

**Towards Financial Autonomy of the Irrigation Sector:
For Better Cost Recovery and Management
(Lessons from Selected Countries and Selected States of India)**

Ashok Gulati and Mark Svendsen

A severe resource crunch during late 1980s and early 1990s has started showing on the poor performance of surface irrigation schemes in India. Rising capital costs, less than optimal O&M expenses, and the 'top-down' institutional structure of irrigation bureaucracy is compelling the policy makers and researchers to look for viable alternatives that can ensure greater efficiency of irrigation network. This paper is an attempt in that direction. It examines the diverse experiments in different countries and selected states of India with a view to identify the factors behind successful stories. Financial autonomy of irrigation departments, followed by farmers' participation in management and ownership of irrigation systems seem to be a promising alternative. It is this approach which can convert the system to 'bottoms-up' and promote efficiency in the irrigation sector.

**Towards Financial Autonomy of the Irrigation Sector:
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ALTHOUGH INDIA HAS one of the largest irrigation networks in the world, the condition of its major and medium irrigation schemes is far from what is desirable. For one, it suffers from lack of sufficient funds for proper operation and maintenance (O&M). And it is in this context that cost recovery and efficient management are the two main areas where reforms have to be brought in, a prerequisite for which is a change in the institutional structure.

This paper concerns itself with these twin questions. Accordingly, first the paper reviews different institutions which aim at recovering costs and increasing the managerial efficiency of these schemes, with special emphasis on those institutions where farmers' participation was involved. The section on Institutional Experiments in Management and Cost Recovery reviews the experience in this regard as obtained in selected countries, and the section on Experience from Selected Countries in selected states of India. Taking into account these experiences, the section on Reforming Irrigation Institutes in India puts forward some suggestions regarding changes to be brought about in the present institutional structure in India for better cost recovery and management of major and medium irrigation schemes. The last section presents concluding remarks with regard to these institutional reforms in the irrigation sector.

INSTITUTIONAL EXPERIMENTS IN MANAGEMENT AND COST RECOVERY

Experience from Selected Countries

Philippines

The example of Philippines is normally cited as a success story for making irrigation services self financing, within government supervision. The main agency dealing with irrigation development and management in Philippines, is the National Irrigation Administration (NIA), set up as a semi-autonomous corporation in 1964 [(Small & Adriano, 1989)]. In the initial stages, NIA dealt mainly with technical functions related to design and construction, system maintenance, physical rehabilitation and water distribution. But due to a shortfall in the target irrigated area in the early 1970s, need was felt to involve farmers' organisations in achieving the given targets and in 1974, NIA was given this responsibility. Behind all the structural and organisational changes was the new concept that NIA must be made financially viable in order to be successful, and to this end, it indeed achieved financial viability by 1979 and received its last operating subsidy from the government in 1981 (Svendsen, Adriano & Martin, 1990).

Between 1964 and 1974, operation and maintenance remained a serious problem with receipts from irrigation remaining well below actual government outlays. In order to correct this deficit an increase in the irrigation fees was brought about, which, in turn, led to demand for improved maintenance of the system but the deficits remained (Bagadion, 1993). Thus, while NIA was reasonably successful in involving farmers in construction of new systems, problems with regards to O&M had escalated. In order to overcome these, NIA was now freed from any repayment obligation to the government and could also raise funds through diverse activities such as equipment rentals, drainage fees, etc. The subsidies were to be phased out in five years, when NIA would become wholly dependent upon its collection from farmers (Bagadion, 1993) for its operating cost.

In response to the government's initiative of changing the functioning structure of NIA, it reciprocated by adopting certain broad measures to bring about a balance in its revenue and operating expenditure. These strategies included - devolution of some of the responsibilities to farmers through organising them into viable irrigators' associations; increasing revenues by raising fees and indexing them to inflation, improving collection rates and initiating other secondary sources of revenue; creating a system of financial incentives to extract better performance from units and individuals. In order to ensure willing and meaningful participation from the irrigators, NIA took a pledge from the people to contribute 10 per cent of construction cost in the form of labor, cash or material at the time of construction (Bagadion, 1993).

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In case of communal systems, a partnership between indigenous irrigators' organisations and NIA was envisaged to increase the strength and usefulness of both. In two pilot projects taken up in 1976, NIA staff interacted with the farmers, which led to the incorporation of their needs and responsibilities in future policy planning at NIA. Such two-way cooperation improved decision making within the association, ensured water rights of the participants, increased irrigation facilities and reduced the capital costs through substantial labour contribution from the beneficiaries without payment for the same.

Attention now shifted to the O&M deficit of 'nationals', and associations were developed to manage the entire system in case of small nationals, or entire secondary canals in case of large ones. The first pilot project of the kind was taken up in 1980 in the Buhi-lalo Irrigation Project (Bagadion, 1993). On large national systems, smaller groups of farmers were formed to manage the area irrigated by a single turnout on a canal (between 25 to 50 ha). These groups formed the lower strata for zone level associations which then negotiated with the NIA regarding the sharing of responsibility and irrigation fees for O&M. The NIA also provided training to these associations in O&M of the systems and financial management. The Buhi-Lalo experience was successful in making irrigators' associations share the responsibilities of O&M of irrigation systems. This showed the way towards financial viability of NIA, and Philippines irrigation system became self-sustaining as far as its O&M and a part of capital cost were concerned.

China

Of the various managing and operating practices followed in irrigation systems in China, we concentrate here on the diverse practices adopted in the western Hunan province. In this province, the primary government irrigation development and management agency is the Water Conservancy & Hydropower Bureau, whose main responsibilities include construction and reservoir management, as well as operation of large canals. A major part of the agricultural irrigated land in this province is serviced by medium-scale government built or assisted reservoir-based systems.

In these medium systems, an annual meeting is held at the beginning of each irrigation season to discuss various issues such as water delivery, fee receipts, etc. As regards irrigation fee, in some systems like the *Sa Reservoir* water rates are denominated in terms of rice, fixed according to the official procurement price. Farmers have the option of paying either in terms of rice or cash with the charge being nominally higher for cash. In the large *Huangshi Reservoir* system, the water charge is a combination of two components - an area based flat rate levied on each farmer in the system, regardless of the amount of water drawn and an additional amount for water actually delivered. The first component is apparently representative of the cost of maintaining the capacity of water delivery to the farm.

In such large systems, water management units do the actual collection of irrigation fees, while in the medium systems, this responsibility is generally undertaken by the farmers themselves. In each village, a bookkeeper keeps an account of the farmers' produce, and the fees due. In systems where the overwhelming part of the fees is in the form of paddy, the village leaders collect the appropriate amount from the farmers and officials of Water Management Department (WMD) of the Water Conservancy Bureau (WCB). The process of collection is simpler for systems where most of the fee collection is in cash. There, village leaders simply collect and record cash payments on behalf of the WMD.

In the western Hunan province, apart from irrigation fee, villagers also make significant contributions in the form of labour. In Dayong county in this province, labour quotas are imposed on individual villages on the basis of amount of irrigated land in these villages and *all* village residents are expected to provide this quota of labour, which is mostly allocated to construction and maintenance of irrigation systems. About 30% of the villagers contribute a fee in lieu of their own labour, while the remaining 10% contribute nothing. Overall, this labour contribution becomes important since irrigation districts are increasingly expected to cover their O&M costs through their revenues due to dwindling public support (Svendsen et al, 1990).

Apart from irrigation fees, funds for operating and maintaining a system are obtained through various innovative secondary sources such as sale of fruit from orchards lining the reservoirs, hydropower revenues, fish production in the reservoir, etc. Prior to 1984, the cash component of the development cost was contributed in the form of grants from the provincial government, which have turned into concessional loans. While such a change in policy has succeeded in increased efficiency, it has led to a decline in new investments in this region.

The management of medium and large reservoirs is the responsibility of the financially autonomous Reservoir Management Division (RMD), which functions under the WCB and looks after the delivery of water to users and maintenance of the structures. At the lowest level, distribution of water to individual users is the responsibility of the village which also collects the fees from the irrigators and channels it to the RMD. For large systems like *Huangshi*, an intermediate unit called water management stations exist between the RMD and the villages. These units receive water from RMD, combine it with water from local sources, and deliver it to villages for distribution to individual farmers, thus facilitating wholesale transfer of water from RMD to the villages. These water management units are

given measured quantities of water for which they are charged volumetrically. Similarly, the villages also receive measured quantities of water and pay for it on a volumetric basis. But at the individual level, water delivery is measured by timing them, but not through any regulation of the water flow.

Thus we find that in China, especially in the Hunan province, the emphasis has shifted from construction of new schemes to financial viability of the already constructed systems. This has led to a number of income-generating secondary sources associated with the main irrigation system and the contribution from these secondary sources often exceeds the revenue from irrigation fees, the collection of which is also claimed to be considerably high. Thus, China provides an ideal example of financially autonomous organs of an irrigation system.

Korea

In Korea, while construction and development services, in irrigation, are provided through a centralized agency such as the Agriculture Development Corporation (ADC), responsibility for O&M is delegated to decentralized semi-autonomous groups like the Farm Land Improvement Associations (FLIAs) [(Small & Adriano, 1989)]. It is the user-farmers who form the membership of these FLIAs and a federation of these FLIAs, at the national level, acts as intermediary between the government and these individual associations. The Ministry of Agriculture and Fisheries contributes towards maintenance of the system by supplying a part of its general tax revenue and also through direct and indirect subsidies to the local management entities such as FLIAs. There is an effective reliance on a system of pricing policies which is aimed at reducing the financial burden on the government. But, it is the users of irrigation water who are ultimately responsible for financing the entire O&M costs and a part of the capital cost. For the smaller projects, it is the FLIAs and irrigators' groups which are accountable both for implementing various measures as well as collecting revenue from the users, while for larger projects, it is the ADC which is held accountable. Combined with these measures, is the effectively implemented carrot and stick policy, of sanctions and rewards, which supported by an efficient institutional framework, has helped the Korean irrigation system become financially independent over time.

USA

In the USA, local irrigation districts are financially autonomous, although they receive some subsidy from the government, for construction of systems. The ultimate burden of financing the construction lies with the users who are sometimes required to repay the entire development cost (without interest) over a period of 40 to 50 years (US Water and Power Service 1980). Thus the total amount that beneficiary farmers are required to pay is determined on the basis of cost, but the actual year to year repayment is on the basis of the farmers' ability to pay. In case of publicly constructed irrigation systems, irrigation districts purchase water from the Bureau and retail it to their members. Most irrigation districts finance the O&M of the systems as well as the repayment schedule through direct water charges. These may often be two-part tariffs, with a fixed part which may be a kind of betterment-levy on land under irrigation (Small, 1989). In some cases it also entitles the farmer to use a fixed quantum of water while the second part of this tariff would depend on the extra water used. In cases where lift irrigation is required, the fixed part of the tariff may be an energy charge for the initial lifting of water from the reservoir, as is the case in the Columbia Basin Project (CBP). The entire cost of irrigation may not always be the direct liability of the farmer users, if part of this cost can be recovered through hydroelectric power revenues or by excess revenues generated by the older projects. In fact, formation of Water Users' Associations has been encouraged by giving them the right to certain secondary sources of income such as revenue from leasing out of project land used for grazing and farming and gains from hydropower plants on the project (Thompson, 1985). In USA, a legal penalty can be imposed on farmers for non-payment of irrigation charges. In the CBP, for instance, districts often exercise their right to foreclose on farm property in the event of unpaid bills (Svendsen & Vermillion, 1993). Government rule also provides for joint liability of an irrigation district to repay the construction costs which implies that until all dues are cleared no landowner can obtain a clear ownership right to his land.

As far as the effect of transfer of management from government agency to the irrigation districts is concerned, we find that in the CBP, it has largely been positive, with a fairly smooth takeover of management and costs by the local districts. It was also seen that over time, the real level of the water charges, both on area and volumetric basis, fell substantially. This was chiefly the result of the irrigation districts striving to develop supplementary sources of income as well as reduce O&M expenses.

Indonesia

In Indonesia, irrigation is viewed as a necessary step towards development and self-sufficiency of the country, hence cost recovery has never been of prime importance. During Dutch rule of Indonesia, cost recovery was ensured through a land tax based on productivity differential between irrigated and unirrigated lands. This tax was abolished after independence but was subsequently re-established as a form of taxing rural development activities of district governments (IPEDA or the new Land and Building Tax) [(Small & Adriano), 1989]. Even though this represents an indirect means of recovering irrigation costs, there is no direct link between revenue earned through this tax and the outlays for O&M. All funds for irrigation development and O&M of the systems thus come through the central or regional governments, with a heavy dependence on the funds provided by the central government. It was expected that over time, the provincial governments would develop self-financing capacities, but in the absence of an adequate incentive structure, this expectation has failed to materialise.

It is only at the tertiary level, in gravity based irrigation systems, that farmers take on the physical and financial responsibility through various institutions such as village governments and water users' associations. In these systems, farmers are required to pay a per hectare per season fee, to the associations, either in cash or in kind. They may also be required to supply additional construction material or labour, if the need arises. The water users' associations do not generally face a problem with regard to collection of fees, due to the presence of strong social sanctions and thus, prove successful in implementing their regulations and imposing the sanctions which are previously agreed upon by members.

Experience from Selected States of India

Andhra Pradesh has been quite successful at involving farmers in management in the Sreeramsagar Project (SRSP) on river Godavari. The first major experiments were carried out with the creation of Command Area Development Authority (CADA) in mid 1970s. In this particular project, an unusually close relationship existed between the CADA, the Water Management Circle of the Irrigation Department and the farmers, which resulted in emergence of fairly efficient management systems and helped reduce the gap between creation and utilisation of irrigation potential (Hassan, 1986). The association between the official organisations and farmers took place mainly at two levels: construction and maintenance.

A programme known as "On Farm Development" (OFD) activity was taken up for development of land and construction of field channels, the design and execution of which was entrusted in 1974-75 to *pipe committees*. Each of these Committees was divided into upper, middle and tail sectors, with farmers of different socio-economic backgrounds being represented in the management of these committees. Although this institutional arrangement proved to be quite successful, once the construction stage was over, the utility of these pipe committees declined and they disintegrated due to lack of adequate interest on the part of the farmers.

In spite of disintegration of the above pipe committees, experiments with them in other fields continued. For instance, to specifically address the problems of the tail enders, experiments with farmers' participation were carried out through the *Warabandi* system, or rotational supply, during the period 1978 to 1988 (Hassan et al, 1992). With the involvement of farmers, more care was taken to allocate water amongst various distributaries, majors, minors and pipes. Maintenance being the responsibility of the pipe committees, active participation of farmers significantly reduced the uncertainty element in the water supplies.

Despite provisions in the Andhra Pradesh Irrigation Utilization and Command Area Development Act (1984), for the Irrigation Departments to carry out responsibilities on behalf of farmers and recover the costs from them, specific cost recovery schemes were never formulated. Some indirect attempts at cost reductions took place through (a) the farmers' role in maintaining the minors and contributing labor for OFD works; and (b) their participation in clearing and desilting operations below the outlet, which led to a corresponding reduction in costs to the concerned irrigation departments. But these pipe committees too, disintegrated in due course for lack of sufficient interest on the part of the farmers (Hassan, et.al, 1992).

In *Bihar*, the Central and the state governments established an inter-disciplinary Action Research Programme (ARP) in the Palganj Distributary (CCA 12,197 hectares) of Patna canal under Sone Canal System, under the sponsorship of USAID.

Since its incipience, the Sone Canal system functioned reasonably well with participation of farmers in various aspects of its functioning. As per the Bengal Irrigation Act, 1876, permits were issued to farmers for irrigating specified plots against request or *satta* and heavy fines were imposed for unauthorised usage of water which was estimated on a volumetric basis. A beneficiary farmer was appointed as *Sattedar* for each outlet to help in management and collection of water rates, in return for 2 per cent of the revenue collected as fees. User-farmers were required to maintain the village channels and improper maintenance led to imposition of penalties. Distribution

of water to each individual field was also the responsibility of the farmer while assessment and collection of water rates was taken care of by the revenue wing of the irrigation department. Thus the administration was run in such a way that the users of irrigation water were happy and the system performed well (Srivastawa, 1992).

After independence in 1947, attention shifted away from productivity to protection of deprived farmers, which made the entire 'satta' system increasingly unmanageable and finally in 1974, the Bengal Irrigation Act (1876) was abolished. Assessment and water tax demands preparation began to be done on the basis of actual irrigation undertaken, the records of which were to be properly maintained. Absence of water managers led to a lack of control over the actual usage of water at the ground levels. Those getting water first, simply flooded their paddy fields thus depleting the supply of irrigation water to the lower reaches of the command, where it was in any case inadequate to meet the demand. Due to the worsening situation over the years, the state government reintroduced the 'satta' system in 1988 (Srivastawa, 1992).

The Action Research Programme (ARP) in Paliganj distributary was also started in 1988. Regular meetings with farmers indicated that adequate water supplies to the lower reaches of the canal were not possible without proper supervision of distribution operations by government functionaries. The ARP appointed farmers' "Ad-hoc Canal Operations Committee" for suggesting roster for water distribution in different parts of distributary command, so as to ensure greater predictability and reliability in the timing of water deliveries and also to ensure equitable water distribution. As a result of this change, the wastage of water in the upper reaches of the channels was prevented and farmers in the middle and lower reaches gained access to relatively more water. The farmers were also encouraged to participate in training programmes initiated by WALMI (Water and Land Management Institute) and eventually helped in formulating maintenance plans and prioritisations of the maintenance works. But as is clear from above, the ARP confined its efforts at ensuring farmers' participation, to the question of distribution of water at the distributary level.

In Gujarat, the Mohini Water Cooperative Society in Kakrapar system is one of the most successful examples of improved water management and efficient cost recovery through farmers' participation. In Surat district, in the village Mohini of Taluka Chorasi, a society was started under the State Cooperative Societies Act of 1961, with initial membership of 145 and share capital of Rs 7900 in 1978-79. By 1984-85, its membership had risen to 216 with a share capital of Rs 11,800. The water cooperative undertook effective implementation of revised rotational schedules and charged government-fixed water rates from the farmers. It has been fairly successful in almost eliminating the arrears in payment and also in minimising the wastage of water. This has been accomplished through cooperative efforts with minimum interference from either the revenue department or the irrigation department. As a result of this experiment on cooperation, the society realised substantial net profits which materialised mainly due to almost doubling of gross irrigated area. This in turn was a result of water savings and acquiescence of farmers in receiving measured volume of water supplies from the authorities (Chambers, Saxena & Shah, 1989).

Maharashtra has, in the past, been characterised by well developed farmer-managed irrigation systems. These systems were independent with regard to various functions relating to maintenance of the canal network, recovering management costs and payment of irrigation fees to the government. Institutions like the Canal Advisory Committee, *Pani (Water) Panchayats* and *Bagaitdar Sangh* (associations of all irrigators on canal), developed through experience over centuries, facilitated accomplishing such a task (Kulkarni and Kulkarni, 1992).

In these systems, examples of which still exist in Nasik and Dhule districts, the land lying between the channels was the irrigable area and was divided into suitable management units called *phads*. The management of the *phad* system was entrusted to farmers' associations in the village and was known as Water Management Committees (or *Pani Panchayats*). Neither these committees nor the canal advisory committees put any direct emphasis on the financial aspects of the system. Their activities were mostly confined to evolving participatory management units responsible for maintaining secondary distribution network and implementing the 'schedule of turns' of irrigation in a village. Dissemination of knowledge regarding new techniques, water requirements of crops and availability of seeds was also undertaken by these *decentralized* participatory management units.

Maharashtra Irrigation Act, 1976 provided for the legal formation of water committees for distribution of water and maintaining sanctioned cropping patterns, provided it had the support of 51 per cent of total land holders or land under a particular canal. Some such societies have, in fact, existed since pre-independence days, like the Manjari society in Khadakvasla canals and Samvatsal society on Godavari canals. Irrigation department of the Maharashtra government has been making conscious efforts to organize similar societies with the ultimate aim of handing them over to the farmers' organisations. This has been done through a discount on the water bill and an additional incentive on timely payment of the bill. Growth of seasonal and non-seasonal crops is generally the basis of fixing volumetric rates for government supplies of water to farmers' associations, although for individual farmers, the farmers' associations have the liberty to fix rates (Kulkarni & Kulkarni, 1992). But so far, the financial aspect continues to be of secondary importance for these societies, with neither financial independence nor effective cost recovery being the guiding principle behind fixation of water rates.

The above review of anomalous institutions in certain selected states of India, which have succeeded in involving farmers' organisations, reveals that their primary focus was always on better management of the existing irrigation systems through farmers' participation. Cost recovery was never the central issue, although farmers' participation indirectly reduced the costs of operation and maintenance.

REFORMING IRRIGATION INSTITUTIONS IN INDIA: SOME LESSONS FROM DIVERSE EXPERIMENTS

Towards Financial Autonomy

Unlike most developed and developing nations where success stories in irrigation development are characterised by at least partially privatised irrigation systems, in India, major and medium irrigation remains largely under direct government supervision mainly due to the huge capital requirements for construction and maintenance. The ensuing inefficiency can be corrected only through more economically viable and financially self-sustaining irrigation systems.

In this context gradual but definite steps need to be taken towards creating autonomous users' groups to handle all or most aspects of operating and maintaining the irrigation systems. Irrigation agency has to be made financially autonomous, as a pre-requisite of insuring institutional reforms in the irrigation sector [(Gulati et al, 1994)]. Financially autonomous agencies have a greater incentive for providing quality irrigation than government or semi-government organisations, since these largely depend upon the revenue from irrigation fees collected from the users, unlike government organisations. As witnessed in section on Institutional Experiments in Management and Cost Recovery, there has been some limited effort towards establishing farmer users' autonomous bodies in various states of India, mostly in management rather than cost recovery. Moreover, such isolated efforts have been inconsistent and have lacked direction. While no definite measure of the extent of such effort is available, the area covered by such experimental initiatives is known to be less than 1 per cent of the area irrigated through major, medium and minor schemes (GOI, 1992). The most obvious reason for the general ineffectiveness of such initiatives, is that farmers have not been actively encouraged to participate in all activities concerning the irrigation system under their care and their suggestions for improvements have often been neglected by the Irrigation Departments.

As a first step towards effective reform these departments need to be converted into financially autonomous corporations in order to make them more responsible towards their duties and responsibilities. With financial autonomy certain additional factors come into play, such as the incentive to increase agency income as well as the incentive to reduce costs (Svendsen, 1991). All these, in addition to the financial burden of independently running the corporation and maintaining a given system will force the institution to become cost efficient. In order to generate sufficient funds for O&M, there will have to be an increase in the water rates, which are at present well below the O&M cost for most states. On an average, gross receipts from irrigation charges were only about 41 per cent of the total expenditure on O&M (GOI, 1992). Designating the irrigation fees in terms of the crops, on the lines of China and Philippines could be taken on, so as to index the irrigation fees to inflation.

While there is need and sufficient justification for an increase in the water rates, there is likely to be widespread agitation on the part of the farmers. To avoid such consequences, concomitant upgradation in the irrigation services, both in terms of quality and quantity, are required. So far, the supply of water for irrigation tends to be both unstable and inequitable. This is where the thrust of quality improvement could occur.

Inviting Farmers' Participation in Management and Ownership

The new pricing system will also need to take care of factors like quantum, timing and reliability of supplies and should be of the kind which promotes a more equitable distribution of water. All these objectives can be achieved by way of a *two-part tariff* (GOI, 1992). The first part can be a flat rate per unit area, levied on all land lying within the command area of the irrigation scheme. This essentially allows the farmer to become a user of the irrigation water and is similar to the concept of economic rent. A farmer could be given the option of not paying this rent and thus not being included among the receivers of irrigation water. The second part of the tariff would be a volumetric rate dependent on the amount of water being used by each individual farmer. But since supervising and measuring the volume of water used by individual farmers may prove difficult, the Irrigation Corporation should instead arrange to supply the water, by volume, to users' groups at the head of the distributary outlet. The charges could be collected for this bulk amount from this group, which, in turn, can distribute this water to the individual users and appropriate the returns from them. Such an arrangement would serve to keep the cost of the corporations low, as well as shift some of the responsibility to the users' groups.

One of the ways in which involvement of farmers' groups would serve to cut down the cost, is through reduction in the wage bill. Indeed, an overwhelming part of O&M expenses of the irrigation system is the salaries and wages being paid to the functionaries of the Irrigation Departments which, in turn, are grossly overstaffed. With the functions

of distribution of irrigation water to individual users and collection of dues therefrom being delegated to users' groups, this inflated wage bill gets cut substantially and makes more funds available for the actual maintenance of the system. There also needs to be no undue concern over large scale deployment of staff. The experience of management transfer in the Columbia Basin Project in USA, showed that many of the staff released from the original government agency could be reemployed by the farmers' organisations in order to gain from their expertise. This would succeed in making the transfer of power smoother.

In the initial stages, farmers can be given charge of maintenance and revenue collection of the distributors and minors, while the main canal remains directly under the Irrigation Corporation. Once the users' groups have been sufficiently trained to look after O&M of the systems properly, entire systems, if small, or specific segments of large canals can be left entirely under the care of these groups. In fact, as successfully tried in Philippines [(Small et al, 1989)], Irrigation corporations in India too, can give O&M of a part or the entire system to farmers' groups on contract, in return for which these groups could receive some money from the corporation. The water rates could be fixed by the corporation keeping in mind the running expenses of the system, the depreciation cost and the capital cost (in order to recover a small fraction of this capital cost annually), where the running expenses could be ascertained with the help of the users' groups. With such groups having control over the supply of irrigation water and ensuring the required quality and quantity of services, reliability and efficiency of supplies would improve and through enhancement of productivity of the irrigated land, it would serve to make users more willing to pay the required fees at the appropriate time.

In order to ensure such proper and timely payments, measures or sanctions which may be legal, economic, physical or social can be implemented. Legal sanctions have been found to be burdensome to impose since they entail huge costs and are therefore rarely used even where they exist [(Small et al, 1989)]. Economic sanctions like a fine on late payment of irrigation fees or conversely, a discount on timely payment of the same and physical measures like stopping the supply of water in the next time period, can also be taken to prevent the users from renegeing on the payment of the fees. But the most effective measure has been found to be social sanctions which act as adequate deterrents against non-payment of fees. In Mexico, for instance, it is the social sanctions which prove to be more effective in making water users refrain from illegal use of water and making them pay their fees on time. Some of the above forms of sanctions could be tried in specific projects in India and depending on their success, a judicious combination of these could be adopted for the entire irrigation network.

Apart from maintenance of the system and cost recovery for the same, other issues such as investment decisions taken in this sector, too need addressing. At present, a large number of new projects are taken up on the basis of political criteria, often resulting in new schemes coming up in areas, already served by some older scheme (GOI, 1992). Also, design and implementation of projects are often found to be faulty midway through construction and have to be redesigned, leading to massive cost and time overruns. Such politically motivated decisions could be restricted if the users were required to pay at least partially for the construction of the project. But in order to prompt the correct investment decisions, it is essential to have an institutional link between the decision making process and the end beneficiaries of those decisions. Such a linkage can be established through farmers' groups having the entire responsibility of managing and financing a system. In fact, such groups should be brought into existence even before the start of an irrigation scheme and their involvement solicited at all stages of construction and operation. In smaller projects in Philippines, for instance, farmers have even been known to change the design of the project to suit the local needs and reduce the cost of the project [(Small et al, 1989)]. Part of the capital cost of construction of the system could also be recovered from the farmers. Study of the irrigation setup in Philippines shows that making farmers repay the investment, while at the same time giving them a say in the planning and implementation of the project, significantly reduces the cost of the project. In fact, farmers can be made co-owners of the project through the means of 'Water Bonds', wherein 5 per cent of the capital cost of the project could be offered to the farmers. This would not only increase the farmers' interest in the system but would also help in recovering part of the capital cost, which otherwise would have to be entirely borne by the government. This idea can be carried forward by allowing these bonds to be offered for resale, thus creating a market for water. Such a market would induce the system to run efficiently and cost-effectively (Gulati et al, 1994).

CONCLUDING REMARKS

The sub-optimal functioning of the extensive irrigation network of major and medium irrigation schemes in India, has now made it imperative for attention to be specifically focussed on the problem of generating sufficient funds for adequate maintenance of the system. This can be done through bringing about a change in the institutional structure which would in turn foster growth of efficiency in the system. The financing of irrigation in India can only be performed efficiently by providing financial autonomy to the Irrigation Departments. This would lead to increased efficiency in cost recovery among the functionaries of these departments. The main aim of such an exercise would

be to hand over entire running of the systems to the users represented by groups or cooperatives. Institutionally this indicates a change over from 'tops down' to 'bottoms up' policy, on the lines of USA, Philippines and Korea. While some isolated efforts have been made in various regions of India, these have experienced only limited success, mainly because organisations or groups lack the initiative to sustain operations without government support. Attention thus needs to be focussed on development of self-sustained institutions or organisations which can carry on their functions independently, especially on a long term basis. Once such user groups have become adept at the functions assigned to them, steps can be taken to ensure their continued interest in running of the system perhaps by making them co-owners of the systems, through issuance of equity shares which would also allow them to be involved in the management, at the designing and construction phase too.

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