraulic units and to have these rights assured. However, there is no simple solution to how such rights can be defined and activated in an equitable manner over the years, at the basin level and in a context of fluctuating water stocks in the dry season.

In practical terms, it still remains to be defined how such drastic changes could be brought into the system with the acceptance and participation of both farmers and agencies. The costs of establishing such a policy, defining sound allocation hydraulic units, involving farmers in the conception phase, coordinating uses at the basin level and reducing political interference, and controlling and applying penalties on unauthorised abstraction etc. are obviously huge. They require not only improved management skills and facilities, capacity building and deep institutional reforms, and improved enforcement capacity and political commitment, but also that these changes be

18. Even in the case of the People Irrigation Systems, the overlap is often only partial. *Muang fay* systems, in particular, often encompass more than one village. The observation made by Hunt (1989) that community-based irrigation often misleadingly serves as an underlying model for large-scale schemes is pertinent for the Thai case.

phased in, as an eventual success will be conditional on their concomitant establishment. The allocation of rights, responsibilities and risks between the different actors is crucial here. Who is inevitably accountable for the micro-allocation of water and fee collection cannot ensure adequate supply. This is an example of the devolution of responsibility for water supply services to organisations with limited power to influence the overall context.

Institutional and political settings

The measures outlined in the preceding discussion translate into crucial exigencies directed to the Thai institutional and political setting. The deadlock reflects the inadequacy of current laws to address the problems experienced; the confused definition and scattered attribution of roles and power to different ministries and strata of government; and a context of political interventionism and laxity in law enforcement.

Most of the Thai legal provisions regarding water issues are widely regarded as outmoded (Wongbandit 1995). A Water Law has been considered, together with the creation of a 'Water Ministry', but ill-fated drafts have been stalled in bureaucratic processes for almost 10 years and have not drawn consensus or enthusiasm from analysts[19] (Christensen and Boon-Long 1994) or the community. There is a notorious fragmentation of responsibilities and roles regarding water resources among the different segments of the Thai administration (a circumstance shared by many countries). There is a list of 30 departments concerned with water issues that belong to seven different ministries (Arbhabhirama et al. 1988). Decision-making regarding water-use projects, for example, shows that the right hand can ignore what the left hand is doing. While water resource supplies in many basins are already much lower than demand, it can be observed that several departments nevertheless continue to develop new irrigation areas (Anukularmphai 2000). The Department of Energy Development and Promotion (DEDP) is promoting investment in pumping stations for groups of farmers along main rivers which are already over-exploited. RID's offices at the provincial level also engage in the expansion of the irrigated area at the edges of the delta, diverting water from the very irrigation canals that already provide insufficient supply to the delta proper.[20]

Political intervention in the ministries, in particular that of Agriculture, is also a factor that works against the application of measures of common interest. A high ranking officer of the Ministry of Agriculture summarised the situation admitting that 'the agencies were unable to coordinate their policies because they were supervised by different parties in the ruling coalition' (The Nation, June 2000; emphasis added). Political and technical points of view are often at loggerheads, most often at the expense of the latter. This was illustrated by the 1999 dry-season when, on the one hand, RID officers militated for a 'zero area target', because of extremely low available stocks in the dams, while on the other, politicians claimed and successfully obtained water releases for 300,000 ha of rice. What is at stake, in such instances, is the level of risk (both for water supply and in political terms) incurred, in the absence of negotiated standards.

Legal provisions are obviously useless without a basic capacity for law enforcement and penalties, an aspect in which Thailand admittedly has an unimpressive record (Christensen and Boon-Long 1994; Kraisoraphong 1995;[21] Wongbandit 1995; Flaherty et al. 1999). The question of groundwater in BMA provides the most glaring example of mismanagement with dramatic consequences. In the late 1990s, the failure to control water abstraction and land subsidence reached alarming proportions, resulting in horrendous costs in flood damage and in upgrading flood protection. In 2000, the city still sinks by an average 2 cm/year (Industrial water use to be targeted, The Nation, 25 June 2000). The Acts Controlling the Rent of Paddy Land of 1950 and 1974 are other well known examples of pieces of legislation turned into dead letters (Molle and Srijantr 1999). Bans on sand dredging in riverbeds, on logging, on

19. However, it must be noted that this situation is not peculiar to Thailand. Countries like Sri Lanka or some States of India have been debating water laws for 30 years without effectively enacting a law (Shah et al. 2001).

20. International agencies are also not exempt from such contradictions, as shown by the World Bank's funding of the Pitsanulok Project or examples from Algeria, where the Bank supported both irrigation *Projects* and urban water supply networks in competition for the same scarce resource (Winpenny 1994).

21. 'Thai society has not been known to be a legally conformative one…[and] is built on personal relationships, not on principle or laws.'

inland tiger prawn farming, or the prohibition on use of irrigation water on golf courses, have also been widely ignored.

The only consensus on the way forward in water reform at present is that of the necessity for river basin organisations, but this has so far failed to translate into any concrete measures and legislation. The government and international agencies are supporting several pilot initiatives of water basin organisations (WBO), but it remains unclear if and how they will be able to operate satisfactorily in the absence of strong political backing and legal empowerment. Even if quality service in water distribution can be ensured, it cannot be inferred that the participation of farmers will be smoothly incorporated into the decision-making process. What is known about the resilience of the Thai 'bureaucratic polity' (see, for example, Nelson (1998) and Arghiros (1999)) should preclude any optimism on the extent of the decentralisation process, as well as on the propensity of the administration to hand over its power swiftly and willingly. Therefore, the odds are high that these pilot WBOs will remain formal institutions with no real power and little degree of people empowerment.[22] A positive way of looking at the ongoing processes is to view these initiatives as part of a learning process. However, there is a risk that a partial failure would also make the participation of farmers increasingly difficult in the future.

Conclusions

The first part of this paper was devoted to the examination of a few axiomatic statements that are generally accepted as basic tenets of a conventional wisdom on water management in Thailand, most particularly in the Chao Phraya River Basin. The confrontation of these theoretical (sometimes journalistic) assertions with real world observations shows that the mere copycat replication of general principles elaborated in different contexts is misleading, and that a bandwagon syndrome can develop by sticking to blueprints based on such rationales.

Most arguments put forward to support the introduction of water charges or water markets were proven to be weak, flawed or unconvincing. Water-use efficiency at the basin level is actually (very) high, in contrast to the perception of it being low, and reflects how water management and access to water resources have been changing in the last two decades, as the basin has gradually closed. The contradiction reveals the common lack of understanding on the issue of embedded water balances at different levels of a river basin. It has also been shown that the centralised water allocation system has handled the issue of allocating water to activities with higher economic return relatively well, and that the assumed 'lion's share' of water for agriculture is actually the (fluctuating) left-over water in the system (after allocation to higher priority uses are met). With reduced scope for achieving water savings or economic re-allocation, the concepts of a water charge or water markets lose most of their appeal. In addition, their application would be critically constrained by several practical aspects: the high heterogeneity in the access to water, and in the social cohesion of farmers; the lack of control over water at the basin level, of metering and conveyance facilities; and the presence of numerous, hard-to-identify, small-scale users. Cost recovery also appeared as a questionable objective, when seen in the wider national context of taxation and subsidisation.

However, the 'virtuous' linkage existing between structural, managerial, institutional and financial approaches was recognised (Small 1996), with the pricing of water considered as a mere reinforcing factor of a contractual binding between RID and groups of users. Such a reform—considering the wholesaling of water to groups—was outlined but emphasis was placed on the existing gap between its prerequisites and the current situation. It was recognised that defining a 'service', water rights or water markets, demands a background of legal consistency, administrative accountability and law enforcement that is rarely found in developing countries (Sampath 1992), where, on the contrary, 'capability in both management and regulation is limited and the social and environmental risks of getting it wrong are considerable' (Morris 1996). The definition of water rights potentially leading to re-allocation would be associated with much political stress and, as Allan (1999) has put it, 'regional politicians have a powerful

22. The examination of the eight existing WBOs showed that farmers are grossly under-represented. The WBOs of the upper and lower Ping rivers, for example, have only two farmer representatives, compared with 22 and 20 officials respectively… To some extent, WBO might suffer from the same lack of political/institutional support and formalisation which affects, 'upstream' of them, the Office of the National Water Resources Committee (ONWRC) and, 'downstream', the WUGs.

intuition that economic principles and the allocative measures which follow logically from them must be avoided at all costs…Government are more likely to rely on the exhaustion of the resource to be the evidence that persuades water using communities that patterns of water use have to change'. Defining a water 'service' involves not only technological issues (improved facilities and modernisation of hydraulic regulation), but also the empowerment of administrative bodies with sufficient power to coordinate the agencies concerned, to register uses and users, to enforce basin-wide control and apply penalties, and to set a process in which representatives from the various lower levels of the basin may participate in devising sound and negotiated allocation plans and guidelines to meet demand of equity in the context of year-to-year fluctuating water stocks. Such a body/bodies must also be provided with sufficient autonomy to avoid that intervention of politicians overriding technical decisions.

At the level of the water user groups, similar mechanisms must be established. The allocation of water within the group (in particular when water is short of demand), procedures for its distribution, definition of water fees and their collection, and the devising of rules and penalties and their enforcement, are essential yet are contingent on the effective negotiation of, and assured delivery of, the 'water service'. Thus, the timing of the different actions and the occurrence their supposed effects are of paramount importance. It must be remembered that the establishment of WUGs is doomed to face the same fate of earlier attempts if it is not concomitant (rather than followed) with clear and perceived new benefits for farmers, in terms of amount, reliability and timing of water supply.

Considering the daunting list of prerequisites to the establishment of 'water wholesaling' and water rights (let alone markets), it is obvious that the opportunities to expand such mechanisms are more limited than suggested in the literature. The example of Thailand is probably representative of a much larger context, including the bulk of Asian medium–large scale irrigation. Thailand shows that situations with no possible volumetric metering, a very high number of small farms with differentiated and fluctuating levels of access to water, committed to wet rice cultivation with severe environmental and market constraints to diversification, weak legal and institutional environments, and significant political meddling, are unlikely to be in a position to benefit from such mechanisms, at least in the foreseeable future.

The critical impositions made to the institutional and political settings should preclude over-enthusiasm and, rather, prudence, gradual reform, testing in pilot areas and in-depth awareness-building, training, negotiation and discussions with all stakeholders, including politicians, are needed. Concomitantly, this process should be geared towards effective river basin organisations giving a say to all users and being provided with sufficient power, legal and political backing, and clear mandates to control, allocate and manage water resources. A worrying aspect of the water pricing reforms presently envisaged is that they stem from ideologically driven external pressure rather than from an endogenous awareness of the seriousness of the situation of the water sector. Experience from other countries suggests that limited success can be expected in contexts where both the administration and politicians are reluctant or passive. Although some signals for change are already visible (Prechawit 2000), it is doubtful that the degree of awareness of stakeholders and of their understanding of the complexity of the issue are, at the present time, compatible with a wide scale and far reaching reform. It is also debatable whether the potential benefits in efficiency, equity and security are equal to the difficulties and costs of implementing it.

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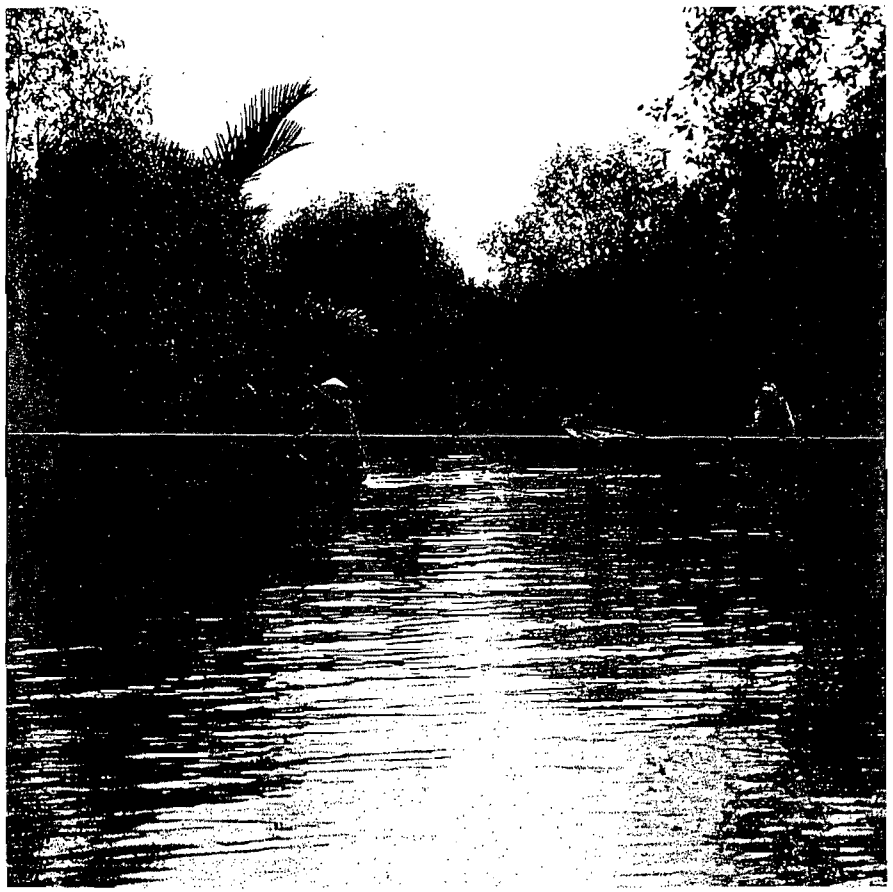

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