

Irrigation Management and the Financing of Irrigation Services:  
Institutional Considerations

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65 Nov 2001

Paper presented at the Seminar on Irrigation Management and Agricultural Development in Sri Lanka, held at the Agrarian Research and Training Institute, Colombo, Sri Lanka, February 20-21, 1986.

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### Institutional Considerations

#### Introduction

Over the past several decades, governments in many Asian countries, including Sri Lanka, have made large investments to build, rehabilitate and upgrade irrigation facilities. As the amount of land irrigated by such systems increased, two areas of policy concern emerged. First, performance of many irrigation systems was well below expectations, leading to questions regarding how the irrigation facilities could be managed and operated more effectively to better realize the potential benefits of the irrigation investments. It was this general concern that has led both to the formation of the International Irrigation Management Institute here in Sri Lanka, and to the large body of literature which will soon fill the shelves of the Irrigation Management Research Information Centre whose inauguration we are celebrating by this seminar. Second, the growing recurrent cost needs for operating and maintaining the irrigation facilities created budgetary demands that governments frequently found burdensome. In the past few years, partly because of economic and budgetary pressures facing many governments in Asia, this second question has received increased attention (see, eg., Easter 1985; Westgate 1985).

Although these two issues -- the quality of irrigation management and performance, and the financing of the recurrent costs of O&M -- are often treated as separate, there are important linkages between them. Furthermore, the nature of these linkages is strongly conditioned by institutional considerations.

#### Types of Effects of Irrigation Financing on Management Performance

Irrigation financing mechanisms may affect the efficiency of system operation through their effect (1) on the availability of funds for O&M; (2) on the accountability of system managers; and (3) on the amount of cooperation and involvement of water users in O&M.

Availability of Funds for O&M. Efficient operation of irrigation facilities is frequently hindered by low funding levels for normal operation and maintenance. If the funds are allocated through some type of government budgetary allocation process, it is likely that in periods of generally tight budgets the amounts provided for operation and maintenance will be severely inadequate. In this situation, if additional funds for O&M can be made available by collecting water charges, a significant improvement in the level of performance of the existing irrigation facilities may be possible.

Accountability of System Managers. Financing policies may enhance irrigation performance by increasing the degree of managerial and financial accountability to water users. If the irrigation agency receives a significant portion of its funds from the water users, project managers are

more likely to be concerned about the quality of irrigation services provided, in order to enhance their ability to collect the user charges. Water users may also realize that the quality of services they receive depends on their payment of irrigation charges.

Cooperation and Involvement of Water Users in O&M. Water users may cooperate more actively in O&M if financial policies encourage them to feel that they, rather than some remote government agency, own the irrigation facilities. This is most likely to occur if the water users bear a clearly defined and accepted financial responsibility for a portion of the capital costs. This implies involvement of the potential water users in the planning and decision-making process for a project prior to its construction.

### Irrigation Financing Mechanisms

A variety of mechanisms may be used to obtain resources for the provision of irrigation services. The most common mechanisms can be categorized as water prices, irrigation service fees, taxes, implicit taxation and secondary income. Water prices and irrigation service fees are direct financing mechanisms, in that they are directly linked to irrigation. Taxes, implicit taxation and secondary income are indirect financing mechanisms, as they bear little or no linkage to irrigation benefits.

Under a system of water prices, payments depend on voluntary purchase decisions by water users. Examples include charges based on users' requests regarding either the volume of water to be delivered, the length of time of delivery of water or the number of irrigations. Because of difficulties associated with the control and measurement of water, pricing is seldom used in gravity irrigation systems characterized by large numbers of small farmers growing irrigated rice.

Irrigation service fees are compulsory charges imposed upon users of irrigation on some basis fairly closely related to the amount of the services provided. The most common example is a flat charge per ha of land irrigated. Such charges are sometimes differentiated according to the number and/or the type of crops grown. In some cases, particularly in small, privately operated irrigation systems, the charge may be based on the size of the crop.

Taxes are compulsory charges levied on individuals with no direct reference to any services provided. Although the tax levy bears no direct relation to irrigation, the amount which an individual must pay may be affected by irrigation. A good example is a general land tax based on assessments of the productivity of land. To the extent that the increases in land productivity resulting from irrigation are reflected in the land tax assessments, owners of land will find that irrigation has increased their tax payments. Other types of taxes which may be indirectly affected by irrigation are taxes on agricultural inputs and marketing and processing taxes on agricultural products produced on irrigated land.

Implicit taxation occurs when government policies cause domestic market prices of agricultural products to be below world market levels, or prices of agricultural inputs such as fertilizer to be above world market levels. The amount of such an implicit tax paid by a farmer depends on the amount of the product which he markets, or the amount of the input which he purchases. As irrigation increases these amounts, the amount of the farmer's implicit tax increases.

Secondary income of an agency or organization responsible for the provision of irrigation services results from institutional arrangements which permit the organization to earn revenues from sources other than charges levied on water users and government budgetary grants. Secondary income frequently results from the leasing of assets over which the organization has been given control.

### Fundamental Policy Alternatives for Irrigation Financing

Regardless of the specific financing mechanisms selected to obtain resources, fundamental policy decisions must be made regarding the institutional organization of four key processes related to financing: allocating resources to irrigation; utilizing these resources to implement irrigation services; obtaining resources from irrigation beneficiaries; and controlling the resources obtained from irrigation beneficiaries.

The relationships among these four processes are indicated schematically in Figure 1. Resources allocated to irrigation (process 1) are utilized to provide irrigation services (process 2). These services generate income among beneficiaries, from whom resources may be obtained either directly (process 3a) or indirectly (process 3b). In either case, some agency will have control over these resources (process 4a or 4b).

Institutional arrangements for the allocation of responsibilities for these four processes are of critical importance to their effects on irrigation management. The principal alternatives are described by four general models (Figure 2).

In the first model, responsibility for all four processes resides in a single institution. This model is applicable to traditional communal irrigation systems, where the institution incorporating these processes is some type of water users' organization. In the second model, responsibilities for implementing irrigation services and obtaining resources from irrigation beneficiaries are combined in one agency, but separate agencies allocate resources to irrigation and control the funds collected from the water users. The irrigation implementing agency thus collects charges from water users, but does so only on behalf of some other agency which controls the use to which these funds are put. The third model involves separate institutional responsibility for each of the four processes. The fourth model is similar to the third, except that the process for directly obtaining resources from the irrigation beneficiaries is absent, meaning that no water charges are imposed on the users of irrigation services.

A satisfactory evaluation of policies for establishing water charges cannot be limited to a narrow consideration of the process of obtaining resources from the water users (process 3). The effects which any specific policy on water charges have on irrigation performance depend on the inter-relationships among all four processes. The key distinction is between situations of (full or partial) financial autonomy and those of financial dependence. With financial autonomy, an irrigation agency has at least partial responsibility for all four processes. In particular, it has control over resources which it obtains from water users, and thereby over the allocation of all or a major portion of the resources devoted to irrigation O&M. With financial dependence, an irrigation agency has no control over funds collected from the water users, and is thus dependent on resources allocated to it through the general government budgetary process.

#### Financial Dependence vs Financial Autonomy: Management Implications

Financial dependence prevails in a number of countries including India (Bottrall 1976; Pawar 1985), Pakistan (Wolf 1985; Bottrall 1978a), Bangladesh (Khan 1981), Thailand and Indonesia. Until recently, financing policy in Sri Lanka could also be characterized as involving financial dependency; however, recent policy changes with respect to irrigation service fees, including the potential for fees collected in a given project to be utilized for the provision of O&M in that project, suggest an interesting movement in the direction of financial autonomy (Engineering Consultants Ltd. 1985).

One disadvantage of financial dependence is that even if water charges are collected from farmers, decisions regarding the amount of funds made available for O&M are essentially beyond the control of either the users or the providers of irrigation services. Furthermore, there are no financial linkages fostering accountability between irrigation managers and the water users.

Financial autonomy usually, but not always, involves decentralized responsibility for irrigation services. Such arrangements can be found in a number of countries where control of irrigation operations is vested in local irrigation districts (USA, Mexico, China), companies (France), land improvement districts (Japan), farm land improvement associations (Korea), irrigation associations (Taiwan), or irrigation cooperatives (Greece). In China, for example, irrigation districts are in principle supposed to be able to sustain irrigation operations without reliance on external subsidies (Nickum 1982, p iii). In practice, however, many subsidies are provided by the government, even for normal operation and maintenance activities (Nickum 1982 pp 4, 35). In Mexico and the United States of America, localized irrigation districts are financially autonomous within the structure of government rules and regulations that provide for subsidies for initial construction (Adams 1952; U.S. Congress 1983; World Bank 1983). A similar situation exists for irrigation companies in France (Bergmann 1984; Pelissier 1968) and for irrigation cooperatives in Greece (Bergmann 1984). Essentially the same can be said for the Land Improvement Districts in Japan (Okamoto et al 1985; Kimura 1977; Kelly 1982). Irrigation Associations in

Taiwan follow a similar pattern (Bottrall 1978b; Abel 1976), although there may be more direct government supervision and control of activities than in the cases of the countries mentioned previously. The situation in Korea is similar to that in Taiwan, with financially autonomous Farmland Improvement Associations responsible for operating the irrigation facilities, but under fairly close supervision through the provincial governments and the Ministry of Agriculture and Forestry.

Centralized irrigation agencies may also be financially autonomous, although this appears to be relatively uncommon. The most notable example occurs in the Philippines, where a semi-governmental corporation, the National Irrigation Administration (NIA), is responsible for the construction and operation of National Irrigation Systems throughout the country. Although the NIA has in the past received substantial funding through government subscription of capital, it is increasingly being forced to conduct its operations within the budget constraints of the revenues which it can earn from its corporate activities.

Financially autonomous irrigation organizations generally impose direct charges on the water users for the O&M services provided. A component of the charge may also reflect the capital cost of the initial construction. In most situations, a major portion of the capital cost is paid for by the central government, based on general policies toward irrigation development. For example, in Korea the central government has a set of policies that involve specified rates of subsidy of irrigation construction costs. As a result of these policies, the contribution of the irrigation organizations to the overall capital cost of irrigation is small; however, the structure of the irrigation service fees paid by the water users is such that it is clear that the organizations are acquiring ownership rights in the irrigation system.

In addition to relying on direct charges on water users, financially autonomous irrigation organizations frequently have access to secondary income which can be used to help finance irrigation activities. For example, irrigation districts in China may undertake sideline economic activities which generate income that is then used to finance irrigation services (Nickum 1982, p.4). Some irrigation associations in Taiwan located in urbanizing areas have found that the conversion of previously irrigated land into non agricultural urban uses has made some of the existing irrigation canals unnecessary. These associations have been able to sell the land on which these canals were located, and to use the proceeds to finance the cost of irrigation services (Taichung Irrigation Association, personal communication, 1985). In the Philippines, part of the funds used to finance O&M activities of the National Irrigation Administration (NIA) have come from income from secondary sources of income including equipment rental, interest on construction funds received but not yet spent, and a management fee which NIA charges for its management of the construction of new irrigation projects. In Korea, secondary income from interest earnings, sale of water for non-irrigation purposes, and rental of assets provides, on the average, about one-fourth of the total income of the irrigation associations. In the United States, the formation of water users' organizations was encouraged by governmental policy that gave to the associations the rights to certain types

of secondary income, such as the revenues from grazing permits, and revenues from the sale of power generated by hydropower facilities associated with irrigation reservoirs (Thompson 1985). In Indonesia, some water users' organizations have the rights to income from specified parcels of land. Officials of the organization are allowed to cultivate these parcels and retain the income from them as compensation for their services, in lieu of direct payment by the water users.

One of the potential advantages of financial autonomy is that it may create financial accountability linkages between the managers of irrigation projects and the users of irrigation water. It is reported, for example, that irrigation districts in China, unlike most economic enterprises in the state sector, are not over-staffed. The reason given for this is that the arrangement whereby the revenue of the district comes from the water users provides an incentive to limit the number of personnel (Nickum 1982, p 22). There is also some evidence that water users in China use the threat of non-payment of water fees as a means of leverage over management (Nickum 1982, p 38).

It seems quite clear that the increased financial autonomy of the National Irrigation Administration has been a driving force in modifications of the financial procedures for operation and maintenance of irrigation projects in the Philippines. In particular, much more attention is now given to fee collection from water users than was the case in the past, and efforts have been undertaken to establish systems of incentives to increase the rates of fee collection. Efforts have also been made to improve the quality of the irrigation services provided to the farmers, as a means of enhancing their willingness to pay their irrigation service fees. Although difficult to quantify, it is likely that these responses of NIA to its increased financial autonomy have increased its efficiency in the management of irrigation systems.

### Conclusions

Policies for financing irrigation services can affect on the management and performance of irrigation systems. More important than the specific nature of the financing mechanisms used are the institutional arrangements establishing responsibility for the four key processes of allocating resources to irrigation, implementing irrigation services, collecting resources from beneficiaries, and controlling the resources collected. If a financing mechanism is to improve system performance through encouraging better management, a degree of financial autonomy is needed to link the provision of the irrigation services with the collection of and control over resources from the water users. Likewise, if a financing mechanism is to improve system performance by encouraging the active cooperation and involvement of the water users in O&M, the mechanism must give the farmers a sense of ownership of the irrigation system by giving the water users a clearly defined and accepted financial responsibility for a portion of the capital costs. This implies both an institutional context of financial autonomy, and the involvement of the potential water users in the planning and decision-making process prior to the construction of the project.

In the absence of any significant degree of financial autonomy for the agencies that provide the irrigation services, mechanisms obtaining resources from the water users may be justified on fiscal or income distribution grounds; however, it is unlikely that they will have any significant positive effect on irrigation performance.



Figure 1. Schematic Representation of Four Key Processes of Irrigation Financing

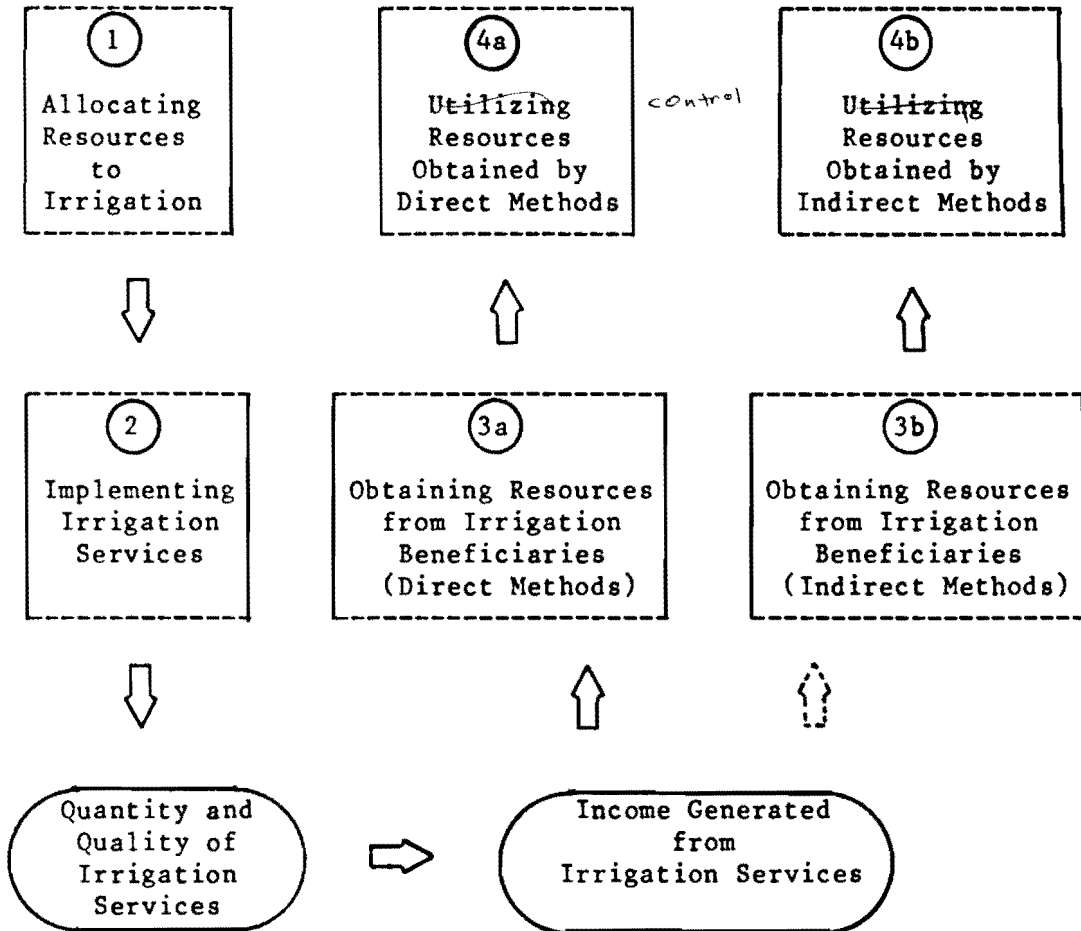
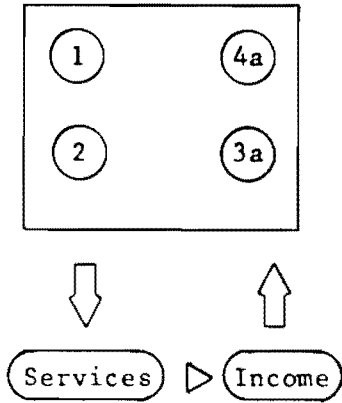
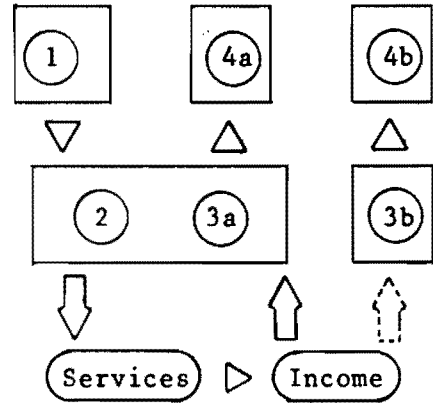


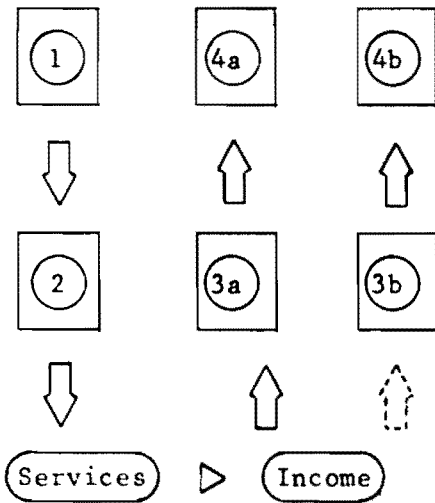
Figure 2. Alternative Models of Organizational Responsibility for Key Processes of Irrigation Financing



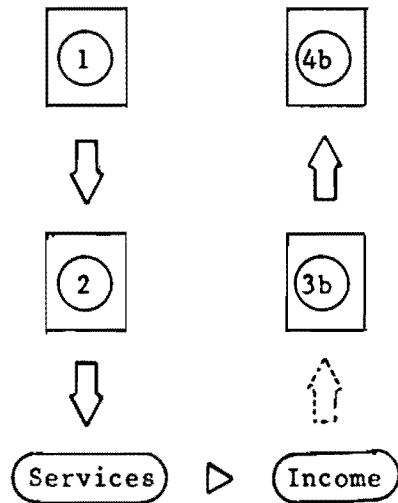
(a) Model 1.



(b) Model 2.



(c) Model 3.



(d) Model 4.

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