

Resource Mobilization in Irrigation Management: Myths and Realities in a Comparative Perspective

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INTRODUCTION

THE PURPOSE OF this paper is, first, to synthesize experiences of various Asian countries with regard to mobilization of resources for operation and maintenance of existing facilities, and second, to analyze the alternative resource mobilization methods and options available and present a clear picture of each of these alternatives. It is intended that this paper will suggest concepts or ideas that could be used in analyzing the options and problems of resource mobilization in Sri Lanka.

The paper is based mainly on two previous works. The first, "Financing of Irrigation Services" (Small et al. 1989), presents case studies from Korea, Indonesia, Nepal, the Philippines, and India regarding the recovery of irrigation costs including both operation and maintenance costs and capital costs.

The second study on which this paper has drawn is an unpublished report, written by this author as a follow-up of the above mentioned one, to find out changes that have taken place since the case studies were written in 1984 and also to ascertain whether any of these countries are interested in forming an irrigation finance network to coordinate research and related activities regarding irrigation finance. In addition to these studies, the present paper also uses various other works on irrigation finance. However, it mainly derives its conclusions from the experiences of the countries in which IIMI's previous projects were carried out.⁶ The more recent study on a research network on irrigation finance, in Thailand, Malaysia, Bangladesh, and Indonesia are included.

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The present paper will also avail itself of experiences regarding recovery of irrigation costs in Sri Lanka as well (Kyi 1989).

FINDINGS OF RESEARCH STUDIES

Before we delve into details of the experiences of these countries regarding the recovery of irrigation costs and resource mobilization, let me summarize a few important points from these studies. First, most countries we have researched are conscious of the need for the recovery of at least operation and maintenance costs. The necessity arises because of the financial stringencies in the countries themselves, or because of the difficulty of obtaining funds from the international donors or lending organizations to finance rehabilitation costs which will surely be incurred if the systems are not properly maintained for some years. In the past, in some countries, irrigation systems were not maintained at the desired level and were left to decay for some years and were rehabilitated at a later stage, usually with international assistance. This option is becoming more difficult because donors are unwilling to finance this "neglect and rehabilitate" option and insist on proper maintenance to be financed by the users themselves. Under these circumstances, all these countries are making efforts to mobilize resources internally so that systems could be maintained at a reasonable level of efficiency.

The second point is that though most countries subscribe to the idea of recovery of operation and maintenance costs to the fullest extent, the full recovery of the capital costs is not accepted or acceptable in most cases. The reasons are obvious. If the full capital costs were to be recovered from the users or the farmers, under the existing economic structure of farming in Asia, which includes largely very small marginally profitable farms, a very substantial part of the family income will have been taken away. It will be suicidal, politically, for any government to introduce this type of measure. It is unlikely that the full recovery of capital costs will be attempted in any country in the region.

Methods of Resource Mobilization

Four methods of resource mobilization are commonly recognized. The first is the collection of irrigation fees or irrigation charge. This is collection based on irrigated area, and collected annually or semiannually from the farmers or the users as in the case of the collection of traditional revenues. The assumption here is that for the services provided at the existing level of efficiency, the user or the farmer should pay a certain fee. The fee, in most cases, does not recover the full costs of O&M and is collected by the revenue agencies or irrigation agencies themselves. Very often, the revenue collected will go directly into the treasury. The money provided for operation and maintenance costs comes directly from the budget allocated, with no relationship to the amount of money collected.

The second method is the collection of requisite service fees for an enhanced level of service. This method is different from the previous one because it implies the idea of a contract. Under this concept, the irrigation agency is required to provide an acceptable level of service to the farmers so that the users or the farmers will be willing to pay for it. In other words, the level of service provided must be enhanced so that the needs and requirements of the user will be satisfied and the user will pay for the service for what it is worth. The concept of reciprocity and mutual obligation on both sides is implied here. This new innovation is just introduced in Indonesia and we will be returning to this aspect later in this paper.

The third option is the turnover of the tail end of the operations of the irrigation system to the farmers, particularly management and operations of distributary and farm channels to the farmers' organizations. It may be like a reverse vertical integration; operation of part of the system or the tail end of the operating system is given over to another organization, a smaller and less powerful one, the opposite of vertical integration in economic terms. However, in this case, the other organization may not have existed at the time of the transfer and, therefore, a new organization has to be set up so that this function could be undertaken. This is presently a very popular option for mobilizing the resources of the farmers. It envisages that, by sharing responsibility with or giving responsibility to the farmers' organizations, not only will their contribution be mobilized but also the operation itself will be user-oriented and, therefore, likely to be more efficient than the one operated by the agency.

The fourth option is the complete transfer of smaller systems to the users or the farmers' organizations. Many countries find that it is more economical and efficient for the users to manage the smaller systems by themselves. In Nepal, the smaller systems, which were previously developed by the government, and which could now be handled or managed by the farmers, are transferred to them. In the Philippines, the small systems which are not paying for the operation and maintenance costs are transferred to the users themselves. Likewise, in Indonesia which has had a long tradition of the farmers owning and managing small systems, smaller systems which have been developed with the assistance of the government are being transferred to the farmers' organizations. However, this option is not really an alternative to the previous three because it relates only to smaller systems which farmers can manage completely, whereas the other three alternatives are related to larger systems which individual farmers' organizations cannot possibly operate or take over. Only a portion of the operation and management of the facilities is involved and the ownership and organization remain unchanged.

This is a very brief summary of what has been practiced, especially in Asian countries, regarding the recovery of irrigation costs. Next, we shall discuss research findings on the various practices of resource mobilization such as the question of collection and ability to pay. Then, we shall discuss the four alternatives mentioned in-depth from both the organizational and economic points of view, and evaluate their chances for success and their pros and cons. It should be noted that irrigation cost recovery is principally a concern of the larger systems. Therefore, the examples used and problems discussed will be limited to the problems of resource mobilization of the larger systems. Problems of the smaller systems are not discussed here.

Highlights of Experiences in Asia

Let us first deal with the experiences of the various countries regarding the amount of expenditure spent for irrigation operation and maintenance. The performance characteristics covering the recovery of irrigation are summarized in Table 1 for the countries studied in the IIMI project.

O&M expenditures vary from US\$216.8 per hectare (ha) for Korea to US\$6.8 per ha in Bihar, India. The variation is wide because of differences in price levels and costs and also because the systems are maintained at different levels of effectiveness and efficiency. In Korea, a very high per hectare expenditure is spent on O&M. The operation and maintenance of both medium and large irrigation systems are managed and financed by 215 Farm Land Improvement Associations, cooperatives consisting of farmers, whereas in most other countries the irrigation departments maintain the systems including distributaries, often with some contribution from the farmers such as labor.

Table 1. Relative expenditure of O&M operations, level of service fees, and farmers' contributions (1982-1983).

	Korea	Indonesia	Nepal	The Philippines	India (Bihar)
1. Average O&M expenditure per hectare	216.8	20.22 a	6.4-14.2	28.26	6.8
2. Desired level of O&M per hectare	-	31.9 a	13.7-41.2	34.26	10.56
3. Actual O&M as percent of desired level of O&M	-	34-63	46	82	64
4. Farmers' contribution - irrigation fee per hectare	196	4	6	17	6
5. Who is responsible for O&M					
Main System	Co-op	Agency	Agency	Agency	Agency
Distributary	Co-op	Agency	Agency	Agency	Agency
Farm Outlet	Co-op	Farmers	Farmers	Agency	Agency
6. Rate of collection of irrigation fee	Very high	Very high	Low to medium	Medium 50	Low
7. Fee or charge as percent of actuals	92.9	18.6	18.9-37	74	57
8. Fees collected as percent of assessment	100	x	1.5 - 52 (20)	50	26

Per hectare rates are all in US dollars

Source: Small, et al. (1986, 1989).

Another observation we can make is that except in Korea, in most other countries the amount spent on O&M and the desirable level of O&M expenditures differ widely. In most cases, actual O&M as percentage of the cost of the desired level of O&M cost varies from 34 to 82. In the Philippines, the desirable level of O&M and the actual cost of O&M are closer than in other countries. The next observation is the amount of irrigation fees collected in different countries; it again varies. In Korea, the farmers' contribution is almost equal to the O&M expenditure, whereas in Indonesia, Nepal, Thailand, and Malaysia the amount contributed by farmers forms a small part of the actual irrigation expenditure. Even in Malaysia where the irrigation system is well-managed, the fees collected were found to equal only 20 percent of the actual O&M cost.

In many instances, the amount of irrigation fees imposed is nominal. Many governments are reluctant to impose the recovery of full irrigation costs. For instance, in Thailand, the State Irrigation Act of 1942 permitted the Royal Irrigation Department (RID) to collect a water charge of 0.5 baht per rai per year from farmers who received water from the systems. This provision was never enforced. But on the RID's recommendation a bill was submitted to the parliament in 1975 to raise the water charge to a level sufficient to cover the O&M cost at the time. Though the bill was passed, the water charge was limited to a ceiling of 5 baht per rai per year. The Ministry of Agriculture & Cooperatives had attempted to raise this limit from time to time, without any success. Currently the Royal Irrigation Department is planning another attempt to present a new bill to the parliament on similar lines.

Likewise, in Malaysia, charging the full cost of O&M was considered out of the question as farming is already heavily subsidized and yet the rice farmers are the poorest stratum of the society. In Indonesia, irrigation fees, as such, were never really collected. Instead, there were different types of land tax, which siphoned away part of the income of farmers but never explicitly as an irrigation tax.

Similarly, in Bangladesh, charging of irrigation fees is very reluctantly being introduced. Under the Irrigation Ordinance of 1963 and Irrigation Rules of 1965 a maximum rate of 10 percent of irrigation gross increased benefits to the land or to the occupier was to be imposed. Under this ordinance, the government decided to impose a water rate of 3 percent of the gross increased benefits. However, this policy was never practiced because of difficulties, particularly, in assessing the benefits to the farmers. Under the new ordinance which came into effect in 1984, a flat rate per acre per crop season for each individual project was to be imposed to cover the annual O&M cost. This fee is collected in 12 existing irrigation projects, but the amount imposed, which is about 250 Taka per acre to 100 Taka per acre, does not add up to the full cost of O&M in all these projects. The assessed amount is still far short of the actual total cost of O&M.

With regard to the collection of assessed fees, except in the case of Korea and the Philippines, in all other countries the fees collected, as percent of assessment, turn out to be very low. The rate of collection as percent of assessment is about 20 on the average in Nepal, 26 in India, and much lower in the case of Thailand. In the Philippines, collection as percent of assessment is 50. In the case of Korea, it is almost 100. When we take into account the cost of collection a more serious picture develops. In Bihar, India, in 1984/1985 when the cost of collection was taken into account, actual collection became negative. In other words, the expenditure on revenue collection as a percent of annual amount collected turned out to be 132. This is because in Bihar an elaborate revenue collection system was set up and assessment, billing, and collection are done by the Revenue Department. However, when its costs are taken into account the collection cost

is higher than the amount collected. This shows that the cost of collection is another important factor we must seriously pay attention to in selecting any resource mobilization alternative.

Regarding farmers' ability to pay the full cost of O&M, Leslie Small's book (Small et al. 1989) points out that even the full cost of O&M will still form a very small percentage of the total benefits of irrigation, implying that it is within the capacity of the farmers to pay the full O&M cost. They also point out that the full cost of O&M plus a certain portion of the capital cost can be paid by the farmers or the users in most cases, without significantly reducing their income level or taking away much of the benefits. However, they clearly indicate that the full recovery of O&M plus capital costs will not be possible under the present economic conditions. The full recovery of these two costs will take away 50 percent or more of the farmers' additional benefits from irrigation; this step will definitely reduce the standard of living of the already impoverished farmers. They also point out that even relatively more affluent farmers, such as Korean farmers, will find it hard to pay the full costs of O&M and capital unless other parameters such as prices given for the crops are changed drastically.

Let me summarize what these various findings have indicated.

1. The average O&M expenditures spent per hectare is still only a part, in many cases a small part, of the desired level of O&M. Contribution from the farmers, either by way of money or labor contribution is still short of the actual cost of O&M except in Korea.
2. The cost of collection, i.e., transaction costs, is often higher than the revenue collected.
3. The farmers have the ability to pay the full cost of O&M, measured by the relative percentage of the O&M cost to the additional irrigation benefits.
4. In spite of this, in countries where small marginal farming predominates, the collection of full costs of O&M is reluctantly attempted.

ALTERNATIVE OPTIONS AND RELATIVE MERITS AND DEMERITS

Irrigation Fees

One of the obvious solutions for the recovery of costs is revamping the collection of irrigation fees. This usually involves rationalization of the fee structure, development of collection machinery, and stricter enforcement of rules. This option is tempting especially if it is assumed that farmers, even under the existing income structure, are considered to be in a position to pay the full costs of operation and maintenance. Of the five countries studied, Small et al. (1989) have pointed out that the farmers can pay even under the existing circumstances. Since this is a beaten track and is the easiest solution to the problem, many countries would like to pursue this line of thinking. Recently, Bangladesh introduced an apparently vigorous campaign to collect irrigation fees from the irrigation systems. In Thailand, too, the farming areas which have been modernized by land consolidation to enjoy the full benefits of irrigation are supposed to pay both the full costs of O&M as well as the cost of the land consolidation.

But the results so far, in both cases, have been disappointing. In the last three years, the rate of collection under the new procedure was still very low. Only a small fraction of the assessment has been collected. In Bangladesh, in the largest of the irrigation projects, the GK system, of a

total assessment of 91.96 million Taka, only 2 million was collected in 1989. Similarly, in Thailand the collections are far behind what was expected. One report indicated that in one particular area called Nongwai, the collection rate had fallen after 1985 and out of 170 water-user groups in the area, 22 groups are not collecting anything at all. Among the groups enforcing the collection rules, 27 groups, 18 percent of the collecting group, collected 1,000 baht or less. As most of the activities for each group will cost much more than 100 baht, the collected amount is almost meaningless.

One important question regarding this option is that the percentage of additional benefit the farmer has to sacrifice for the payment of O&M costs is a good indicator of their ability to pay. Here, Small et al. (1989) imply that the smaller the percentage of additional income the O&M cost forms, the more the chances that the farmers will be willing to pay. Alternatively, they are contending that it is economically feasible for the farmers to pay the full costs of O&M. How far this contention is correct needs to be examined. My observation is that it is not the relative percentage of sacrifice that will be a determining factor in the collecting of the fee; the absolute level of income also must be taken into account. Five percent out of an income of Rs 1,000 will be different from 5 percent out of an income of Rs 10,000, if one looks at it from the point of view of farmers. It will be harder for one from the smaller income group compared to the farmers who have a greater absolute level of income, to part with the same percentage of income. This is very important in the sense that in many parts of Asia, farms are very small and farm incomes are also equally small, many living at or below the line of poverty. Will these people be willing to part even with a small portion of their income, however small it may be, to the government as irrigation fees? For a small farmer, even a small sum of money has many other contending uses. Will the farmer be willing to part with this money which could be used to pay the school fees or the cost of school books for his children? With such a level of poverty, is it reasonable to expect that these people will be willing to pay the full cost of irrigation fees when they have not paid any amount in the past? To test this question, Table 2 was prepared. Here we have eight countries in Asia in which relative yield per hectare of rice is mentioned against average size of the holding in the respective countries.

In this table, yield per holding indicates how average farms in various countries fare in terms of their relative volume of production compared across countries. The gross physical production

Table 2. Yield per hectare, average size of rice farms, and yield per average holding in selected rice growing countries in Asia.

Country	The Philippines	Sri Lanka	Indonesia	Malaysia	Thailand	Nepal	Korea
Yield (1987)(t/h)	2.63	2.63	4.05	2.95	1.98	1.76	6.38
Average ⁷ holding	1.95	0.76	0.50 ⁸	2.09	2.69	1.34	0.59
Yield per holding	5.14	2.00	2.02	6.16	5.32	2.36	3.76

Source : World Rice Statistics, 1987, IRRI; 15 and 145.

⁷ Generally for the average holding, the nearest year figure is taken when the figure for 1987 is not available.

⁸ Estimated.

per average farm in Korea, the Philippines, Thailand or Malaysia is higher than that in Sri Lanka, Indonesia, or Nepal. If the relative prices are not taken into account, the average farm achieving greater volume of production could be taken as being better off and better able to pay the O&M cost. When this piece of information is brought to bear on the information given in Table 1, it becomes apparent that differences in levels of absolute gross output of farms are related to the level of irrigation fee imposed or the rate of collection of the fee. Sri Lanka, Indonesia, and Nepal, whose farmers enjoy lower absolute output, also happen to be countries in which the rates assessed stand far below the irrigation cost and there is a difficulty of collecting it, as indicated by the rate of collection. It is often argued that Sri Lanka having had a farming structure in irrigated agriculture along with rain-fed rice cultivation, similar to what has been found in the Philippines, the rate of assessment and collection of fees should be at the same level and that Sri Lanka farmers should be equally qualified to pay for full cost of O&M as in the case of the Philippines. The facts indicated by the table question the soundness of this surmise. The average size of Sri Lankan farms is smaller and as a result their gross output is smaller even though the productivity per hectare is the same.

A similar point will also be seen when the output of the farms in Indonesia is compared with those of the farms in other countries of the region. Indonesian farms are relatively worse off because of their extremely small farm size though their per hectare output is high. This fact is further illustrated in Table 3, in which the ratios per farm household income and national average household income are computed. The farm household incomes in Indonesia and Sri Lanka are only one tenth and one fifth respectively of their national average household income. The variation between the levels of farm and national household incomes is not as wide as in the case

Table 3. Ratio of estimated per household rice farm income to national average household

	Indonesia (Rupiah)	Sri Lanka (Rs)	The Philippines (Peso)	Korea (Won)
Average rice farm income	222,550	13,313	22,226	5,128,244
National average household income	2,475,000	68,700	42,203	5,641,020
Average rice farm income as a percent of average household income	9.0	19	53	91

Sources: Small et al. (1989) and Social Indicators of Development, World Bank Bulletin.

of the Philippines, forming only half of the national average household income. This again strengthens the assertion that the extent of poverty of farmers in Indonesia and Sri Lanka compared with that in other countries with a similar background in the region has a definite influence on the collectibility of charges for irrigation services.

We still have to explain the relatively good performance in resource mobilization of irrigated farms in Korea in spite of the low output of the average farms. The yields of the average Korean farm equal more or less those of the farms in Indonesia and Sri Lanka and yet high O&M costs are easily collected and the systems are well managed by farmers' organizations. This supposed anomaly is explained by the fact that the subsidized price of rice in Korea is set very high above the world price level thus indicating the artificial increase of farm income and the relatively well-off conditions of rice farmers, which again is possible only because of the level of industrialization and resulting prosperity of the country.

In considering this option as a possibility, the question of cost of collection and the difficulties likely to be encountered in enforcing stringent collection rules must also be addressed. We have seen that in Bihar, India, the collection cost is higher than irrigation revenue collected, the price that had to be paid for a vigorous attempt to collect irrigation dues from very poor communities. Besides, the notion that the farmer has the right of free access to water just as the ruler has the obligation to provide enough water to farmers, the long-held cultural tradition in Asian countries, plays its part in this relationship between the farmers and state agencies. All these factors make it difficult for these countries to introduce a vigorously enforced campaign to collect the enhanced fee from the already very poor farmers.

Service Fee

The second available option is the introduction of the concept of service fee in the water distribution arrangements. The concept of service fee explicitly implies a contractual arrangement. The term "service fee" is similar in meaning to that prevailing in the public utilities industries with respect to product or service provided. The term implies that the party or person receiving the service has a legal obligation to pay for the service provided and he also has a right to expect a reliable predetermined quantum and reasonable quality of service from the supplier or provider. On the other hand, the provider or the supplier of the service must be able to fulfill his obligation under the contract. That means he must provide the service on a mutually agreed predetermined basis. The introduction of this concept in the relationship between the user and the supplier in irrigation systems will revolutionize the long-standing practices of water distribution in irrigation management. Gone are the notions that water is a gift distributed as and when available and also that the user has no particular obligation to pay for it.

In the classic *warabandi* systems, the available water is distributed equally to the users so that each user can make the best of it. In that system the distribution of water is a pure allocation among the different contending users and the allocation is decided on the basis of some concept of equality. In contrast to this notion, the new concept implies that a satisfactory and reliable service will be provided. That means the system will be reasonably efficient to provide water at

the right time in the right quantity. On the other hand, the user must also be prepared to pay for the services provided. Both parties are legally bound to observe their mutual obligations. It is also to be noted that while the providers of the service are irrigation systems, the users are the farmers and, therefore, the contract signed will be between the system managers and the users, the farmers; each contract will be drawn on the basis of needs of a particular system.

However, realities of the field situation do not permit a purely economic contract in which the system will supply water at the farm gate measured by a volumetric method and the farmer will best use the water available at the gate. Under the existing physical conditions and also with the prevailing management practices, this is hardly possible. At this stage, the system could not possibly provide volumetric water delivery at the farm gate as in an electricity company. It is most likely that volumetric delivery at the tertiary gate, however, is within the capability of these systems. If water is distributed at the tertiary gate and the farmers' organizations are to take over from there, the farmers will have to evolve a system among themselves for distributing water, collecting fees, and arbitrating the problems arising therefrom. In other words, the water will be sold on a bulk basis and the farmer association must pay for it.

The attractiveness of this option is obvious. The economic use of the water resource will most likely be accomplished under this kind of arrangement. Water will be diverted on the basis of payment, and different contending users will be given water on the basis of their ability to pay. In other words, where the water goes will ultimately be determined by the economics of particular users' groups. There will be pressure on the part of the systems to be more efficient and to observe their obligations, and also on the part of the users to economize and to make the best use of the water available.

The success of this new arrangement will depend on a number of preconditions. One of them is that the systems must be prepared to deliver the water on a demand basis. That means that the whole practice of management of water will have to be changed. Planning and distribution must be properly synchronized and the physical systems must be updated so that new requirements could be accommodated. In other words, drastic changes in the practices of water management and improvement in the physical conditions of the system are called for in this exercise.

The importance of this point is often overlooked. Many of the systems in the past have been operating on an allocated basis. To change them into a system responsive to demand will require a tremendous organizational and management improvement. Proper planning systems and distribution systems must be set up and the personnel must be made to understand that they are performing a service which has to be sold and for which the user will be paying. In addition, the idea of accountability will also have to be introduced as they are now providing a service which is sold. The best way of running the system will be to put it on an accountable basis, a change that will revolutionize the whole concept of management as it moves from the departmental system to an economically independent unit.

In addition, if the service cannot be provided at the farm gate, an intermediate association handling water from the tertiary level to the farm gate will have to be organized. What is needed here is not simply mutual sharing of activities but the machinery to make basic collective decisions. The association will have to allocate water among different groups, settling disputes arising from sharing water between users, determining the fees that each farmer contributes, and collecting them and paying fees to the service-providing organization. All these will have to be done by the farmers' organization. The launching and preparation of this type of organization is another precondition for the success of this new innovation.

In Indonesia, where the concept of fee has been introduced there are numerous problems yet to be solved. Although the idea of contract is accepted, the peculiar nature of the Indonesian administrative system is such that irrigation systems are run by the Provincial agencies while fees are traditionally collected by the Ministry of Home Affairs. Coordination between the revenue collector and the service provider and relating the fee collected to the service provided are still to be sorted out. Another important condition of the new arrangement is that the rate structure of the service fees will have to be mutually agreed upon. Since the cost is the only basis available at present, the service fees will probably be decided on the basis of the cost of O&M or costs of these systems supplying the amount of water demanded. Under this situation, the questions arise, 'How do the farmers know that the O&M costs defined and collected as service fees are reasonable?' 'What defence do they have if the O&M costs are not properly managed or padded up?' 'Will the farmer have to pay for all the inefficiencies of the irrigations agency?' In other words, in this kind of relationship between the two parties, where no comparable market exists and where there is unequal strength between the parties with regard to information, the question of what is a reasonable price becomes a very difficult one.

With respect to this problem, Indonesian managers are planning to involve the farmers or the farmers' representatives in overseeing both the compilation and allocation of the operation and maintenance costs. In other words, whether the costs incurred by the irrigation agencies or systems are reasonable or not will be assessed by the farmers' representative. There still are problems in this type of arrangement. Will the farmers be technically able to do that job? It is a difficult thing for farmers to go into a large organization and assess the acceptability or otherwise of the cost incurred there. Even if this is permitted and accepted, it is still a very difficult task for the farmers to accomplish reasonably well.

In spite of these problems, the idea of service fees and mutual obligations between the user and the supplier is a sound economic concept. By this new innovation, the economic use of water could be accomplished, and in the long run the alternative uses of water between different types of crops and allocation between agricultural and industrial uses of the water can be more rationally made and the idea of economic goods is introduced in water management.

Turnover

The third is the most difficult of the three options in the mobilization of resources for irrigation management. It is concerned with the turnover of operations of tertiary and distributary systems to farmers' organizations. That means, farmers' organizations will carry out system planning and management as well as the distribution of water to the farmers. In addition, these organizations will also determine what the obligations of the farmers are with regard to payment of water charges and arbitrate when disputes arise between the various users. If this option is adopted, the irrigation agency will have no obligation except delivering water at the system gate and any problems beyond this point will be the responsibility of the farmers' organizations. This proposition is very attractive, especially to the irrigation agencies and the government. A lot of problems and hazards borne by the agency will now be transferred to the farmers' organizations.

Advocates of this proposal foresee a number of advantages. It has been recognized that there existed an informational gap between the users and the suppliers in the past, suppliers not knowing the users' requirements and demands and not being able to respond, and also users themselves not knowing the limitation of these systems. This problem will be largely solved because from now on the users themselves will be managing the systems. The coordination between the users' requirements and the suppliers' functions will be easily accomplished. Another advantage foreseen is that under this scheme, farming will become an integrated system, just as in agribusiness. As the farmer would also be taking over the function of getting resources in an integrated unit, getting and using resources will be done under the same management more effectively. It is also supposed that farmers knowing best, entrusting them with the responsibility and letting them cooperate among themselves to do the job will enhance their participation, motivation, and hence productivity in water management. Loopholes will be closed, and more economic methods will be looked for as it is now in their own interest to do so. The expectation is that this system would be more productive and more efficient than previous ones without additional cost to the state. It is also consistent with the current trend of ideology that has been gaining currency in this part of the world, known by various names such as people's participation, decentralization, or even privatization.

Let us examine these claims very carefully. What are the real comparative advantages of this arrangement over the older system or over other alternatives? What are the conditions for its possible success? Will this proposition be acceptable to the people who will implement it? First of all, let us examine what real comparative advantage this system has over the others. It has been claimed that in user-managed systems more coordination between the users and the system can be achieved since users themselves are now managing the systems. It may be said that the supplier-user relationship involving such questions as at what time and what quantity to be supplied, will be accomplished logically at more aggregate levels under this new system. But it is still doubtful that there will be a real gain in this regard. Previously, users, the farmers and suppliers, the manager of the system, met, bargained, and compromised on how allocation has to be done. Under the previously mentioned service contract arrangement, each one is trying to maximize his own benefits, each one responsible only for his own part and obligated to do the job he is concerned with and, therefore, responsibilities are clear. The process of each one optimizing for his own best interest also assures that a mutually agreeable minimal economy in resource allocation will be achieved.

Under this third alternative when water management and distribution functions are taken over by the farmers' organizations, it can be assumed that the boundary relations between users and the supplier no longer exist. The users have taken over part of the supplier's functions and have internalized it. It will be difficult for the user to perform the allocation function now in contrast to the situation where both parties are trying to reach an agreement on a bargaining basis, because here the users have to see to both the functioning and the requirements of the system on the one hand, and the requirements of the farms on the other hand. These two functions have to be coordinated now by the users themselves; in other words, the bargaining and compromising function has now blurred. It will be quite difficult for the user association to reach a reasonable solution between these two contending requirements when users themselves have an interest in both sides. Apart from this point, which has doubtful merit, whether any other comparative advantage is possible or attainable by the new arrangement is difficult to visualize. The internal operations of this association regarding planning and management functions will probably remain the same. In

irrigation organizations -- who opened the gate and at what time, who is responsible for what -- all these decisions relating to the design of work will still be made in the same "rational" fashion as before.

On the other hand, a number of weaknesses can be seen in the new arrangements. First, since the farmers' association will have taken over the tertiary and distributary systems a new boundary is created. The previous boundary at the farm gate between the system suppliers and the users is now replaced by the boundary at the main system gate where the water will be delivered to the farmer associations. The same kind of relationship that exists between the user and supplier at the farm gate will now be faced at the main system gate. If the new arrangement is to fulfill its promises, coordination between the main and the tertiary systems or the efficacy of the main system to satisfy the demand of the tertiary systems will become very important.

The second important point we have to stress is that the new organization this option entails cannot be built overnight. New system managers, farmers' representatives, and professionals operating it will have to arrive at a reasonable working arrangement. All these would necessitate the development of acceptable expectations, obligations, and relationships. This takes time and the learning period has to be accounted for. In addition, the lack of skills on the part of the new system managers will be another problem. It is true that farmers know best how to operate their own farms, knowing the terrain, water flow, and all the peculiarities of their own farm; but when it comes to system management it is an entirely different ball game. This is a modern system run on the principles of rational organization of work, in which some of the technical demands are very specific and exact. In other words, the lack of skill on the part of the farmers about managing this system will also be a constraint. The next question we should note is that under this system the farmers or farmer associations will have to assume, wholly, risk and uncertainty which in the past had been shared. In the previous situation farmers were on this side of just receiving water; they run only their own farm operations and their involvement is limited to that; whereas now they are taking over the operations of the water distribution systems and any foul-up, any breakdown in the newly acquired systems, will directly affect their financial and economic interests. They have assumed risks involved in managing the new functions and also in the possibility that the new relation may not really work out as expected.

The next question to solve will be how to motivate the farmers to accept and participate in the new system of arrangements. Many may believe that farmers will love to participate and take over the responsibilities. Farmers are cooperative animals and the chance to participate, decide, and take over responsibility will all be to their liking. We wonder whether these assumptions are correct. Will the farmer be really motivated to accept and perform under this proposed arrangement when it is known that the costs of failures and the risks are theirs? Farmers are known to be very rational individuals. They try to do their best within their limitations and the horizon they can see. They, in effect, are optimizing within their own limited sphere. They are also known to be risk averters. That is understandable because farm sizes are small and the margin of error they can afford is so small that they cannot possibly take a big risk. One crop failure would mean almost starvation in many instances and, therefore, it will be difficult for farmers to really take risks. It is also known that their time horizon is short-term oriented. This, again, is understandable. First of all, for that matter, most people are short-term maximizers. For marginal farmers, to think about what the environment would be or how the irrigation system will deteriorate in ten years or five years from now may be of no consequence when they are trying to do their best now. Farmers are also known to be conservative because traditions they follow and the system of

relationships they have built are longstanding, their world more or less stable and almost unchanging, and any departure will put them in risky and uncharted situations. We doubt that farmers could be motivated to really accept and contribute to this new innovation of turnover.

First of all, farmers are most likely getting water now at a very nominal rate from systems managed by the government. Will farmers see themselves or their representatives taking over this part of the system to manage, for which they had no responsibility before and no risk was taken? Will they see managing the system by the farmers as a more efficient way of delivering water? Under the new system, farmers will have to take full responsibility for paying the cost of operating systems and take the risks involved. Transaction costs that will be involved to establish farmers' organizations; days of meetings, collaboration, and participation will be needed. In addition, any failure in the system will be assumed by farmers or their representative and all the costs involved will become their responsibility. Under these circumstances what motivation will farmers have to take over the system? Advantages must be so clearly seen for farmers to assume all risks and responsibilities. They may be "tempted" or "persuaded" into it but basic reasons for them to participate effectively do not exist.

CONCLUSION

This paper argues that out of three alternative options available for mobilization of resources for O&M of irrigation systems, the idea of service fee has better chances of success and a logical economic basis to support it. The other two options are considered to be lacking either economic rationality to fulfill the necessary conditions or organizational logic to support a viable organization. It is argued that persuading farmers to pay for water which has been provided almost free is extremely difficult especially when farmers are in abject poverty, the state most of them are in, and have to forgo a number of contending uses of the money collected as fees. There needs to be some positive motivation for the farmers to part with even that small sum which some well-meaning economists have contended is affordable. We consider that farmers are incrementalists and the move from the present state of nonpayment or free service to fee paying users stage will need compelling reasons or incentives. We also posit that regarding option three a successful switch from a more passive role of receivers of benefits or social goods to the role of manager of the systems with all the attendant risks and difficulties will be possible only if certain preconditions are fulfilled and proper organization is established.

In introducing an integrated organization, two possibilities exist. One may be that the internal organization will be run on the same rational basis as before and a farmers' committee would work as a board of management. In this case no economic and comparative advantage is gained. The internal organization remains more or less the same. On the other hand, if farmers' preferences are brought to on the management process itself, instead of cost revenue, output or acreage, new collective criteria such as preference of different groups or different priorities will be used and new organizational relationships and problems created in the process will have to be taken into account. Whether the new organization will perform better than the existing organization to serve

the farmers' needs and whether the farmers will be willing to pay for the cost of the service will be doubtful.

It is argued that there is no clear comparative advantage of the new arrangement over agency operations except some improvement in boundary relations between water users and suppliers, which again is counterbalanced by new developments such as the difficulty of making rational choice by users when they are responsible for system management. It is pointed that the integration between two functions -- farming and water distribution -- is attended by new risks and uncertainty.

It is also contended that assuming farmers as rational, risk averting, conservative decision makers, this alternative will be neither preferred nor supported by farmers. The paper emphasizes the importance of basic economic rationality, the lack of which dooms the new social arrangement.

Next, we posit the view that farmers' organizations are not necessarily better or worse than any other form and it all depends on the intended functions, the type of organization adopted, and economies and diseconomies or comparative advantages arising therefrom. We view that when the farmers' organization takes over the water distribution function from main system gate downward, it is a kind of reverse integration -- smaller fish swallowing big fish. Problems of boundary relations between farmers or farmers' organizations at the farm gate or distributary gate are internalized and, as such, some transaction costs, such as those involved in adjusting, bargaining, and compromising process may be saved. Some informational advantage, farmer-managers of the system knowing better the farmers' requirements, will also be attained. But reconciling different claims of individual farmers, synthesizing their respective needs and arbitrating contending interests will still have to be done at the higher aggregative levels. Whatever principles are used, there will be gainers and losers, and dissatisfaction will arise.

In contrast, the market solution or near-market solution at the boundary level is rather neat; each side knows what it wishes to maximize or optimize, and tries to arrive at a solution acceptable to both. The limits of the group solution should also be recognized; in very small-scale operations, with the established face-to-face contact, the group solution may be very effective. Once the scale of operation becomes larger, routinization, and systematization become necessary, and the comparative advantage of groups will dissipate. What happened in large-scale collective farms in Eastern Europe is a testimony to the monumental failure of large-scale group exercise.

Another important conclusion we can draw from the experiments in the past is that whether a contractual service or the takeover by the farmers' organization is introduced, concomitant improvement of the main system is a precondition for the success of these innovations. Unless the main system is ready and prepared to serve the new demands of service arrangements, the very basis of the service concept will falter. Streamlining the planning and management of water delivery functions such as improving operational plans will have to precede the introduction of new innovations.

In conclusion, this paper stresses that without hard knocks, economic thinking, or economic basis or without changing the basic parameters, suggested organizational remedies will be more 'snake oil' than real medicine. We most often are happier to be deluded than to be demystified or exorcised.

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