

PRINCIPLES AND ISSUES IN WATER PRICING POLICIES

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The volume of written material on the pricing of water in texts, monographs and papers is massive.

Numerous systems of water pricing or fees have been used in irrigation throughout the world. In many cases, the price is determined by the government while in others, actual formal and informal markets exist. The variable of water supplies and water values is a key problem in government or administrating pricing of water. It is difficult for governments to administer the price flexibility required to respond to the changing supply and demand condition. Only markets seem to have the necessary price flexibility to respond to seasonal and yearly variations in water. However, the institutions within which markets might operate have not been widely developed. In developing countries, no clear relationship exists between the levels of economic development and the levels of cost recovery. Some countries impose an annual extraction charges, others impose assessment which varies from 15 to 70% of the operation and maintenance costs. There seems to be no clear set of lessons to be learned from cost recovery systems imposed by world practices.

There are, however, many factors which make it difficult to set policies for irrigation water charges in developing countries. These include: irregularity and unreliability of water supply from irrigation systems; low level of cropping techniques; inadequate supply of farm inputs; inadequate credits and other services; small farm holding; defective tenure systems; great variation in income and low repayment capacity of farmers; lack of farmers cooperation and inefficient cooperative organization at the farm level; inadequate government policies and laws dealing with irrigation water charges and low prices of agricultural products at the farm gate.

In addition, the inability and the unease to collect water charges is one of the main constraints to set policies for irrigation water charges in developing countries. This may be because farmers are unhappy with the way water is being allocated or they view water as a free good because of the lack of any collection institution.

Abstract

The overall objective of this study is to analyse the different approaches and methods widely used all over the world for assessing water pricing policies. Water system cost recovery can be either direct or indirect or a combination of both. For a cost recovery program to be effective and efficient, it must be accepted to all parties. In order to be acceptable, it must be perceived to be equitable. Perceived equity is an intangible that is more often a product of credibility, trust and negotiation than of price predetermination. Water pricing policies should no longer be viewed as simply the results of certain economic theories, but must be viewed as a tool of socio-economic development. Irrigation water pricing programs have to be planned with major considerations to farmer's capacity and willingness to repay, productivity of land, need of water, profitability of irrigation projects, social benefits from irrigation development and national agricultural production objectives.

Résumé

Ce travail a pour objet l'analyse des différentes approches et des méthodes les plus couramment utilisées dans le monde pour la détermination des politiques de tarification de l'eau. Pour qu'un programme de récupération des coûts soit efficace et efficient, il faut qu'il soit accepté par toutes les parties. Pour cela, il faut qu'il soit équitable. L'équité est un bien incorporel qui est le plus souvent basé sur la crédibilité, la confiance et la négociation plutôt que sur la prédétermination du prix. Il faut que les politiques de tarification de l'eau ne soient plus considérées tout simplement le résultat de certaines théories économiques, mais un instrument de développement socio-économique. Les programmes de tarification de l'eau d'irrigation doivent tenir compte de la capacité et de la volonté des agriculteurs à payer, de la productivité des terres, de la nécessité de l'eau, de la rentabilité des projets d'irrigation, des bénéfices sociaux liés au développement de l'irrigation et des objectifs de production agricole nationale.

Goals of pricing system

Appropriate prices of irrigation water could serve as an instrument to promote efficient use of water, minimize the burden on the general tax payer and achieve other objectives, such as providing adequate incentives to farmers to use irrigation water and improving the economic conditions and financial capability of rural people. Svendsen (1991) states that the purpose of charging system for cost recovery is not an end in itself, but a way of achieving economic efficiency and equity within the national economy.

a) Conflicting Government goals

Pricing policies are motivated by two fundamental conflicting goals: efficiency and equity. Efficiency objectives are generally traded off or compromised on grounds of distribution equity. The desire of societies to equitably distribute income often conflicts with the desire to maximise total output or efficiency. Administrators of public water programs are often under pressure to redistribute income and at the same time to achieve efficient usage of water.

Such conflicting goals, the need to encourage efficient use of water, the desire to redistribute income towards the agricultural sector, the recovery of capital costs from users, the desire to favour small farmers and

the need to minimize administrative costs, let the policy making be a very difficult exercise.

b) Price determination

Price determination for irrigation water is a function of many interrelated site-specific, physical, hydrological and agricultural factors such as climate, abundance of water, soils and crops. The combinations of regulation and prices reflect a trade off in the resolution of the conflicting goals mentioned earlier. Regulation and pricing systems also depend on the value of water, the dependability of supplies, the systems of delivery, the extent to which flows can be regulated and the level of subsidization. Therefore, no one system of allocation can be universally recommended. Government objectives in the irrigation sector must be clearly defined before effective pricing policies can be adopted.

c) Minimizing Administrative Costs

The goal of minimizing the costs of administering resources are often conflicting with goals of efficiency and income distribution. More efficiency usually involves more precise monitoring, more differentiation of prices according to place, time and quality and more policing. Adding income distribution as a goal of

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water regulations and prices inevitably adds to the costs of transactions. Administrators should seek to minimize both the private and the public costs of transactions and problem solving. In the absence of any means to measure the volume of water consumed, the extent of cost recovery of irrigation projects depends on the feasibility and desirability of levying special taxes on beneficiaries, (Benefit pricing).

Irrigation pricing systems

Irrigation has traditionally been considered a means to promote development of agriculture, rather than economic efficiency. It has generally been implemented for the benefit of the farmer, rather than for revenue purposes, and is often cooperative in nature. Farmers have seldom been required to pay for it. Irrigation contributes to the stability of agricultural areas and prices and is therefore considered in terms of economic goods for the whole community. However, in recent years, water has become a scarce resource, its value in uses other than agriculture has made it uneconomic to use for irrigation under the present pricing practices. Unless some portion of costs is recovered, irrigation may become an uneconomic proposition, even in the developing countries.

Basic principles of water pricing

Cost recovery

Cost recovery involves a repayment to the government for all or part of the investment, interest, operation, maintenance and other expenses incurred in a given project by the people who benefit from that project. Ideally, cost recovery policies should be an integral part of project selection, design and evaluation. Such policies should concentrate on efficiency pricing of water as well as on discriminatory benefit taxes. Efficiency pricing leads to cost recovery by setting the level and structure of prices to be charged for output from an irrigation project so as to maximise its net economic benefits to the community. This principle, also called marginal cost pricing, aims at charging users up to 100 per cent of the actual costs incurred in building an irrigation project. The scope for efficiency pricing is limited, however, especially in developing countries where the actual volume of water consumed by each user is almost never accurately measured.

Irrigation water charges

This subject was widely argued by designers, planners, politicians, and decision makers. There are different opinions and contradictory views, some of which are in favour of water charges or fees in order to

achieve cost recovery, where as the others are opponents of cost recovery policies.

Arguments in favour of assessing high water charges

Assessing high water charges makes it possible for the a government to augment its much needed financial resources, and provides funds for further development projects.

— In one sense, cost recovery from beneficiaries promotes social justice in that only those who live in the command area pay. The alternative of all the people in the country paying the costs through general taxation is unfair and laden with potential political problems.

— Assessing farmers a high fee for water provides an economic incentive for less wastage of water. Farmers will perceive water as a more precious commodity. Furthermore, reduced wastage makes it possible to irrigate a larger area with the same quantity of water.

Arguments opponents of costs recovery policies

— Some people receive direct benefits and others receive indirect benefits from irrigation projects. Therefore, there are difficulties in trying to recoup costs; it is not feasible to assess the indirect benefits and at the same time it is unfair to expect direct beneficiaries to bear the full burden.

— Irrigation potentials are frequently underutilized. Therefore, if charges are increased, farmers will be less motivated to irrigate.

— Cost recovery policies do not take enough account of the need to help the socially underprivileged, to redistribute incomes toward the agricultural sector and to promote rural development.

— Cost recovery measures are difficult to implement, because both efficiency pricing and benefit pricing require accurate measurements and high administrative costs.

— Increasing the charge of water would not, as an and in itself, improve the productivity of irrigation schemes, and it might cause some decline. There needs to be some insurance that the increases in fees will provide additional operations and maintenance, improvement in water delivery services and increases in the productivity of farms and irrigation systems.

Marginal Cost Pricing (MCP), Average Cost Pricing (ACP), Benefit Pricing (BP) and Sociopolitical Pricing (SP) are considered the principles of water pricing.

a) Marginal cost pricing (MCP)

In economic terms, the marginal cost is the cost of producing one additional unit of product (in this case, a unit volume of water). It means that all costs due to an increase in the output of a service are incorporated into the price of the increased output. This pricing system would only apply to irrigation water if it is valuable, if it is pos-

sible to control amounts sold and if ownership is clear. Thus, when we define marginal cost pricing, we are probably not referring to the immediate problems of many developing countries. Despite The fact that MCP is economically efficient in the real world of administrated prices, it is rare that one encounters any reference of economic as a goal. In addition, such system has many disadvantages such as the very unstability of price, the difficulties to determine the true marginal cost of a unit volume of water, the measurements difficulties, the complexities of tariff structures and the impracticality for farmers.

b) Average cost pricing (ACP)

Average cost pricing is intended to cover all costs including depreciation, interest and operation, maintenance and thus, it satisfies the requirement for financial viability. Compared with MCP system, the cost is easier to calculate if applied correctly and it allows for total recovery of investment and interest. The only disadvantage of ACP system is that it does not encourage economic efficiency. Furthermore, if the system is underutilized or working at less than its full capacity, the consumers must pay a very high price.

c) Benefit pricing (BP)

The objective of benefit price or benefit taxation entails not only the reimbursement of costs of management, operation and maintenance by the users, but also a certain proportion of net benefits obtained from irrigation. The funds recovered will enable the government to pursue further development of the sector. The main disadvantage of this type of pricing is that it is completely unrelated to both the volume of water used and differences of water costs in different locations. Another is that accurate monitoring of income is difficult. Finally, it is difficult to overcome the problem of tax evasion, especially if taxes are progressive.

d) Sociopolitical prices (SP) (Subsidies)

Under this system the farmer contributes to only the operational costs of the system while most of the costs of the project is financed by the government. The objective is to provide maximum agricultural income for farmers and to redistribute income from the non-agricultural to the agricultural sector. The subsidy is supposed to serve as an incentive to farmers to increase production by cutting down their costs. However, while the subsidies may have positive social and political results, they often do not produce the incentive effect. The lowering of water charges often leads to an increase in consumption of water discourages efficiency in allocation of resources and leads to an increasingly large financial deficit for management of the irrigation system and wastage.

Under this system, general or specific taxation is applied by the government to recover the cost of irrigation projects.

d-1) General taxation

General taxation includes income taxes, consumer goods taxes and production taxes which generally affect users and non users equally. Experience proved that ordinary returns from taxation is always below the magnitude of investment required to satisfy the water demand for irrigation. In this connection, either more taxes are required or the irrigation works do not get built. The question is whether it is equitable for people to pay additional taxes for irrigation projects while benefit is only directed to small groups of beneficiaries.

d-2) Indirect taxes

Many countries rely heavily on indirect taxation in charging the costs of irrigation projects. Such indirect taxes could be imposed on the non-agricultural sectors and to some principal crops that are marketed under state or semi state organizations. This charging practice, in spite of its great simplicity, does nothing to discourage wastage of water and promote the efficient water use.

d-3) Cross subsidies

One of the most common forms of sociopolitical pricing is the cross-subsidy or cost charging. Generally, for a large water supply project, taxes are to be paid by all who receive benefits, those who use water for navigation, fishing, recreation and power as well as irrigation. The question is what's the most convenient mode to be introduced to divide the local cost shares among the beneficiaries. This could be realized either by letting certain sectors pay more than their share for the project and subsidise other sectors or by letting all users pay a fair share for benefits. The weakness in the former approach is that the sector subsidized by other sectors, in our case local irrigators, could ask for larger irrigation project which might be not socially efficient. The later disadvantage that the users will have no incentive to overdevelop the project. We feel that, as an ideal approach, local cost shares have to be imposed in proportion to benefit shares at the margin for each purpose.

d-4) Special taxation (Land tax)

Taxing the land benefiting from irrigation facilities at a rate directly proportional to the benefits, offers a good opportunity for a progressive approach to irrigation cost recovery. Although, land taxation seems to be a sound tool for irrigation cost recovery, yet, it is difficult to apply. The unease in applying such approach could be attributed, on one hand to the difficulty in quantifying in a precise way the net benefits the farmer is gaining as a result of irrigation and on the other one, in estimating the exact

portion of his net benefit that can be extracted. Precise identification and regulation for setting land tax requires a very complicated administration.

Approaches to irrigation water fees assessment

There are several approaches for assessing the irrigation water fees.

Some suggested that water pricing should be considered as conditional tax or fee that covers part of the expenses of modernization, operation and maintenance of the irrigation network. Another approach is that the price should be based upon some value of the irrigation water per unit area, per crop or per cubic meter. Methods for assessing charges that are applied throughout the world could be outlined in the following:

1) Volumetric pricing

This method is usually the one preferred by economists, since it offers the best opportunity for obtaining economic efficiency. That is, the rates are assessed at a level that approximates a price determined by supply and demand. Pricing water according to the quantity used makes farmers give strong consideration to the cost of water as a factor in production. This leads to optimal use of that resource. All things being equal, this would also optimize the output from the entire command area.

It is claimed that a major problem with this approach in many developing countries is that there is no practical way to measure and police the diversion of water from the distribution system to the farm.

This might be an important reason for the widespread use of area-based pricing.

2) Area-based pricing

This approach involves pricing water per hectare or per feddan irrigated, with minimal control of the amount of water supplied. If any semblance of efficiency and equity is to be achieved, this approach must be considered in the light of the delivery system and the ability to control the amount of water diverted to farms in different parts of the command area.

Especially in times of water shortage, there is a need to limit the amount each farmer can obtain. Control in a scheme that uses area-based assessments is usually achieved through arrangements among farmers to alternate in skipping a turn or to cut back on the time allowed to open the ditch. Equity depends upon farmer's discipline in adhering to the control schedules.

In area-based assessments, there is a tendency to apply uniform rates to all parts of the command area. However, there are very few, if any, large publicly operated irrigation systems in the world that can deliver water uniformly to all parts of a large command area without incurring a great deal

of cost. This creates a dilemma. If the costs are incurred to ensure equal water delivery to distant points, equity suggests that these added costs be assessed on the distant farmers. Whether they would be better off than before the improvements is a moot question. One solution would be to adjust the fees to approximate the services received, but this could add considerably to the complexity and cost of administration.

3) Administration water allocation

This approach largely depends on the enforcement of very tightly administered turn controls to deliver water in accordance with the number of shares held by each of the farm families in the command area.

The number of shares is usually associated with the amount of irrigable land held and an annual duty is assessed accordingly. Usually there is no additional charge.

The mechanism is completely neutral with regard to its impact on water use either seasonally or by crop. It is, in effect, a variant of area-based pricing and it emphasizes the need for effective allocation of water across all water availability scenarios. It provides more authority to the irrigation system managers in terms of efficiency schedules and rules for distributing water that many countries would find acceptable. The primary check against abuse is to have the managers responsible for a representative body of shareholders or water users who also develop the rules.

Strict regulation of water turns is the key to ensuring equity and efficiency whether water supplies are tight or plentiful. If water is abundant, management could act as if there were no water surpluses and, if other beneficial uses or storage are available, efficiency gains would be possible. The water duty is usually assessed on the basis of area.

4) Betterment levies

Such levies are a form of taxation often discussed as a mechanism for recovering some of the unearned capital gains that result from the public investments. In the case of irrigation improvements, such levies usually have nothing to do with the use of water but they do isolate one of the important beneficiaries, the land owner. Such levies are commonly assessed to recover, for the public, windfall gains in land values that are directly attributable to a public investment, such as an irrigation improvement, a road, or some other infrastructures.

Discussion

From the analysis of such forementioned approaches regarding the advantages and disadvantages of each method, it is evident that there is no specific approach to fees assessment that will assure success.

For instance, volumetric pricing offers the best opportunity for obtaining economic eff-

iciency, however, it requires the capability of fairly precise measurements of water delivered to each individual users. Few irrigation systems have that measurement capability. Area-based pricing can be effective in areas where the system can distribute the water supply fairly evenly throughout the service area and farmers adhere to the control schedules. Anyhow, a typical approach to such any undertaking is to design a mechanism consistent with policy guidelines that will attain the objectives. Irrespective of the method and approach followed to set the value for the irrigation water fee, it is very important to establish strong political subsidy in order to put into motion any substantial changes in agricultural water charges or the establishment of any fee particularly in countries where irrigated agriculture is an important economic sector (Sagardoy, 1987). The establishment of a water rate policy is, within broad limits, more a process of political bargaining than of achieving economic equity. The government water charge policies for system management and investment cost recovery are only viable if they can be actively supported by politicians. Equally, to develop cost recovery mechanisms, it is very essential to establish a procedure that governs the farmer-government interrelationship in terms of estimating and collecting the fees and ensure that they are directed toward the improvement and maintenance of the irrigation system and that they are getting value for their contribution (USAID, FAO 1986). In this respect, administrative considerations are important, particularly when the different cost recovery mechanisms can be administered, but more important is the ability of the administrative processes to maintain the intended equity.

Water laws need to be flexible enough to allow for a variety of site-specific solutions. The problem is to find combination of regulation and prices which will accomplish the two objectives of efficient use of water and an equitable distribution of income.

There is no doubt that farmer participation is necessary for a successful cost recovery and water fees charging policies. It is contended that, if the views of farmers in developing countries were considered in the design of irrigation improvement approaches and water pricing approaches, these measures would be not less successful than other approaches. Most public water authorities have not made a serious effort or provided incentive to encourage farmers to be full partners. For an appropriate water fees policy, it is necessary to establish a convention between farmers and public authorities for sharing the management and fiscal responsibilities.

Decentralization of operational and financial responsibilities within irrigation schemes should be encouraged in order to create conditions favourable to both increased farmer involvement and increased agency accountability. The development of strong farmer organizations with opera-

tional and financial capabilities is one way to move in this direction, under these conditions, farmers are generally willing to pay their fair share of the cost.

Institutional capacities and capacity building are among the major constraints. The majority of the governments, particularly those of the developing countries, are facing the problem to set a proper water pricing and irrigation cost recovery policies providing the two fundamental goals: efficiency and equity.

A formal review of the World Bank supported irrigation projects (1986), revealed that in 85% of the cases, governments failed to fully comply with cost recovery covenants. The combination of regulations and prices to allocate water depends on the technology, the ability and motivation of the people who run the system. Without the appropriate control structures and a well trained staff, the establishment of a successful irrigation water policy will be always difficult. This is also true, even under conditions where other irrigation water charging policy constraints are visibly solved.

Conclusions and recommendations

As previously discussed, there are different approaches and methods for assessing irrigation water pricing policies. A cost recovery program for a water resource can take many forms, it can be either direct or indirect or a combination of both. International experiences with cost recovery have not been good. At the national level, although most countries with public irrigation schemes, have policies and legislation that allow cost recovery, many of these provisions are poorly enforced or not at all. The failure in establishing a proper irrigation charging policy in the majority of these countries and the developing ones in particular, are mainly due to the lack of government commitment, unreliable water supplies because of poor operation and maintenance, and the heavy burden of direct and indirect taxes already imposed on the farm sector by the government.

Developing countries need to develop a cost recovery policy for a water resource system which be, on one hand, capable of accommodating historical water use pattern and, on the other one, flexible enough to meet the changing needs of society. The proposed policy should be consistent with and promote the economic and social development objectives. It should be basically directed towards satisfying the following criteria: economic justification, economic efficiency as well as economic equity. This requires the determination of the magnitude of costs and benefits, the identification of beneficiaries and the determination of the proportion share of benefits received by each class of beneficiaries.

The satisfying requirements is not an easy task as it requires a data base on the magnitude and incidence of benefits and costs for

the entire water storage and delivery system that is not currently available. Moreover, the manner in which costs are ultimately shared by various users and perhaps, other economic sectors of society, is decided in view of the government policy and the various prevailing social issues. The choice of cost recovery methods is closely allied to the questions of who administers the process of assessment and collection and the extent to which farmers participate in that process. In developing countries, as long as the responsibility for operations and maintenance and for fee collection is subject to public rules or revenue and expenditure control, it will be difficult to ensure adequate operation and maintenance to project the integrity of funds set up for that purpose. The simplest means to ensure adequate funds which are available for optimum operation and maintenance on government operated schemes, is to turn the entire responsibility over to users associations who would assess, collect and deploy the funds in their collective interest. The development of strong farmer's organization with operational and financial capabilities is the way to encourage decentralization of operational and financial responsibilities within irrigation schemes and increased farmer's involvement. Finally, it should be stressed that for assessing a successful water pricing policy, special attention should be paid to farmer's capacity and willingness to repay, profitability of irrigation project, social benefits from irrigation development productivity of land and the national agricultural production objectives and plans. Water pricing policies should be viewed as a tool of socioeconomic development and no longer the results of certain economic theories. They should include not only cost recovery, but also an evaluation of the scarcity of the resource with a view to its sustainability.

At a state level, reviewing bodies should study the water rates structures in the light of the agricultural production, cropping pattern and other related factors, with a view to rendering the rate structures more rational and acceptable to farmers. ●

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