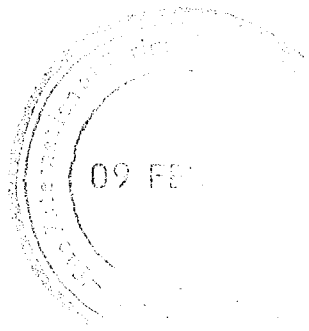
Irrigation Management in Sudan



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CHAPTER 1

Privatization of Irrigation Operation

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INTRODUCTION

In many countries where the irrigation sector is substantial, governments have been trying, since the early 1980s, to change the relationship between the farmers and the government bodies which have hitherto organized and operated most aspects of irrigation services.

The motivation of this process is not the same in every country, and in most cases there are a number of reasons why it is being undertaken. However, in the great majority of cases a primary characteristic of the change is that more responsibilities should be accepted by the users of the irrigation facilities, and therefore, that fewer responsibilities will be retained by government organizations.

Privatization is one such policy. It has not yet been applied (to irrigation) in many countries, so we do not yet have many models of successful implementation. There are many possible levels or degrees of privatization, and the term is not easy to define. In general, it means a policy that transfers the majority of decision making into the hands of a nongovernment organization, and that provides few guarantees of subsequent financial support from the government to this organization.

Less drastic transfers policies, under which the areas retained by the government are still quite significant, are usually called "turnover." There are at present more examples of these than of full privatization.

In developing policies for privatization or for turnover it is necessary to formulate a view of the ultimate governance and organizational arrangements that are desired, and then to plan a process (perhaps lasting several years) through which those arrangements will be brought into existence.

In planning this process, it is essential to ensure that the interests of all groups of people who will be significantly affected by the proposed changes are expressed and taken into account. Failure to do this may be the most common case of failure of transfer programs, because resistance by the affected groups may prove too strong to be overcome.

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Stakeholders

Privatization cannot be easily imposed. Since it requires that groups of farmers accept tasks, responsibilities and relationships that they do not have at present, those people must be involved from the beginning in the formulation of the plans. This must be a genuine involvement, not just a passive role in which they are merely informed about the government's plans for them: if they are to make it succeed, they must have some capacity to influence the shaping of the plans.

Many other groups, as well as the farmers will be affected by the outcome of the process, and, if they are not sufficiently consulted, they may not devote their necessary efforts to making it work. One such group is the staff employed in the existing managing agency or agencies, who may well feel anxious about the possible effects of the plans upon their status.

A necessary step in preparing for a privatization program is, therefore, to identify all major groups of stakeholders (people whose lives and interests will be significantly affected by the changes envisaged) and seek ways of involving all of these groups into the planning process.

Since these various groups do not have the same goals, the process should be regarded as a negotiation, in which each group can expect to get some, but not all, of what they seek. In this respect, the government should be regarded not as a neutral facilitator of the process, but as one of the interested stakeholder groups, seeking to achieve as much as it can of its own specific set of objectives.

Objectives

There are many reasons why privatization or turnover policies may be adopted by governments. Some of these reasons will probably not seem attractive to other participants in the process.

For example, the objective of reducing government expenditure on irrigation may be endorsed at the policymaking level, but it is not likely that this will be a goal desired by the systems' users. Nor will it usually appeal strongly to middle and lower levels in the existing organization.

Such objections may be dealt with by adopting multiple objectives that give some degree of satisfaction to each stakeholder group. Often, this seems to involve combining the privatization program with some physical improvement or rehabilitation scheme. This has the disadvantage (to the government) that it requires an initial increase of spending.

In other cases, the argument may be made that farmers will obtain benefits such as improved equity or reliability of service as a direct consequence of the change of governance system arrangements. This argument may not seem very convincing to farmers unless there is evidence to demonstrate its validity; so this course of action is more likely to work if it is led by a pilot project.

The above simple examples show how the objectives of different groups have to interact and how some groups will usually have positive reasons for wishing to frustrate or at least to reduce the aims of other groups. Because of this characteristic aspect of the process it is probably better to seek agreement at an early stage about the broad objectives of the process, among all the affected stakeholders.

At least, it seems essential that government organizations entering upon transfer programs should have a clear understanding of why it is being done, and what benefits and results are wanted. If these aims are not sufficiently clear, then it seems that it will be difficult to sustain the momentum of a transfer program through the quite long period of time that is required for its implementation.

Scope of Privatization

The question of exactly what it is that should be privatized gives wide room for negotiation. It has several dimensions, especially:

(a) which irrigation facilities should be put into the control of the new organization?

(b) what range of irrigation activities should it take over?

(c) what should be its scale? (In particular, should irrigation systems that are single units from a hydraulic point of view be subdivided in order to suit the assumed management capacities of the new owners/operators?)

(d) should the change of governance be restricted to the irrigation services, or should it include also ancillary government-assisted services that are necessary to the success of irrigated agriculture, such as crop protection, marketing, crop processing, and others?

The answers to each of these questions must be specific to the conditions of the local society as well as to the physical system conditions.

In most countries where turnover programs are under development, there is a tendency to apply them first to rather small systems. There are probably several reasons for this: it is possible to try out a number of alternative modes and find out which works better; farmers may not have the management skills to deal with larger units; it is easier to overcome resistances to the policy; the new farmers' organizations which will run the systems may be expected to be more cohesive; it is easier to adapt or even abandon the policy if it is found not to work.

Recipient Organizations

Privatization, or turnover, involves the transfer of control from government to some kind of nongovernmental organization. This may be a new organization, or something that has existed previously.

In most cases, planning is based on the presumption that the organization will be, in some way, representative of the existing set of farmers who are already users of the system. This is not the only possibility, and in some countries ways of bringing in urban capital, or bringing back the new financial resources of emigrant workers, are being explored. However, at present, the "farmers' organization" seems to be the standard model.

These organizations, in most countries, have only a very brief or negligible past history and " track record." Even in countries where the traditional farmer-managed irrigation sector is long-established and strong, there exists state-managed sectors. Therefore, the organizations that are eventually expected to become the recipients of the privatization transfer may have to be created for that purpose.

Many difficult questions have to be resolved in this phase, and the way they are resolved probably has great impact upon the subsequent success or failure of the enterprise. Such questions include the legal status of the organization; how membership in it is determined; whether membership is voluntary or automatic; how it will choose (and when necessary dismiss) its officers; how it will finance itself; and so on.

Much of the early impetus toward turnover occurred in places such as Southeast Asia where the size of landholdings is quite small, so the membership of the association could initially be equated to those holding land within the system boundaries. In places where the land-people ratio is much higher (such as Pakistan or Sudan) there may be large numbers of people who are not landholders, but whose interests in the success of the system are nevertheless very great. It is probably necessary that ways be found for accommodating these interests in the new organizations.

The Transfer Process

The fact that new organizations often have to be created, as recipients of the transfer of authority, means that there must be uncertainties about the eventual performance and sustainability of the organizations. An unusual response to those uncertainties is to develop some sort of staged plan for the whole operation, under which each successive stage may have to demonstrate a certain level of achievement, before the

next stage is initiated. This phased approach has been developed methodically in the Philippine turnover program.

A possible disadvantage of such phased programs (from the government viewpoint) may be that they take a long time, and afford numerous opportunities for groups that are hostile to the policy to intervene for delay or reversal of the policy. Others may say that the time spent is well-justified, if it ensures a more widely supported and, therefore, sustainable result.

A major requirement of a prolonged program is the maintaining of political support for the operation.

Residual Role of the Government

Privatization and turnover are processes in which a new relationship between farmers and the government is established. The revised role of the government needs to be given just as much attention, in the planning stages, as the role of the farmers.

Even in full privatization, it is not to be expected that the government hands over all of its functions. It will normally wish to keep an interest in certain areas, such as:

i. water allocation.

ii. effluent pollution.

iii. reserve powers that may enable it to recover control if the new organizations are unsuccessful.

iv. provision of some support services like research and technical advice.

In the more usual cases of partial transfer or turnover, various kinds of arrangement can be devised under which the government irrigation agency continues to provide the essential technical service of operating the main water delivery facilities. In the end, such arrangements usually aim to establish a contractual relationship, according to which the technical agency provides agreed services, and the users' organization gradually develops a capacity to pay the costs of those services, subject to their satisfactory performance.

From the farmers' point of view, the main interest will probably be financial. Their organizations will wish to maximize the amount of financial support that they can secure from the government, and for as long as possible. Governments may try to link their inputs to some kind of performance indicators, in

order to motivate the new organizations. However, the problem of what the governments should do about unsuccessful organizations is a particularly difficult one, and does not appear to have been answered yet.

Ultimately, if transfer programs progress well, the character of the government irrigation agencies must change radically. They would eventually cease to be operating organizations, and instead would develop the features of regulatory agencies, whose main concern would be to set rules and standards and ensure that the new operating organizations comply with those standards, on matters like water abstraction, effluent quality, environment and public health, and perhaps on areas such as land tenure, organizational membership, and financial behavior.

That stage seems at present quite far off. However, it seems clear that, from an early stage of the transfer process, the agencies should start to improve and develop their monitoring competence. As the transfer proceeds, there will inevitably be many requirements for performance information, including comparisons between the performances of different organizations, and evidence about the trends of performance over time in each system.

The development of these regulatory functions is, of course, valuable in itself. An important secondary benefit may be to convince staff of the agencies that there will be some continuing role for them in the new arrangements.

CHAPTER 2

Transition of Self-Managing Irrigation Institutions in Developing Countries

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MANAGEMENT PERFORMANCE AND INSTITUTIONS

The Problem Management Turnover is Meant to Address

Poor Management Performance. THERE ARE ABOUT 220 million hectares (ha) of irrigated land in the world. This represents about 18 percent of the total cultivated land. But this land produces about 33 percent of the world's total harvest (Repetto 1986, p.3). About 158 million ha of irrigated land (72 percent of the world's total) are located in less-developed countries. In recent years, roughly US$10 to 15 billion has been spent per year on irrigation development in the Third World. One study on Asia (where two-thirds of the world's irrigation is) has projected that 38 percent of the needed increase in food production would have to come from existing irrigated areas and 36 percent from new irrigated areas (op cit. p.3).

Given the importance of irrigation for the world's food supply and the vast resources expended on irrigation development, it is tragic that the actual performance of irrigation systems has been so disappointingly low. This is largely due to faulty design and construction, poorly managed operations and inadequate maintenance. (Carruthers 1983; Bottrall 1981;). Frequently, the actual area irrigated is a fraction of the design area. Water is wasted in the upper parts of systems and is rarely available in the lower - end sections. Water deliveries are often untimely and unreliable. Canals and gates, whether built properly or not, are allowed to fall into disrepair. In general, only about 25 to 30 percent of water diverted into large canal systems in developing countries reaches the crops needing it (Rangeley 1985).

Irrigation performance has generally remained relatively poor -- after widespread and repeated physical improvements, extensive training efforts and attempts to elicit farmer participation. This indicates that something else is more fundamentally constraining its effective management. More attention should be given to turning to the nature of the managing organizations themselves, and in particular to the

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question of "what are the institutional incentives to manage in such a way as to achieve good performance, however, defined?"

Management Turnover as a Solution

By the late 1980s, the emphasis on "farmer participation" shifted in many countries to a different and more thoroughgoing approach -- which is the turnover of primary management authority itself to water users' associations or other nongovernmental institutions. In response to poor management performance, financial pressures, increasing agricultural diversification and commercialization and increasing numbers of rural nongovernmental institutions, many governments in developing countries are privatizing irrigation institutions and turning over their management to water users' organizations, or other nongovernmental institutions.

What is it? By the term, *irrigation management turnover,* we mean the contraction of the government's role in irrigation management and the corresponding expansion of the role of water users and other private-sector institutions in irrigation management. This includes various types of institutional changes involving greater private-sector control, authority, responsibility, resource mobilization and profit-sharing in the management of irrigation. Management turnover does not necessarily mean the total withdrawal of the government from all activities. It can be selective, in accordance with local management contexts. By the term, *privatization,* we mean the transition from governmental to private-sector ownership of irrigation system assets. Worldwide, there is considerable diversity in the kinds of private-sector irrigation management models and in methods for transferring management. By *self-management,* we mean the implementing or direct supervising of operations, maintenance and system improvement functions by an institution whose jurisdiction and membership are based on local "hydro-management" boundaries (such as a common water source or diversion). Through management turnover or privatization, many governments are pursuing the objectives of: 1) improving the management performance and sustainability of irrigation systems, 2) reducing government costs for O&M and 3) reallocating scarce revenues to more technical or more inherently governmental purposes (such as regulating water use along river basins). However, management turnover and privatization policies are normally driven by two assumptions: 1) that farmers are financially and organizationally ready to assume ownership and/or management and 2) that management turnover will improve the performance and sustainability of irrigation systems. Both assumptions are crucial. But they are largely undocumented.

Why should self-management improve irrigation performance?

Repetto (ibid, p.7) notes that:

> *The dynamism of private irrigation is instructive... because it illustrates how successful a different kind of irrigation service can be. Since farmers can control water availability with little risk of supply shortages at critical growing periods, and then apply water to optimize farm income, agricultural yields under private irrigation are larger than under public canal or tubewell irrigation.*

The main argument for turning over irrigation management to self-managed or private-sector organizations, such as water users' associations, is that nongovernmental institutions tend to have the proper structure of incentives to manage according to performance criteria. The argument is as follows:

> *Nongovernmental irrigation management institutions are forced to be locally self-sustaining. Their organizational survival depends on financial viability. Viability can only be achieved by recovering O&M costs from the users or beneficiaries. The ability to recover O&M costs from beneficiaries is directly related to the productivity of irrigated agriculture. The users have a personal interest in ensuring the long-term productivity of their irrigated agriculture. This is ensured through good O&M management performance.*

The turnover of irrigation management is an attempt to both economize on government budgets and to achieve more productive and sustainable irrigated agriculture through local control and enterprise. Due to its widespread occurrence and implications, turnover may shape the nature and performance of irrigation management more profoundly over the coming few decades than any other innovation in irrigation. In reversal of the effects of bureaucratization on local resource management institutions (somewhat analogous to loss of genetic diversity through biotechnology), it may help reopen the path toward institutional diversification through local adaptation.

In addition to its potential benefits for O&M efficiency, turnover to self- management may provide an approach to improving equity and capital investment efficiency. Because turnover shifts the role for setting objectives and priorities to the users, it may help establish social legitimacy for irrigation fees and a shared understanding of the need for equitable contributions from all users. It can also help engender an understanding that the costs of O&M are not the only costs involved in an irrigation system. The costs associated with capital investment, such as system improvement and rehabilitation, are also important management responsibilities.

In a number of countries it is gradually being recognized that increased productivity is not a sufficient measure of success. And there is often a danger that increased production will be sought through expensive investment in infrastructure rehabilitation or replacement, at an overall net cost both to those who must bear the cost and to the national economy. As observed above, government agencies sometimes seek to improve performance through construction or rehabilitation rather than through effective maintenance, in a context of separated budgetary arrangements for recurrent and capital expenditure. Hence, there is no planning on the basis of optimal trade-offs between the two.

It is possible that turnover could constitute a creative solution to this issue. If farmers can come to accept responsibility not only for O&M but also for at least a share of the cost of capital/investment, then a climate of incentives can be provided to make rational decisions on the efficiency of capital investment and the optimum balance between that and O&M.

It does not follow that the observed poor management in the public sector proves that the private sector will do better. The argument for turnover may be compelling and preliminary indications of results justify optimism. But we do not mean to imply that management turnover should be accepted *a priori* as a solution for most management problems. Nor does IIMI intend to take an advocacy position for it (at least not until much more is known about it). Like any other management innovation, it must be evaluated on the basis of its actual effects on performance. Turnover can be justified if and only if it supports:

1. sustainable economic viability at the farm level,
2. sustainable performance at the system level, and
3. overall net benefit at the national level, measured so as to include increased levels and equity of rural income and greater efficiency in the use of government resources, including the cost of capital.

Institutional challenges for irrigation. Experiences in privatizing management in sectors other than irrigation can provide some lessons for irrigation. However, we are limited in our ability to translate methods used from other economic sectors into irrigation management. Irrigation management differs from other sectors according to its own characteristics. These characteristics together tend to make nongovernmental management more challenging in irrigation than in many other sectors. They require new solutions not directly translatable from other sectors. While such organizational challenges exist in other sectors, it is their relative importance and overall configuration that are characteristics of irrigation. Some of these key features are listed below.

1. Irrigation has extensive and varied kinds of *externalities* (salinity, waterlogging, inequity) which originate from group and individual actions.

2. While the demand for amounts and timing of water deliveries normally varies by individual, it is often *difficult or impossible to measure and assign charges for deliveries* at the individual level (unlike electricity or municipal water supply). Water often flows between fields. Farmers often use more than one water source. More often than not, in the developing countries, the "transaction cost" of measuring and pricing water deliveries would exceed the benefits, even if the technical and practical constraints could be overcome.

3. Irrigation involves a profound managerial challenge of matching complex demands for water with constraints in supply and delivery. This often makes it difficult to define and achieve equity. To be effective, *matching variable demands and supplies* generally requires some amount of local control and collective information use.

4. Maintenance problems frequently have unequal and indirect effects on water users. The *link between payer and beneficiary is vague* where irrigation fees are not based on real needs at the system level. The ability to collect fees and maintain systems properly may be difficult where farmers do not help set maintenance priorities. And it is often difficult to exclude free riders from O&M services.

5. Irrigation often has extensive indirect and variable forms of *subsidization and taxation* by governments, markets, and powerful interests.

6. Irrigation systems often approximate *natural monopolies,* where only one organization at a time can deliver operational or maintenance services.

7. In many environments the *economic value of irrigation water* is low enough to constrain the range of viable management alternatives (Young 1985).

8. Poorly developed land tenure, water rights, regulatory supports and *nongovernmental management institutions* often constrain private-sector alternatives (Woodhouse and Ndiaye 1990).

9. *Resistant bureaucracies* lack incentives to reorient themselves for turnover and for post-turnover roles (Wolf 1991).

Such constraints, however, do not make management turnover or local self-management impossible. But they do require considerable political will power (including strong support from planning and finance ministries). They also require effective regulation and/or competition in service delivery, clarity about water rights, legally sound and socially viable local managing organizations and supportive incentives for agencies and local organizations.

EXPERIENCES WITH MANAGEMENT TURNOVER IN DEVELOPING COUNTRIES

Examples in Asia

Water users' associations in Japan, South Korea and Taiwan often have considerable political strength and elaborate rules and procedures. They are among those who achieve the highest rice yields in the world. Such associations often act as bodies which commission third parties to handle management tasks. There are systems in China where farmers' organizations sponsor auctions to award irrigation management contracts to private parties (Svendsen 1990; Svendsen and Liu C. 1990).

In the Kakrapar Irrigation System in Gujarat State, India, the Mohini Water Distribution Cooperative Society reportedly manages effectively a large distributary canal. The Cooperative Society purchases water on a volumetric basis from the Irrigation Department and manages the distributary and tertiary canals (Datye and Patil 1987).

A study comparing private tubewell irrigation with government tubewell and canal irrigation in Uttar Pradesh, India, found that cropping intensities, irrigated crop yields and agricultural income of farmers were significantly lower in the public tubewell and canal irrigation systems than in the private tubewell systems. In the government systems, farmers generally complained of unreliable and inadequate deliveries of irrigation water. The overall average for food grain yields in India is about two to three tons per hectare in public canal-irrigated areas. This can be contrasted to about five to six tons per hectare generally attained in private tubewell irrigation systems (Dhawan 1985; Repetto 1986:5).

Another recent study comparing public and private tubewell irrigation found that public tubewell irrigation in India scores poorly in terms of survival of pumps continuing to function, actual versus planned area irrigated, hours operated, financial viability, and access of resource-poor farmers to water (Chambers et al. 1989). Chambers et al. note that over 95 percent of the area irrigated in India by tubewells is served by private tubewells. They attribute a large part of the problem on public tubewells to lack of accountability of the public operator to the users. They conclude that "the poor performance of public tubewells presents such strongly interlocking weaknesses that we doubt if they will emerge as an effective large-scale means of supplying water to resource-poor farmers" (ibid. 88-89).

In 1982, the Philippines cut off government funding for National Irrigation Systems operated and maintained by the National Irrigation Administration (NIA). Since then NIA has accelerated its institutional efforts to create water users' associations and raise the collection rates of water service charges. NIA staff generally acknowledges that the best way to improve the collection rate (which is about 50 to 55 percent nationwide) is to either improve the management of irrigation according to the farmers' objectives or to turn over full management to water users' associations. It is generally considered that a 65- or 70-percent fee collection rate would enable NIA to be financially self-sustainable.

The Philippine model of turnover proceeds in three stages, going from user charges, to devolution of tasks, to NIA withdrawal at the distributary or system level. In stage one, NIA contracts with users' associations for the management of O&M, while NIA manages the diversion or pump and collects the fee. In stage two, the users' associations still receive contracts for O&M management but they also handle collection of the fee and receive a greater share of the proceeds. In stage three the users' associations take over full management and receive all fees collected. Institutional organizers from NIA, from nongovernment organizations (NGOs) and from farmers' groups themselves have been used in the turnover process. Despite reports of successful cases of turnover (Bautista 1987; Gonzales 1991), few systems in the Philippines have moved to full turnover. So far, there is little systematic evidence about the effects of turnover or about why full turnover has not been more widespread in the Philippines.

In 1988, the Government of Indonesia embarked on a 15-year program to turn over full management to water users for all of its public irrigation systems below 500 hectares in size. This constitutes 70 percent of all government systems in Indonesia. Trained agency staff are being used as institutional organizers. Repairs are made in the systems according to farmer priorities prior to management "turnover." The government is also introducing, for the first time, an irrigation service fee to recover costs of irrigation operations and maintenance for the main and distributary levels of its public systems. These structural adjustments are part of World Bank and Asian Development Bank irrigation sub-sector loan programs.

In Sri Lanka, the government is extending management turnover from pilot areas to distributaries of large-scale systems throughout the country.

Financial pressures and the recognition of the potential for effective farmer management have led to the adoption of this policy, which includes the formation and development of water users' associations, transfer of O&M responsibilities to users' associations and the development of a new division of responsibilities between the government and the farmers in irrigation systems. USAID, the Asian Development Bank and the World Bank have been assisting, or are planning to assist Sri Lanka with institutional and policy aspects of management turnover. In Nepal, the government wants to expand the role of farmer management of agency systems, turning over partial management of these systems. USAID and the Asian Development Bank are also involved with this "joint-management" strategy in Nepal.

During the 1980s the Government of Bangladesh has taken a series of actions to deregulate and "privatize" the distribution and purchasing of irrigation pumps and related supplies. It is selling off its public tubewells and withdrawing from both the providing of pumps and management of tubewell irrigation. The well-known Grameen Bank is purchasing and managing some of the public tubewells. Some are being sold on credit to landless farmers' or women's groups, who then manage pump operations. The Asian Development Bank and other donors have assisted the government in aspects of the privatization of public tubewell irrigation in Bangladesh. There is some concern that the privatization of tubewell irrigation in Bangladesh may lead to greater concentration of power and access to irrigated land among elites. The privatization of public tubewells and transfer of management to local groups are also on the policy agenda in Pakistan (Chaudhry and Young 1988).

Examples in Africa

As of January 1991, the Government of Nigeria "commercialized" its River Basin Development Authorities (RBDAs), which manage the approximately 100,000 hectares of large-scale irrigation systems in northern Nigeria. Federal government funding has been cut off and they must now become self-financing. The recovery rate of water charges in large-scale irrigation systems in the more successful schemes in northern Nigeria is running at roughly 50 percent. The RBDAs are currently seeking ways to expand the role of farmer management and to increase the fee collection rates in these systems. The recent increased profitability of irrigated agriculture due to import restrictions may support the move toward expanding the role of farmers in managing these systems. The government is also supporting the expansion of private-sector pump irrigation management in the *fadama* sector (low-lying areas with flood recession or residual moisture), which already serves approximately 800,000 hectares (IIMI 1990).

In 1984, the Government of Senegal initiated a policy of "disengagement" of the State Agency for Senegal River Basin Irrigated Agriculture (SAED). SAED is withdrawing from irrigation management and the providing of agricultural inputs. Irrigators' Associations and their higher-level federations are being created and are already taking over functions of water management within and between the river lift pump schemes. In its recent five-year plan (1984-89), SAED has been withdrawing from the provision of credit, inputs and marketing and from the operation and maintenance of rice mills, agricultural machinery and irrigation in large-scale "perimeters." There have been reports of both successes and failures in various areas along the Senegal River Valley, with poor maintenance of canals cited as an early problem in the process (Woodhouse and Ndiaye 1990). There is also concern about the possible negative effects of the disengagement on the ability of the poor and those with insecure land tenure to secure access to water and land.

In Madagascar, which has 1.2 million hectares in irrigation schemes, a 15-year program was initiated in 1986 for the rehabilitation and management turnover of systems from 100 to 3,000 hectares in size. The program involves the creation of water users' associations and turning over of full responsibility for O&M in these systems. As an incentive for farmers to take over management, the government offers to rehabilitate the systems, or distributary canals, if the farmers agree to finance or directly manage O&M. As of 1990, of the 380 small-scale schemes eligible for turnover under the program, farmers have already agreed to the terms for rehabilitation (i.e., O&M sponsorship) in 187 of them. Of these, 176 systems, or 8,000 hectares, have been "inventoried" (for identifying development needs) and 29 systems are under implementation.

Under the program, the water charge collection rates have gone up from 16 to 20 percent before the program to about 65 percent in 1990. In the larger systems, the associations manage distributary canals while federations of associations oversee management of the primary canals (Nguyen 1990). The World Bank has provided financial and technical assistance to the turnover program in Madagascar. Elsewhere in several parts of Africa, there are signs that privately managed irrigation is showing better performance than government-managed systems, especially for small-scale irrigation (Barghouti and Le Moigne 1990).

Examples in Latin America

Latin America has had longer experience with transferring irrigation management to the private sector than has Asia or Africa. But until recently, much of it has been in pilot areas rather than nationwide (Plusquellec 1990). Mexico started a program in 1988 to transfer management of its 77 irrigation districts (3.2 million ha) from the government to water users' associations (WUAs) for lateral canals or sets of laterals. This includes the creation of federations of WUAs at the main system level. The transfer program is currently being implemented in four pilot districts. Implementation is expected to spread to 20 districts in 1991 and to all 77 districts within 5 to 10 years. Irrigation districts manage systems which exceed 1,500 ha in area. Systems smaller than this are already managed by the water users (Velez 1990).

In the 1970s, a few public irrigation systems in Colombia were converted to management by WUAs. The process was accelerated in the 1980s, becoming a national program by the end of the decade. Uniform accounting procedures establish rate costs per O&M task for all agency systems. Water charges are set on the basis of actual total system-level costs. In 1989, three irrigation districts (totalling 17,850 ha) were "taken over" at the request of farmers' organizations because they felt they could manage the systems more cheaply than the government was doing at the prior level of charges. Such calculated group decisions behind farmer takeovers are only possible where water charges are based on open

information about the actual costs of O&M at the system level. As Savas (1987) has noted, the real value of user charges is not to raise revenue, but to "reveal fully the true cost of service." (ibid. p.248). In Colombia, heavy emphasis is given to training farmer water association leaders. There are early signs of successful results in some locations (Plusquellec 1989).

The rehabilitation and turnover of management in project schemes in the Dominican Republic have shown encouraging early results. It is reported that turnover of management from the public agency to locally empowered water users' associations has, in general: 1) reversed negative environmental degradation due to salinization, waterlogging and declining land productivity; 2) increased the total area under irrigation; and 3) improved the equity of irrigation and its benefits, regardless of size or location of fields within the systems (Hanrahan et al. 1990). Both the World Bank, the Inter-American Bank and USAID have been key donors that have assisted several Latin American countries with irrigation management turnover initiatives.

A FRAMEWORK FOR COMPARATIVE ASSESSMENT OF THE TRANSITION TO SELF-MANAGEMENT

We suggest that an assessment of irrigation turnover and self-management should consist of the following four components:

Identifying basic physical and social characteristics of the resource. This concerns key physical and social uses of the resource which constrain the range of feasible and appropriate institutional alternatives for self- management. These resource characteristics relate primarily to how irrigation water is, and should be (according to policy) acquired, used and measured.

Describing the relationship between management functions and institutional arrangements. This component enables us to analyze which types of organizations perform which management functions, and under what sets of rules and incentives. This will be done to help build a typology of institutional alternatives for full or partially self-managed irrigation.

Assessing institutional performance. Self-managed irrigation will be assessed according to institutional and management performance criteria, including both management outcomes and impacts.

Hypotheses about the transition to self-management. Criteria or working hypotheses are posed and used to guide analysis about essential conditions conducive to the development of effective self-managed

irrigation institutions. They are based on the current state of knowledge about institutional development in irrigation and provide a conceptual framework for explaining the emergence of turnover and self-management and the realization of positive or negative results. They will be further developed during the program.

The first component enables us to define the social purposes and basic physio-technical constraints imposed in a given irrigation environment. The second component provides a framework for specifying the relationship between management functions, types of organizations, and institutional rules and incentives. The third component is the assessment of how well organizations are managed and what their impacts are, either before or after turnover to self-management. The fourth component is the analysis of why some turnover processes or self-managed institutions perform well and others do not.

Basic Physical and Social Characteristics of the Resource

Based on the literature about collective action and natural resource management, we assume that efforts to develop effective and locally sustainable institutions should begin from a clear understanding about the physio-technical nature of the resource, its social uses, and proprietary rights related thereto (Ostrom 1990a). Water becomes a "resource" when social purposes are attached to it. It becomes a form of property when social rights of access and use are attached to it (Furubotn and Pejovich 1972; Coward 1985a). It is at the convergence of the physio-technical and human purposive characteristics of resources that institutions are forged (Ostrom 1990b; Coward 1985b). Hence, when we refer to the nature of the "resource," we refer not to physical attributes per se, but to aspects related to the resource's social uses.

Basic institutional forms for resource management are fundamentally shaped by three characteristics of the resource. These are: 1) whether access to the resource can be excluded or proscribed, 2) whether the resource is consumed individually or jointly, and 3) whether resource use can be measured, either at individual or group levels. By answering the questions of exclusivity of access and singularity of consumption, we can designate whether a resource is a private good, a toll good, a common pool, or a collective good (Savas 1987, chap. 3).

If a resource is consumed individually and it is possible to exclude some people (such as non-payers) from access to the resource, then it is considered a "private good." An example of this is water purchased from vendors in bottles or storage drums ( ). If a resource is consumed individually but it is not possible to exclude unauthorized access to it, it is called a common pool good. An example of this is an underground aquifer where there is extensive use of small, private tubewells in a setting where effective regulation is not feasible.

If a resource is consumed jointly but it is still possible to exclude access to it, such as for non-payers or "free riders," then it is called a "toll good." An example of this might be tubewell or pipe irrigation for groups of farmers who buy into use rights. They use the pumped water together and exclude others from using it.

Figure 1. The nature of exclusion and consumption of water resources in different environments.

	Feasible	Exclusion	Infeasible common pool
Private goods	Bottled water	Groundwater at the level of underground aquifer	
Individual Consumption	Tubewell or pipe irrigation for individual fields		
	Surface irrigation at farm level (no return flow drainage)	Surface irrigation at farm level (return flow drainage)	
Joint	Tubewell of pipe irrigation for groups	Water from public well in town square	
Toll goods	Surface irrigation at canal level in tightly controllable settings. Return flow drainage	Surface irrigation at canal level in loosely controlled settings. Return flow drainage	Collective goods

Source: Savas 1987.

Perhaps, the most difficult situation for the development of the private-sector or local self-management of irrigation is when irrigation water becomes a "collective good," especially if the scale of resource access and use is large. Collective goods are inherently consumed jointly and exclusion of access to free riders is not feasible. More pure examples of this type of resource, outside the water sector, are the provision of a national defense, a lighthouse, or advertisements. An example of irrigation approximating a collective good would be where there is unrestricted access to flood recession land. A less extreme but more common example, would be at the level of a distributary canal in a loosely controlled surface irrigation system, especially where there is substantial reuse of drainage water by other farmers in the system. In this case, canal water is used jointly, often through syphoning or tapping directly from the canal, and it is reused by other farmers through drainage.

This shows that irrigation water could be either a private, a toll, a common pool or a collective good, depending on the nature of the local socio-technical setting. In fact, the nature of irrigation water as a social "good" may be different at different hydro-management levels of the same system. It may

social "good" may be different at different hydro-management levels of the same system. It may approximate a toll good at one level (such as at the point where it is purchased and supplied to a group on a volumetric basis) and become a common pool or collective good at another level (such as along a distributary canal). Which type of a good irrigation water resembles tends to determine (within broad parameters) how social or elaborate the resource management institution will need to be, and to what extent the public sector is likely to be involved in management or regulatory functions. Although diverse resource management settings produce a considerable variety of institutional forms and rules, there appears to be a tendency for greater government involvement in resource management the closer a resource approximates a common pool or collective good, especially where access and use are managed on a large scale (Savas 1987).

Whether and how resource use is measurable also has an effect on the type of institutional arrangements which are feasible for paying for and controlling the service. Forms of payment and allocation will differ according to whether water use can be measured, and if so, if it is done at the individual or group levels on a volumetric, area or seasonal basis. In many irrigation environments the effort and "transaction cost" that would be required to effectively measure and charge volumetrically for individual water use may exceed the potential benefit to be obtained from it (Young 1985). This may occur where there is substantial flow of water between fields, where there is use of local supplemental water sources, where there is reuse of drainage water, where illegal syphoning or tapping of water occurs frequently, or where functional measurement structures do not exist or would be too costly. In such cases, size of landholding, cropping intensity, or other
simpler bases for fee assessment levels can be used (Small and Carruthers forthcoming).

The problem of measurement is greatly simplified for pump irrigation, where fuel use becomes a surrogate measure for water use. In surface irrigation, the measurement problem can be dealt with at the group level. It is more practical for an agency to deliver and charge for a measurable volume of water to a distributary canal turnout than to individual fields. In the Philippines, water users' groups are assessed as a unit. They, in turn assess farmers individually for water use, often making adjustments on the basis of local knowledge about field-level water availability. As an incentive to collect fees, users' groups are given discounts or rebates for higher collection rates (Svendsen et al. 1990; Bautista 1987).

Measurability is likely to shape the nature of regulation and the extent of government involvement in setting fee levels, resolving conflicts, and limiting water use.

The characteristics of exclusion, consumption and measurability are determined by combinations of local, physical, technical and social factors. Drainage reuse patterns, irrigation infrastructure, control of water theft, or collective action of farmer groups are all potentially equal in importance in determining what type of good the irrigation resource may be in a given setting, and consequently what types of institutional arrangements will be feasible. This also implies that changes in the local socio-technical environment can

potentially transform a resource from one type of good to another, which in turn is likely to lead to pressures for other basic institutional changes.

In a comparative analysis of irrigation institutions, Ostrom (1990b) implies that the more collective the good, the more "social capital" (i.e., organizing and organizational investment) is likely to be required to craft effective institutions. This does not argue that there is a smaller range of institutional possibilities for common pool or collective goods. Instead, we posit that the range of institutional possibilities probably increases for common pool and collective goods because of the greater "social capital" or organizational investment required in order to integrate social and individual purposes. Diverse environmental factors, gradual trial-and-error experiments and negotiations lead to the emergence of site-specific institutional forms, which continue to evolve over time.

Management Functions and Institutions

Much of the discussion on turnover and private-sector management creates an image of either all private or all public. Some of the opposition to privatization arises from a misunderstanding that it necessarily means that all management functions and ownership are to be transferred to the private-sector. More opposition arises when it is assumed that prior functions ensuring public accountability will be lost to private interests. However, Savas (1987) has documented numerous examples where privatization programs turn over regulatory functions to private sector organizations while the government retains essential review and sanctioning authority. Such transfers usually lead to an increase in the efficiency and effectiveness of regulation, rather than the opposite.

In reality the proportion of irrigated land in the world which either has no government or no farmer investment in the systems is very small. Much of the concern with farmer-managed irrigation gravitates to a concern about government intervention strategies (IIMI and WECS 1987). The vast majority of surface irrigation involves a mixture of government and private management. Some responsibilities, such as regulatory oversight can be retained by the government. Locally self-managed organizations may opt to have specific operations or maintenance tasks to be performed by third parties. The challenge is to be as institutionally discerning and selective as the socio-technical purposes and capabilities require.

Hence, an analysis of institutions for self-managed irrigation must adopt a framework which admits a mixture of roles for governmental and nongovernmental organizations, but which nevertheless allows us to identify an overall expansion of the role of nongovernment or self-managing organizations in irrigation management and a corresponding contraction in the role of the government. And it must enable us to depict the functional and organizational situation before and after turnover. This requires a somewhat elaborate framework. But the complexity, diversity, and partial nature of self-managing arrangements

requires it. Table 1 below provides a matrix for analyzing which types of organizations perform which management functions, and at which levels of the system. The set of six basic management functions related to irrigation is listed below:

Producing the service. The actual implementation of operations, maintenance, and system improvement tasks.

Providing resources. The mobilization of resources to sponsor operations, maintenance and system improvement.

Commissioning the service. Identifying who will perform what services (i.e., O&M, system improvement) and under what terms, conditions, and standards of performance.

Regulating and auditing. The administrative granting and issuance of permits to water using entities in accordance with the above legal rights and responsibilities. Also, seeing that the legal rights and responsibilities are complied with, through inspection, performance assessment and application of sanctions.

Authorizing resource access and use. Legally defining basic rights and responsibilities for water access and use.

Owning facilities. The activities of purchasing, selling, paying taxes, inventorying, reporting to auditors, etc.

Functions one through five can be subdivided into the essential tasks of: 1) operations (i.e., the movement of water), 2) maintenance of structures, and 3) system improvement (i.e., rehabilitation and modernization). And these functions may be discharged by different organizations at different levels of the irrigation system. We can distinguish four "hydro-management" levels as follows: 1) water acquisition (such as at the weir or pump), 2) conveyance (such as through the main canal), 3) distribution (such as along distributary canals), and 4) application (such as between and within fields below a turnout).

Table 1. Organizations performing different management functions at different hydro-management levels of irrigation systems.

Functions		Hydro-management levels of irrigation systems			
		Acquisition	Conveyance	Distribution	Application
Producing the service	O	(Government)		(WUA)	
	M	(Government)		(Local contractor)	
	SI	(Government)		(Government)	
Providing resources	O				
	M				
	SI				
Commissioning the service	O				
	M				
	SI				
Regulating and Auditing	O				
	M				
	SI				
Authorizing Resource Access and Use	O				
	M				
	SI				
Owning System Facilities	O				
	M				
	SI				

O = Operations. M = Maintenance. SI = System Improvement.

Table 2 below lists a preliminary set of basic types of organizations which can be placed within the cells of Table 1, according to respective functions and hydro-management levels. These range from government legislative bodies to interpersonal networks. In many cases, the same organization may perform all three of the management tasks of operations, maintenance, and system improvement at the same level. In other cases, responsibility for different tasks may be given to separate entities. An example of this is shown, as an exemplary entry in Table 1, under the function of "producing the service." A water users' association conducts operations directly while it contracts out maintenance to another local group. System improvement is implemented by a government agency. At the level of water acquisition, which may be a weir, the government performs all three basic management tasks.

Table 2. Types of organizations potentially involved in irrigation management.

Type of organization	Example
1. *Government legislative body*	*Parliament, Provincial Council*
2. *Ministry*	*Water Resources, Finance, Planning*
3. *Government line agency*	*Irrigation Department*
4. *Semi-independent line agency*	*NIA (Philippines)*
5. *Government area development authority*	Command Area Development Authorities *(India) Sudan Gezira Board*
6. *Semi-independent area development agency*	*ORMVA (Morocco), Mahaweli Development Authority (Sri Lanka)*
7. *Agribusiness corporation*	*Agricultural Enterprises (Mozambique, Zimbabwe)*
8. *Non-local NGO*	*Grameen Bank (Bangladesh)*
9. *Private contractor*	*O&M Contractors (Hunan, China)*
10. *Irrigators' organization*	*Water Users' Associations*
11. *Interpersonal networks*	*Ad hoc or informal interactions between farmers*

Tables 1 and 2 provide a comparative framework for identifying what kind of organizations have the authority and/or responsibility to perform different management functions. A distinction is made between authority and responsibility for functions because of the often-observed situation where governments attempt to turn over responsibility for tasks but not the related decision-making authority. Besides its comparative utility, this kind of matrix can be useful in identifying the range of possible institutional options for different management functions. Turnover need not be all or none, but often will involve degrees of turnover or mixtures of types of institutions, even within the private sector.

Table 1 can also be used in another way -- to relate basic institutional rules and incentives to different functions. Rules and incentives provide the basic direction and "energy" for organizations to function according to their stated purposes. Identifying what rules and incentives exist, or do not exist, for different management functions will help us eventually to determine causes of success or failure of institutions to meet their performance objectives. A gate tender who receives no bonuses or no more intensive supervision during dry-season rotational irrigation has little incentive to control gate adjustments more intensively during the dry season than during the more relaxed wet season (unless of course "irregular" incentives exist).

Using the Philippines again as an example, NIA estimates that an irrigation service fee recovery rate of about 70 percent is generally needed in order for systems to be financially viable. The fact that the average recovery rate is about 55 percent, indicates that weaknesses exist in the current set of incentives or rules for farmers to pay the fees. The fact that water generally flows regardless of whether or not farmers follow the rule to pay the fee, the perception that the fee includes unnecessary overhead charges, and/or the perception that the O&M service is poor -- are indications of weaknesses in the system of rules and incentives. Turnover to complete local management would alter the rules and incentives (including perhaps lower fees and greater control over performance) and may create a more positive match between rules, incentives and performance objectives. However, existing rules and incentives related to NIA's own financial survival may militate against it giving widespread support for implementing full turnover.

So, in some cases, rules and incentives can be further introduced to bridge gaps between objectives and functional practices. When this gap cannot be bridged in this manner, however, pressures may need to come from higher levels in the government to bring about a realigning of organizations to take over the management functions. The challenge of how to gain enough bureaucratic support for turnover may be greater in some countries than the challenge of how to create effective local, self-managing institutions.

Institutional Performance

The performance of irrigation institutions can be assessed in terms of management outcomes and impacts. By *outcomes*, are accomplished or not we mean of implementation objectives and what levels of efficiency are achieved. *Impacts* are the indirect results or effects of the management activity on the human and physical environment.

We suggest the following five performance criteria, as essential elements of a comparative assessment of outcomes of irrigation turnover or self-management: reliability, manageability, financial viability, physical sustainability and institutional sustainability.

Reliability. How timely, adequate, and predictable are the implementation of operations, maintenance, and system improvement services? To what extent are implementation targets achieved?

Manageability. Are the management procedures practical and implementable, given physical and resource constraints?

Financial viability. Is the irrigation system financially self-sustaining for all necessary management functions? How cost-effective are investments in operations, maintenance, and system improvement -- both in terms of meeting management objectives and overall productivity?

Physical sustainability. Is the institution keeping the irrigation system's physical structures and agricultural land in favorable condition over the long term, so as to achieve the enduring social objectives of irrigation? More specifically, are maintenance and system improvement activities able to keep the system functional enough to continue to meet operational objectives?

Institutional sustainability. Is the institution able to continue to meet its members' needs and adapt to changing demands? Will future government regulation or socioeconomic pressures interfere with its ability to function and survive?

We suggest the following four criteria as elements in a comparative assessment of impacts of turnover and self-management:

Agricultural productivity. This can be measured in terms of cropping intensities, yields, or profitability for the system as a whole or per unit of land, water, or labor (depending on what the main limiting factor of production is).

Replicability. This refers to the ability of a given type of institution or management to be disseminated widely and be perpetuated as long as desired, without dependence on skills and materials which are not available locally or on external and temporary forms of assistance.

Environmental impact. What are the impacts of the irrigation institution and its management on the physical and social environment? This may include physical aspects such as waterlogging, salinity, erosion, soil and water quality, or social aspects such as health, population, or gender relations.

Equity. How fair is the allocation and distribution of water and its effects on spatial variations in cropping intensities, yields, and productivity of land? How are fairness and water rights defined locally?

These criteria are selected because of their widespread, comparative relevance. However, other performance criteria, such as employment generation or local conceptions of equity criteria, may be found to have important local significance. Any comparative assessment should also document what performance criteria take priority in different settings.

Hypotheses about the Transition to Self-Management in Irrigation

The most important research task for a comparative assessment of irrigation turnover and self-management is to specify what conditions bring about successful turnover processes and effective self-managed irrigation institutions.

A typology of turnover processes. We have defined management turnover broadly as the expansion in the scope of nongovernmental or self-managed institutions in irrigation management and the corresponding contraction of the role of the state. This definition includes a variety of steps which can be taken to shift management from governmental to nongovernmental institutions. The following are some steps which governments take in the process of irrigation management turnover. The steps are listed roughly in the ascending order from conservative to more complete measures.

Introducing irrigation service fees. The government begins charging fees to water users to pay for part or all of the cost of O&M, and sometimes part of the capital investment costs. However, the government continues to produce the O&M service. This is perhaps the most widespread initial step in management turnover -- turning over responsibility to help pay for the service.

Fostering competition in service delivery. The government takes steps to enable or encourage private-sector organizations to provide some irrigation O&M services, either for existing agency irrigation systems or for new development. Examples are in Bangladesh, Pakistan, and Nigeria where the governments are actively encouraging private-sector development of locally managed tubewell irrigation.

Contracting. The government specifies the scope of work, terms, and conditions and pays nongovernmental contractors or water users' associations to do the work. This is used at the level of distributary canal organizations in Sri Lanka and is considered as stage one of the turnover process in the Philippines. Depending on incentives applied and the extent of farmer involvement in decision making, it may or may not serve to engender self-reliant local management.

Vending. The government produces a service upon request and payment by a nongovernmental entity. When the user requests for and specifies the terms for the service and the governments charge a service fee vending differs; otherwise, the service will not be defined or delivered. An example is found in many African countries where the irrigation agency provides agricultural inputs to individuals or groups upon request and payment. Another example is in the case of the Mohini Water Distribution Cooperative Society in India, where a local cooperative orders and purchases water volumetrically.

Franchises. The government awards rights to nongovernmental organizations to supply the irrigation service for a specified period of time. However, unlike service contracts, with franchises, the clients or users pay for the service. An example of this in Hunan, China, where local irrigation management organizations hold auctions and grant franchises to local groups to manage O&M for a specified period of time.

Grants. The government provides a subsidy to a local organization, which could be whether the user or the service producer, to reduce the cost of using the service. Grants may be provided in the form of payments, materials or special loan privileges. An example in Indonesia is the Village Subsidy Program, wherein the government makes annual grants to villages and allows the village to decide in what development projects to invest the funds. Experience showed that a large proportion of such funds was used for village irrigation and that the funds stimulated significant amounts of local investment (Hafid and Hayami 1979).

Joint agency/users' investment. The investment by the government in irrigation O&M or system improvement is contingent upon some corresponding level or proportion of local investment. An example is when the agency provides materials and technical guidance for maintenance if the water users'

association agrees to provide the necessary labor. Other arrangements are based on proportional equity investment, such as 50/50 sharing of costs.

Agency becomes financially autonomous. The agency, which was funded by central government revenues, is converted into a semiautonomous or fully autonomous agency which must become largely self-financing through payments for its own services. NIA in the Philippines and the recent "commercialization" of the River Basin Development Authorities in Nigeria are examples.

Joint agency/users' management. Joint agency/users' management includes the participation of farmers in an advisory or joint decision-making capacity in the planning of water allocations and delivery schedules, operations, maintenance and system improvement or rehabilitation.

Devolution of responsibility and/or control. Governments turn over management responsibility and authority for certain functions, at certain levels and under certain conditions. Generally, the government retains some role in the activity, such as regulation or authorization, or perhaps direct management -- but at a higher level. An example is when governments turn over O&M to water users' associations up to a certain level in the irrigation system or for systems up to a certain limit in size. The agency retains a management role at the main system or river course level and provides oversight and technical service roles for O&M at lower levels. This is the common approach to turnover being used in Indonesia, the Philippines, Sri Lanka, Madagascar, Mexico, and Colombia.

Load shedding of functions. When the government agency totally withdraws from an activity or sector, at all levels load shedding of functions occurs. An example is the withdrawal of the Government of Senegal from the function of irrigation O&M management. However, this would not be a total withdrawal from the irrigation sector if the State still retains a role in regulating water use.

Privatization of assets. Privatization of assets is the conversion of ownership of irrigation property from the government to nongovernment organizations or individuals. Such property may include irrigation infrastructure and/or water rights. The Privatization may be implemented through the sale of assets, the sale of stock, or the legal transfer of ownership. Examples are the sale of public tubewells in Bangladesh and Pakistan.

Whatever steps taken in a country to implement a turnover process reflect official images of intended outcomes and assumptions about how best to achieve them. But the potential diversity of institutional alternatives, mixes and sequencing is very great and policy analyses should not be limited to any single or

limited model, such as training water users' associations, etc. Third parties, subcontracting arrangements, private-sector oversight, competing O&M companies, and so on are among other options to be considered.

Working hypotheses about turnover. An assessment of these perspectives will help in identifying location-specific performance criteria and working hypotheses about turnover processes. However, as a starting position, and based on currently available literature about irrigation management turnover and autonomy (Wolf 1991; Svendsen et al. 1991; Cowan 1990; Vermillion and Johnson, 1989), the following five criteria or working hypotheses are posed herein, to seek to specify necessary conditions for successful turnover:

1. Whether financial and political pressures are strong enough to threaten the agency's basic mandate, resources or the job security of several classes of staff.

2. Whether new roles have been identified for the agency which substantially replace management roles being turned over and whether the new roles are supported by clear policies, resources and incentives for reorientation.

3. Whether irrigation institutions taking over management are becoming primarily financially autonomous.

4. Whether most members of the farmers' organizations taking over management share the view that sustainable financial viability can be achieved.

5. Whether the new managing entity has clearly recognized legal rights and authority to manage O&M prior to turnover.

6. Whether the turnover process enhances local collective authority through group investment and decision making about operations, maintenance, and system improvement.

Working hypotheses about conditions for effective self-managed irrigation institutions. We now wish to propose a few working hypotheses to help explain or predict under what conditions self-managed irrigation institutions will perform effectively or not. Literature relevant to this concern falls into three categories:

1. *Institutional alternatives for privatizing public services* (Savas 1987; Cowan 1990; Roth, 1987; Small and Carruthers forthcoming).

2. *Theories of common property resource management and collective action* (N. Sengupta 1991; E. Ostrom 1990a; Ostrom 1990b; Shui forthcoming; Berkes 1989; Hardin 1982; Olson 1965).

3. *Irrigation management performance* (Chambers 1988; Small and Carruthers forthcoming; Small and Svendsen 1990; Uphoff 1986).

From this literature we can identify a list of propositions about necessary criteria for the development of effective irrigation institutions. Ostrom (1990b:38) has made a useful synthesis of the existing knowledge about what is needed for the emergence of viable irrigation institutions. Some of the hypotheses below are adapted from her synthesis.

1. Whether system boundaries and service access rights are clearly defined.

2. Whether there is a proportional relationship between management inputs and benefits among those investing in the irrigation institutions.

3. Whether benefits of investing in irrigation institutions exceed competing opportunity costs.

4. Whether the corporate body which specifies the rules is largely constituted by the irrigators who are affected by them (at operational and collective levels).

5. Whether there is a practical system of monitoring and regulating behavior which is accountable to the corporate body of rule makers.

6. Whether those who break the rules are likely to receive graduated sanctions as authorized by the rule-making body.

7. Whether irrigators and their representatives have ready access to conflict resolution arrangements.

8. Whether irrigators have the legal right to organize and make institutional changes commensurate with their perceived management needs.

9. Whether management functions are spatially and vertically integrated at multiple levels, according to functional requirements.

10. Whether performance results: are in accordance with the expectations of irrigators, whether they are visible to irrigators and whether they have no serious negative side effects.

11. Whether the system design is compatible with the institution's basic rules, rights and procedures and whether it is manipulable by the managing institution.

Perhaps such hypotheses can help integrate comparative efforts to understand why certain results occur in different turnover approaches and what conditions are necessary for successful outcomes.

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CHAPTER 3

LADIES AND GENTLEMEN,

This morning's session of the Workshop dealt with the first few tentative steps that were taken elsewhere in Africa and in S.E. Asia toward `privatization' or `turnover' of the management of irrigation schemes. My task now, is to anticipate some of the `technical' issues that might be relevant in the context of the irrigation schemes of the Central Clay Plains. Needless to say, these are purely personal opinions, and fall short of the carefully considered and strictly impartial standards set by IIMI this morning; nevertheless, I am grateful to IIMI for having made it possible for me to attend this Workshop.

By way of introduction, let me point out that `privatization' is one of the most provocative words in the English language. It is particularly emotive when used in those countries of the tropics which have inherited legacies in large-scale irrigation left by British civil engineers. For example, in India, Egypt, Pakistan, Sri Lanka, and not least, Sudan, the strength of the irrigation bureaucracies is one of the principal characteristics that all enjoy in common. It was not by chance that these countries, which formerly had political links with Britain, now have enormously influential and powerful `Ministries of Irrigation.' Modeled on the former `Departments of Irrigation,' the various `Ministries' have in each case built on and greatly expanded the strong British traditions of excellence in civil engineering. Without exception, the modern `Ministries' have, in fact, played overwhelmingly dominant roles in the development of irrigated agriculture in their respective `public sectors.' No better example can be quoted to prove the rule, than the very impressive reputation earned by the Sudanese Ministry of Irrigation since the successful negotiation of the Nile Waters Agreement in 1959.

It is against this historical background, that the impact of the currently fashionable, worldwide trend toward `privatization' of publicly owned enterprises and nationalized service industries needs to be examined. On the one hand, it is inconceivable that the Government of Sudan should be contemplating a reduction in its *overall* commitment to agricultural production in the larger `*large-scale, small-holder*' schemes of the Central Clay Plains and on the other, it is entirely understandable that every option should be explored to make the government's role as the monopoly `supplier' of water more cost-effective and more `user' friendly. We shall be returning to this specific topic in due course. The legacy left by British civil engineers is significant for several reasons. By far the most important is that the strength and coherence of each of the national irrigation agencies I have mentioned, has been built on the `closed-shop' policy of recruitment. The loyalty amongst professional civil engineers has been cleverly exploited, nationally and internationally, to ensure that the irrigation bureaucracies retain their exclusive hold over the *technology* of irrigation and to keep a right of veto over the various ancillary *sciences* involved on the fringes of irrigation. Professional solidarity has provided irrigation engineers with a very substantial power

base, which has frequently been used to great effect since the end of World War II in the national politics of irrigated agriculture across the Third World.

Another reason is that the early British engineers were complete masters of the art of creating `idealized-images' of how `farmers' should use irrigation water efficiently and economically.

In the Indus Basin, for example, in what is now Pakistan, the British engineers invented the marvelously philanthropic concept of `spreading-water-thinly-over-the-ground' for the benefit of less-fortunate users downstream -- a concept which even today is often urged on `farmers' by WAPDA without a thought for the practical consequences of such self-denial. Here in the Gezira, the engineers of 1925, 1934 and 1951 devised the most sophisticated `rules and regulations' covering every supposed contingency for fieldstaff, inspectors, and tenants. There is much anecdotal material, but no properly documented evidence to show that the system ever worked as `designed;' yet by virtue of constant repetition of harmless `white-lies,' the *legendary* versions of what was expected of everyone, gradually gained credibility in the popular imagination.

Blind faith in the 1934 `rules and regulations' laid down by the British has recently led to ten years of misunderstandings by IBRD under the GRP; and to all appearances, it is likely to continue as the main constraint on improved relations between MOI engineers, SGB administrators, and SGB tenants, for a long time to come.

For this reason, I have put `Operations and Maintenance' at the top of my list of technical issues which may require special consideration in the context of re-thinking on the administration of public-sector irrigation schemes. However, my terms-of-reference suggest that any discussion should start with an international overview of the topic, before hazarding comment on the local situation.

Operations and Maintenance, (O&M) - from a Personal Viewpoint

As mentioned above, a long-standing convention requires us to accept that `O&M' constitute an occupation reserved exclusively for qualified civil engineers. We have also fallen into the trap of believing that it should be dealt with as one subject rather than two. We even go so far as to write it O&M rather than O and M. Yet no two tasks could be more dissimilar then O and M. I put it to you, that *Operations* has nothing whatever to do with civil engineering, but calls for the same sort of training and qualifications as does the management of a chain of supermarkets. The skills called for are identical; both jobs putting a premium on the ability to *anticipate* public demand for the product(s) on offer. The successful supermarket manager must ensure that his `shelves' do not empty when demand is high, nor overflow with an embarrassing surplus of unsold stocks when public demand slackens. Knowledge and experience are needed on such `look-alike' topics as:

(a) the `time-lag' in the pipeline between the bulk supplier and the individual consumer;

(b) the reasons for seasonal peak periods of `demand' by consumers;

(c) adequate feedback of information to the Divisional Manager's desk from country-wide retail outlets;

(d) computerized data-handling for deliveries from the warehouse(s);

(e) effective use of modern communication systems, etc.; and

(f) costings of operations, profitmargins, and the covering of overheads.

All these criteria apply equally well to officials in charge of main system `operations' as to the commercial `management' of supermarkets.

*`Maintenance'* on the other hand, is simply routine servicing and repair, a function to be carried out either by `in-house' technicians, or let out to contract. Maintenance men and machinery must obviously be called in frequently to keep operations running smoothly, but those who carry the crucial responsibilities for matching `supply' with `demand' should never be burdened with the day-to-day mechanics of routine `maintenance.'

Unfortunately, neither *operational* water-control nor the *maintenance* of large-scale distributive systems create any significant opportunities for civil engineers to practice their professional skills and expertise. The result has been that the more capable and ambitious civil engineers in most irrigation agencies have opted for the prestige and status popularly associated with design, construction, research, and consultancy. Indeed, `O&M' condemns a civil engineer to a rural life style far removed from his expectations on the day he graduated. Whether he likes it or not, he flounders in the `deep end' of irrigated agriculture, with all its farming inconsistencies, its dependence on the weather, its `people-problems,' and its biological `ifs' and `buts.' -- in Phillip Kirpich's excellent paper (1987) on the subject, he emphasized how inadequately civil engineers are trained to cope with the humanitarian and socioeconomic problems that are the dominating characteristics of irrigated agriculture in real life. He suggested to his ASCE readers that a fifth year of university teaching would be desirable to equip graduates in civil engineering with the broad-based skills necessary to *manage* irrigation systems.

Specialization Needed in `Operations'

From what I have seen in "large-scale, small-holder" irrigation schemes elsewhere in the tropics and sub-tropics since leaving the Sudan, there is a strong case to be made, in every country, for specialization in `operation,'-- as distinct from the management of drag-lines and the moving of so-and-so many meter-cubes of silt. It is clear that the `dual-purpose' notion has earned O&M its universally bad press.

Operations in the Gezira after Roseires.

I stress the need to distinguish `O' from `M,' because it leads me up to the claim that MOI's day-to-day *operation* of the Gezira/Managil System, has, in fact been a separate and virtually independent function within MOI, since the `informal' changes in water control that followed the opening of Roseires Dam in 1966/67.

Diversification in the late 1960s meant that *scheme-wide water control* had to be dramatically improved, if the supply system were to respond adequately to the rapidly expanding needs of the scheme's tenants (as the government of the day under President Nimeiry very rightly insisted it should).

The result was that `operations' became highly centralized on the office of the Divisional Engineer (DE), Wad Medani Division, (an integral part of MOI HQ) -- this was in striking contrast to the traditional concept of joint responsibility shared broadly amongst all the Sub-Divisional Engineers of the Scheme. `Operations' was originally built around the old-fashioned `Balanced-System' principle in which each Sub-Divisional Engineer was under a moral obligation to satisfy to the best of his ability the indents submitted by the local Block Inspectors at the heads of their minor canals.

In retrospect, the original Agreement of 1926 between the Government and the Sudan Plantations Syndicate was astonishingly naive on the quantification of demand:

> *the Government undertakes to comply with the reasonable demands of the Syndicate or their representatives for the irrigation of the land by the amounts of water reasonably required by the Syndicate.*

It seems almost unbelievable that the experienced engineers of those days could abdicate their primary responsibility in favor of a small group of expatriate `Inspectors,' who had no training whatsoever in the irrigation sciences or even in basic agricultural operations. By a combination of `rules-of-thumb' and good personal judgement, the quantification of those `reasonable demands' seemed to be acceptable to both sides for so long as cotton remained the sole concern of the Inspectors. The introduction of the diversified food crop rotations was to change all that.

The need for upgrading `operations' in 1968/69 was urgent for two reasons. Firstly, because everyone concerned had lost faith in the ability of SGB Inspectors to forecast their requirements for the weekly `indent;' and secondly, because Sub-Divisional staffs were acutely aware that distribution downstream of Sennar was by then completely left to the personal discretion of the 1,500 or so gatekeepers employed by MOI (see later reference to `proportional division').

Many of you will recall how brilliantly MOI succeeded in raising Sennar releases pro-rata with SGB's intensified requirements during the highly productive `boom years,' 1968/69 to 1973/74: from 4 milliards per annum immediately before the completion of Roseires, to 6.5 milliards per annum in 1973/74: an increase of 62 percent via precisely the same physical layout of canals.

The Gezira Research Station publications for those seasons reported that the Divisional Engineer, Wad Medani Division, (ably assisted by the ADE, Wad en Nau Sub-Division), achieved the seemingly impossible task of keeping actual 10/11 day period releases at Sennar within the narrow confidence limits of +/- 12.5 percent around the seasonal pattern of calculated CWR demand.

The `Technical Adjustment'

The secret of the DG's success lay in his good judgement of the daily *additions*, or *subtractions,* needed to compensate for the errors and discrepancies in the SGB indents received via the Sub-Divisions. The corrections were made before sending the final `setting' instructions on for implementation by the Resident Engineer at Sennar. What was referred to as the `Technical-Adjustment' (or the "Cover"), increased or decreased the releases by very sizable amounts indeed, according to *feedback* of information and advice from the field. Informal advice as to what was going on, was channeled either through the ADE, Wad en Nau; or notably, through MOI's Director of Irrigation Services. The essential `feedback' from SGB field staff filtered indirectly through to the DE's office, by way of frequent and informal discussions at a personal level between the Agricultural Manager, Barakat, and the then Director of Irrigation Services. Huge increases of 3,500,000 cubic meters per day, over and above the total SGB indent, were not uncommon in October and November; while at other times of the season, `adjustments' swung less predictably from modestly positive to heavily negative.

When used judiciously, the `Technical Adjustment,' was clearly capable of exerting a very powerful influence over the `quality' of the operational management of the system served by Sennar. The faults inherent in the SGB `indenting' system could be compensated for by raising or lowering Sennar releases by appropriate amounts. The `proportional division' tactics employed by MOI gate-keepers ensured that the improved Sennar releases eventually found their way reasonably fairly down to the minor canal heads, albeit with a good deal of short-term fluctuation.

But because the Technical Adjustment functioned only at the discretion of the Divisional Engineer, it was also open to misuse and abuse. When relations between MOI and SGB began to deteriorate after the introduction of the Four-Course Rotation in 1975/76, the seasonal patterns of supply and demand at Sennar began to show serious shortcomings. Because of the important lessons that can be learnt from a season in which the `Technical Adjustment' functioned only at the discretion of the Divisional Engineer, it was also open to misuse and abuse. When relations between MOI and SGB began to deteriorate after the introduction of the Four-Course Rotation in 1975/76, the seasonal patterns of supply and demand at Sennar began to show serious shortcomings. Because of the important lessons that can be learnt from a season in which the `Technical Adjustment' was not used in the best interests of the Scheme, I have prepared a schematic diagram based on 1977/78 data.

Right through the 1970s, the October-November peak period of `demand' continued to be satisfied with remarkable regularity each season. This was indeed so in 1977/78, reaching the then agreed limit of 32,6 million cu.m./day for most of November 1977.

For the months of September, and for December to end of January, the releases at Sennar were regrettably far short of the level of calculated CER demand. In September, the reasons were thought to be induced by the fear of flooding should heavy rainfall occur, exceeding the capacity of the `escapes' on the main canals; (though the DE would neither confirm nor deny that this was so). In the winter months of 1977-78, the negative Technical Adjustments were, astonishingly, in the *wrong* direction to compensate for SGB's serious underindenting at that time.

The actual reasons for these marked discrepancies on either side of the peak-demand period, were not fully disclosed at the time, and it would not be diplomatic of me to pursue them now - except to point out that the 32,6 million cu.m./day achieved in mid-November, made it difficult for anyone to believe that siltation and/or weeds in the minor canals had become a limiting constraint just thirty days later. The tenants' complaints of widespread `water-shortages' at that time were nevertheless quite genuine, and provided good grounds for a more `open' exchange of information across the disciplines on such a vital matter.

The lack of any *formal* arrangements by MOI for cross-disciplinary involvement in main system operations has always been a feature of the Gezira Scheme from its beginning -- presumably because of the traditional `closed-shop' rule.

However, since the adoption of Penman technology, and the very wide range of advances now available in the `irrigation sciences,' not to mention the new `management-services,' it seems that MOI has the opportunity to break away from the conventional `secrecy' that was the rule rather than the exception in former times. The increasingly important role played by the Ministry's Hydraulics Research Station is a most encouraging feature of recent years. I recall that in 1972, Sayed Yahia Abdel Magid originally planned the scope of HRS with the greatest enthusiasm, envisaging it as fully competent across the disciplines, in both engineering technology and agriculturally oriented research, especially on water use in the commercial areas under tenant management.

Before modern computers became available, the DE had no option but to depend on his personal judgement and his own private "rules-of-thumb.' Today, in the 1990s, he should have all the advantages of a supporting team of technicians and specialists, covering the very diverse range of disciplines needed as back-up for `operations' in the Gezira. Top priority would certainly be for someone from the SGB hierarchy, fully conversant with the day-by-day progress of agricultural `operations.' The new telephones enable the vital `planting-date' information to be reported in from the Blocks, and processed by SGB's Statistical Section, at a speed never possible with manual methods. The scope for involving microcomputers in the DE's day-to-day decisions is obvious; as they would give him the advantage of instant answers to the many `what-if' questions that arise in CWR and CWU.

In the context of a debate on ways and means to reduce the level of government involvement, it might seem strange to suggest the setting-up of a new and much more sophisticated command center for control of releases at Sennar. However, I do believe it to be an essential first step in restoring confidence in `water-control.' It would provide a bridge between the three main institutions, (hitherto completely missing except for a limited period in the early 1970s).

In my view, there is nothing more important than bringing MOI's irrigation `operation,' SGB's agricultural `management' and the modern `irrigation-sciences' represented by both GRS and HRS, into one integrated, water-oriented, `Tactical Headquarters' -- `Ta HQ' for short.

There can scarcely be any function in a `large-scale small-holder' irrigation scheme, more important than masterminding the releases at the headworks. It is doubly important in the Gezira, owing to the Scheme's evolution toward `proportional-division' over the past sixty years. It has also moved away from its original `*supply-led*' design concepts, to become a perfect example of an irrigation system that is `*demand-led*'.

The Block Inspectors no longer determine `*how,*' `*when,*' and `*how-much*' water shall be given by the tenants to their crops. Instead, these critical decisions are taken at the *hawasha* level by the tenants themselves, based on their judgement of the needs of the crops, thus justifying the term `demand-led.'

Memories Best Forgotten

I have dealt at length with `operations' and the tremendous opportunities that the new communications system open up for improved cooperation in the future. I should perhaps conclude with brief references to attempts in the past to break MOI's traditional monopoly of O&M. In all cases but one, the proposals involved the secondment of a cadre of qualified civil engineers, and a quota of earth-moving machinery, from MOI to the management of the Gezira Scheme. All such attempts have failed, largely because of the perceived effect secondment might have had on the career prospects of the junior engineers involved. On paper, the right to control `maintenance' machinery for silt-clearance has been the issue at stake. In other words, `M' has been wrongly assumed the critical factor in `O&M,' rather than `O' as argued in this paper. My recollection is that the question of *water-control* operations was not even referred to in the proposals suggesting a unified command structure. The latest attempt was made as recently as 1981/82 and ended in disaster.

So far as I am aware, only one attempt has been made in the public sector schemes, for tenants to take direct control of `operations.' A proposal for the takeover of the management of the pumps was put forward in 1974 by spokesmen for the tenants of the Blue Nile (BN) pump schemes. The BN tenants argued very logically that they were capable, collectively, of taking over the day-to-day *operation*, (but *not* the maintenance), of the various pumping stations serving the schemes.

[Farbrother's Contribution to the Final Discussion Session - 7.10.1991.]

Nile Waters

The reference on page 7 of the MOI presentation to the *".. dwindling water resources in the country, and the increasing demand for it..."* seemed to me something of an exaggeration, considering that total annual

consumption is still very far below the figure of 18.5 milliards agreed under the terms of the 1959 Nile Water Agreement. In 1985/86 for instance, the PJTC figure amounted to no more than 12.6 milliards; and even so, it included a large number of estimated consumptions based only on installed capacity.

Minor Canal Management

Page 9 of the MOI presentation, under the heading of: Establishment of Water-User Associations states:

> *Recently, the MOI was made responsible for managing the Minor canals up to and including field outlet pipes in the big irrigation schemes (as from 1992 season). This makes the MOI, for the first time, render its service directly to the farmers. Farmers' participation in some functions of irrigation management at the minor level and below should be encouraged and every effort should be made in promoting and institutionalizing this role.*

In May 1983, the IBRD Staff Appraisal Mission made it a condition of disbursement of Rehabilitation Project funds, that MOI should take over from SGB the responsibility of the management of one selected Minor in the Gezira, down to and including its field outlet pipes before December 1983. On that occasion, I must remind you that MOI failed to introduce the official rules and regulations for the management of the Minor concerned and its FOPs -- not for lack of effort; but because the 1934 rules and regulations were (and always have been) completely unworkable in every respect in real life.

After apologizing to the Chairman for expressing forthright criticism of the government's 1992 intentions, I will outline the three principal reasons why such moves could only be counterproductive, drawing on the applied research findings accumulated at the Gezira Research Station between 1965 and 1978; and on the diagnostic investigations of the joint Wallingford HR/HRS-MOI team of civil engineers between 1985 and 1990:

(a) That the current `*grass-roots*' practices in the Gezira have evolved over the past sixty years into a viable and socially acceptable irrigation regime. Moreover, when the water use efficiencies achieved `informally' by the tenants, Inspectors, and MOI field staff are judged on the criteria laid down in FAO I&D Papers Nos. 24 and 33, there can be no valid criticism of its technical merit (see Francis M. and El Awad O., in Asian Regional Symposium [1989]).

(b) There is no virtue whatever in putting MOI employees into face-to-face confrontation with the Gezira tenants. The remarkable freedom from conflict and hostility that has characterized the Gezira since its inception, has been largely due to the Block Inspectors and their *ghaffirs* acting as

an effective `buffer' between the two sides. A return ticket to India, to see at first-hand the wretchedness of direct confrontation between `engineers' and `farmers,' would be a cost-effective method of reversing such misguided intentions in the Sudan.

(c) The institutionalization of `farmer participation' has ominous overtones for the tenants of the Gezira. (MOI's phrasing is more than a little patronizing, considering that the tenants, their fathers before them, and in some cases their grandfathers, have been in *total* control of irrigation management at the FOP level and on the *hawashas*, for as far back as anyone can remember). I do not know how informative the paragraph would be when translated into Arabic; but if I were a tenant, I would be highly suspicious that any one of several very different meanings could be read into the call for WUAs including such controversial issues as:

i. organizing communal labor for clearing/weeding Abu XX;
ii. the formal structuring of water rotas for Abu XX;
iii. imposing legal obligations on those who share Abu XX;
iv. strengthening the position of the samad;
v. reinstating the authorized duties of ghaffirs; and/or
vi. exploiting tenant labor (unpaid) for 6.00 a.m. and 6.00 p.m. control of field outlet pipes; or, (more hopefully the following, as the best possible solution for all concerned in 1992:)
vii. regularizing and legalizing existing `grass-roots' practices.

Kenana Sugar Estate

The acknowledged success of water management at Kenana Sugar Estate has tended to highlight the advantages of private enterprise. Under its unified command structure, the supply engineers, the agricultural engineers, the agricultural management, and the field-labor supervisory staff are responsible only to the Company's hierarchy, and are not divided by professional or institutional loyalties.

Of course, Kenana is not a `privatized' scheme, having been planned, designed, and constructed, completely free of government involvement or technical influence (apart from MOI and PJTC approval of the scale of the water allocations as part of the national quota). The innovative designs introduced by Howard Humphries for the distributive system took no account of Gezira expertise; and I recall the splendid initiatives in field-water layout pioneered by the Australian agriculturist, John Gallacher.

For that reason, it would be quite wrong to assume that the `unified command structure' would transfer satisfactorily into the setting of the government's existing medium-scale and large-scale schemes. It is not just that they are already firmly set into the `shared-responsibility' mold, but that they are irrigated by

tenant `small-holders' *at their own expense.* Kenana on the other hand, is irrigated at *Company expense* by a paid labor force. (Note: N. W. Sennar Sugar, New Halfa Sugar, and Haga Asselliya Sugar, and the various MOA research stations, are also, in fact, irrigated by direct labor - *at government expense*).

The `Tactical Headquarters' (Ta HQ for short), that I outlined yesterday, is certainly not comparable with a `unified' management structure, as at Kenana. There are no similarities whatever. In the case of the Gezira however, it does represent an attempt at formal interdisciplinary cooperation, injecting enthusiasm at what I believe to be the most highly sensitive point of contact between the institutions in the mechanics of water control. To whom is the Ta HQ accountable? I hear you ask. One answer to that, is that the representatives should ideally be accountable to themselves as a body, standing or falling on the bottom line of the tally between supply and demand at Sennar.

At the other extreme in the scale of size of irrigation schemes on the Central Clay Plains, the 100 feddan or less category clearly provides the entrepreneur with the opportunity to do his own multidisciplinary thinking in his own time, *at his own expense.* I have underscored the word `expense,' repeatedly in the paragraphs above, because agricultural economists rarely weigh the costs of labor inputs heavily enough at the small holder level. This is especially true in the Gezira, where the real costs of spending huge totals of man-hours watering crops of cotton and foodcrops are not properly assessed.

Before concluding, I would like to congratulate my colleagues, on the exceptionally high standard, in every respect, of the MOI presentation. It is most encouraging to note the determination expressed by MOI for a fully integrated approach to the complex problems of disengagement in operational management of the small- and medium-scale irrigation systems.

CHAPTER 4

Privatization Issues in Sudan Irrigation Sub-Sector

INTRODUCTION

Historically, the irrigated sub-sector dominated agricultural production in Sudan. Though it comprises only about 20 percent of the total cultivated area, it produces more than 50 percent of the total agricultural production. Some important and strategic crops are grown only in the irrigated sub-sector. These include, wheat, winter legumes and extra-long staple cotton. The sector has also an advantage over the rain-fed one (traditional or mechanized) in that it stabilizes agricultural production, especially food crops.

The Sudan irrigated sub-sector consists of schemes varying in size from a few thousands to over two million feddans with a combined area of 4.5 million feddans (1 feddan = 0.42 ha). The sector is dominated by four large parastatal schemes: Gezira, Khashm El Girba, Rahad and Es Suki having among themselves 65.3 percent of the total irrigated area. The combined share of the three defunct Agricultural Corporations, the Northern, White and Blue Niles, in the total irrigated area is 16.8 percent while that of Sugar Public Limited Companies (excluding Kenana Sugar Estate) is 2.9 percent. In addition to other public irrigation schemes (notably, Gash, Tokar, Barka and Abu Naama), the area of the public sector irrigation schemes at one time approached 93 percent of the total area.

Over the years, the government invested heavily in this sector making it the locomotive of the economy. Unfortunately, the sector did not live up to its expectations. Infrastructure has deteriorated, production, productivity and areas have decreased. The share of agriculture in Gross Domestic Product (GDP) has plummeted from 44 percent in 1971-75 to 34 percent in 1986-90. For the first time, the agriculture sector has lost its leading contribution to the GDP; presently, it ranks second to the services sector which commands 50 percent of the GDP. Within the irrigation sub-sector, some schemes faired better than others. Some have become a burden on the government.

In its attempt to halt and reverse this declining trend, the government is currently restructuring this sector with particular emphasis on institutional, technical, economic and environmental factors. These factors are intrinsically related. For the purpose of this conference, the paper discusses the privatization of irrigation schemes with related policies and issues involved from the perspective of the Ministry of Irrigation and Water Resources.

IRRIGATION MANAGEMENT IN THE SUB-SECTOR

Since the inception of modern irrigation in Sudan in the early decades of this century and until the present time, management of the irrigation system in most of the irrigation schemes remains in the domain of the public sector. The Gezira Scheme was managed from the beginning and until its nationalization in 1950 by a private company (Sudan Plantation Syndicate [SPS]) which was responsible for agricultural and business matters while the government built and then managed (through a government body known then as Sudan Irrigation Department, [SID]) the dam, the canalization system and the irrigation control works. SID was responsible for operation of the Sennar Dam, diversion, control and distribution of the irrigation water up to the head of the minor Canal. The SPS took over the responsibility of operating the minor canals and of field distribution of water. Maintenance of the irrigation system, upto and including the field outlet works, remained the responsibility of SID. After the creation of the Sudan Gezira Board (SGB) which took over from SPS, SID became the Ministry of Irrigation (MOI) after Independence with responsibilities including planning, development and management of Sudan's water resources.

The style of management in the Gezira Scheme (i.e., the division of responsibility between MOI and SGB along some recognized and well-defined lines) developed over a long time was so successful that it was emulated in other public sector irrigation schemes. This style of management recognizes the professionalism, specialization, expertise and limitations of each side.

The aforementioned setup of management seems well-suited to large-scale public irrigation schemes. On the other hand, privately owned small irrigation schemes are managed wholly by their owners, without MOI intervention whatsoever. The same thing applies also to some private small- to medium-size irrigation schemes, notably Kenana Sugar Company, Seliet and Elwaha. An interesting example of management is to be found in the four limited sugar companies which is very similar to that in the days of the SPS and SID in the Gezira Scheme.

Irrigation management in the pump schemes, started by private enterprise along the White and Blue Niles, witnessed a great deal of changes over the years. Before nationalization of these schemes in 1968, they were managed by the private sector. The Agrarian Reform Corporation (ARC) was created to take over the responsibility of these schemes including irrigation management. Later on, the ARC was dissolved and the Blue and White Niles Agricultural Corporations were established. At the same time, the Northern Province Agricultural Corporation was also established. Unfortunately, these three corporations ran into many difficulties including irrigation because of antiquated facilities and inability to operate and maintain such facilities. A couple of years back, the government decided to dissolve these corporations and to put them for sale. Also it decided that MOI should take over, in the meantime, the responsibility of operating and maintaining irrigation facilities in the Blue and White Niles Corporations. Ever since, the irrigated area has increased steadily reaching a fourfold increase this year to that obtained two years ago.

In irrigation management, two of its main functions are operation and maintenance (O&M) of the irrigation system and its facilities. It is often the case that the success or failure of an irrigation scheme depends on how well or bad O&M are carried out and to whom these functions are entrusted. Table 3 shows who is responsible for what in O&M of the irrigated sub-sector.

Table 3. Operation and maintenance of irrigation systems.

Nature of ownership	Percent of total area	Responsibility for O&M
Large public-sector schemes	65.3	MOI
Medium public-sector schemes (Gash and Tokar)	7.3	Gash and Tokar with technical assistance from MOI
Small public-sector schemes	16.8	MOI (in the majority of these schemes)
Public limited companies (mainly sugar industry)	3.0	MOI (at present)
Private schemes	7.6	Private sector

As can be noticed from the Table, MOI domination is overwhelming. This near monopoly may be attributed *to the following:*

* Since most of these irrigation schemes are developed and owned by the government, it is assumed that the government should also be responsible for their O&M.

* Over the years, MOI has provided a complete range of services to O&M. This includes resources, expertise, research and development. Being the government agency responsible for planning, designing and implementing irrigation projects in the country, MOI is in a better position to assume responsibility for O&M.

* The level of sophistication and complexity in O&M increases with the size of the irrigation system. Neither agricultural corporations nor the private sector has the expertise or resources to carry out these functions adequately and in a cost-effective way.

* Some O&M functions like desilting requires expensive equipment and expertise to operate and maintain them beyond the means of any single agricultural corporation or the private sector. Centralization of such functions in the hands of MOI is necessary and cost-effective.

* O&M is not attractive enough for the private sector because of the initial high capital investment and the low return on that investment.

Centralization of O&M in the hands of MOI is not without problems. Some of these are inadequate funding, the sheer size and the enormous geographic extent of the irrigation sub-sector. Also the absence of competition leads to complacency and, hence, inefficiency.

PRIVATIZATION ISSUES

Privatization of irrigation schemes is a complex process raising many interesting and sometimes difficult issues. It is beyond the scope of this paper to discuss them all (hopefully some of these issues will be dealt with
in other papers of this workshop). The paper is confined to issues directly related to irrigation.

The irrigation schemes put forward for privatization have two things in common: they are all pump schemes and their water sources are the Nile and its tributaries. However, they vary considerably in their size, land classification, conditions and complexity of their irrigation facilities and in other infrastructure. These variations together with the geographic location will determine to a large extent the attractiveness or otherwise of a particular scheme for privatization.

Some of the issues involved are highlighted and discussed briefly as follows:

1. *Sale of privatized schemes.* It is most probable that the government will not be able to sell the schemes put forward for privatization. In this case, the government has three options to consider: a) to sell the remaining schemes, or b) to rehabilitate these schemes and put them for sale again, or more drastically c) to abandon these schemes.

2. *Ownership.* It is unclear so far to whom the government is going to sell these schemes. Prospective buyers can be an entrepreneur, a company or a cooperative society. Irrigation management style, turnover process and future relationship with MOI depend largely on the nature of ownership. It is suggested here that the size of ownership be as follows:

   entrepreneur - less than 100 feddans
   cooperative - between 100 and 10,000 feddans
   company - more than 10,000 feddans

3. *Water allocation and water rights.* After privatization, it is natural to expect the new owner to select a cropping pattern and cropped areas which maximize his profit. This may run against national interest. Given the dwindling water resources in the country and the increasing demand for water, maximizing net return with respect to each unit of water is a national objective for better utilization of our water resources. MOI may exercise some control in this respect, e.g., reducing water allocation and/or reviewing water rights, where and when deemed necessary. A minimum of water rights for each scheme needs to be established and guaranteed. This issue needs further development and institutionalization.

4. *Sustainability.* Failure in attaining and sustaining efficient performance was the key factor which led the government to privatize these schemes. If the private sector is to succeed where the public-sector has failed, the government should not, from the beginning, let the privatized schemes be on their own, particularly the small-scale ones. Support from the government, for a specified transitional period is essential. This support may take many forms such as technical assistance, credits and soft loans for upgrading and renovating irrigation facilities, O&M, training in repairing and servicing of pumps, channel construction, maintenance procedures, irrigation water management, etc.

5. *Competition for services and resources.* Privatization will increase the demand for services and resources. There is already an acute shortage in trained and experienced professionals, service personnel and technicians as well as insufficient service facilities. MOI may face difficulties in keeping its trained and experienced staff away from the lure of the private sector. Financial flexibility will enable MOI to improve its performance and to remain competitive in rendering its services.

6. *Turnover of management responsibilities.* In pursuance of the government policy of privatization of some irrigation schemes, care needs to be exercised in turning over management responsibilities to the new owners because they may lack experience and/or may be ill-equipped to handle the job initially. MOI should continue providing support for O&M till such time as the private sector can take over in a phased-out program. Development of strategies using lessons and experiences derived in other countries for turning over management responsibilities to the private sector is quite essential.

7. *Public intervention.* It is most probable that some privatized schemes, in particular small to medium ones, will turn, at some time in the future, to MOI to assist in or take over the management of these systems. How will MOI respond to such a request and which criteria and guidelines are to be followed in such cases? Methodologies and procedures need to be developed to make such intervention most beneficial.

POLICY ISSUES

The points discussed in the preceding section just touch on a far complex process as privatization of irrigation schemes. This complexity stems from the variety of environmental, technical, social, economic, institutional and political implications of privatization. These implications result in a series of questions related to the appropriate policy to be used. The following policy issues are discussed in such a context with special emphasis, of course, on irrigation aspects.

1. *The national role of MOI.* As water resources are a national asset, its planning, development and utilization are the most important functions that the government can perform in support of irrigation development. Clearly, these are functions that cannot be performed by the individual irrigation schemes whether private or public. Therefore, the integrity of MOI in discharging its duties is of utmost importance. Also important is the jurisdiction of MOI over formulating and enforcing water regulation and management laws. (The recent Irrigation and Drainage Act approved by the government is a welcome step in this direction).

2. *Turnover of O&M responsibilities.* From MOI experience, it is extremely difficult and costly (in human and material resources) to centralize O&M functions for numerous small and scattered irrigation schemes. MOI experience is largely in big irrigation schemes. Given these realities, MOI has realized the need to turn over the management of small and medium-scale privatized

irrigation schemes to the new owners (with the safeguards discussed earlier, in particular, appropriate resource assistance). This policy is advantageous to everybody:

i. it makes the privatized schemes more responsive to their irrigation systems which in turn leads to possible reduction in O&M costs;

ii. it will free the hands of MOI in concentrating its efforts in managing the large irrigation systems and improving their performance.

3. *Establishment of water user's associations.* It is generally believed that irrigation systems where farmers are entrusted with some or all irrigation management functions are more successful than those where farmers' participation is minimal or nonexistent. Recently, MOI was made responsible for managing the minor canals up to and including field outlet pipes in the big irrigation schemes, as from the 1992 season. This makes MOI, for the first time, render its services directly to the farmers. Farmers' participation in some functions of irrigation management at the minor level and below, should be encouraged and every effort should be made in promoting and institutionalizing this role.

4. *Water charges.* Although MOI will not be responsible for O&M in the privatized schemes, these schemes will be asked to pay water charges commensurate with the real value of water on a volumetric basis at the abstraction point whenever possible, as this is the most direct method of water charging. The reason for this is twofold: a) water is considered not only as a commodity but also as the most important input for agricultural production; its planning, development and utilization cost money and, therefore, privatized schemes should contribute in meeting these costs, and b) to encourage proper water management and water conservation measures in these schemes.
5. *Integrated approach in privatization.* As privatization of irrigation schemes is intricate and complex because it encompasses a wide spectrum of related issues, there is a need for an integrated approach combining (among other things) irrigation management, land use and land policy.

CONCLUSION

Privatization of irrigation schemes is perhaps more complex than their nationalization. Sudan has some experience in the latter but not in the former. Therefore, sailing in such unchartered waters needs careful consideration in planning, implementing and following up this process so as to reach its intended shores. The Ministry of Irrigation has a crucial role to play in the orderly turnover of management responsibilities and in giving a helping hand to these privatized schemes.

CHAPTER 5

Priority Setting for Privatization of the Irrigation Schemes in Sudan

Dr. Mohamed Ahmed Ali Dingle[4]

INTRODUCTION

THE CHALLENGE IN the management of irrigation systems in Sudan as generally elsewhere is to know how to build the optimal techno-structure of the selected institution. The priority setting for privatization should consider this challenge and accompany the privatization needs with effective regulations that can offer solutions translatable into productive action plans.

No matter how long the privatization process will take, it is essential to establish an atmosphere of competition in the different sectors of the economy to allow more effective means and mechanisms to be pursued by the private initiative.

In Sudan, the turnover to the private sector is expected to proceed under a typology drawn by a high ministerial committee given a mandate under the 1990 Act for the disposition of public enterprises. This ministerial committee responds to the recommendations submitted by a higher technical committee assisted by sectoral committees.

This discussion paper on the priority setting for privatization of irrigation schemes in Sudan will present the arguments on the subject after giving an insight into the government responsibilities and management performance under the existing institutional setting, and after describing the corporate option, the setting, the formation and the legal status, the functional relationships, the rationale of the work plans, and the responses of the tenants.

In this discussion paper, the organizational issues and the staffing of various administrative and service units will be excluded as a reference subject in spite of the fact that overmanning is considered as one of the major weaknesses of the existing institutions.

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THE CORPORATE OPTION AND THE FUNCTIONAL RELATIONSHIPS

The Setting

The corporate option in the institutional setting of the irrigated schemes was based on political and socio-technical factors to attain the objectives of pooling managerial and technical resources under one autonomous body to make the best use of the huge investments provided by the government in the irrigated schemes.

The Formation and the Legal Status

At the beginning and before issuing warrants of establishment under the 1976 Corporations Act or similar private laws, the Ministry of Agriculture (MOA) used to second various technical expertise in the fields of extension, crop protection, horticulture and mechanization. Moreover, MOA used to nominate the top managerial posts. Together with the advice and assistance available on requests from the line departments of MOA, the service units of the corporations manned by the seconded staff offered the technical backing as envisaged in the work program. The day-to-day operation and the role of supervision and guidance to the tenants were left to the field staff who were recruited directly by the scheme management.

By 1976, the bylaws under the Corporations Act gave more autonomy to the corporations and all the resolutions regarding the management responsibilities are left to the members of the Board of Directors who are to be nominated by the Minister of Agriculture.

The Functional Relationships

Under the corporate option, the following functional relationships are to be realized:

i. The continuation of the developmental efforts in the scheme areas that encourage promotion of the production activities like machinery and equipment, fuel supply depots, workshops, chemical stores, transportation and communication means and marketing facilities, etc.

ii. The continuation of providing, at cost, the seeds (cotton, wheat, hybrid sorghum), fertilizers, herbicides, insecticides, sacks, land preparation services and cash credit for the labor requirements of the cotton crop.

iii. The adherence to the rules and procedures of water management by maintaining the relationship between the Field Inspectors, *gaffirs* (the water guards) and *samads (*the contact farmers) as should be for the efficient operation of the minor canals.

iv. The adherence to the production relationships that govern the financing of cotton crop activities with the assurance of adequate input supplies and services and later fair prices for the produce which are finally reflected in each tenant's individual account.

v. The coordination with the other government agencies like the Ministry of Irrigation (MOI). The Sudan Cotton Company (SCC), and the private agencies like those involved in tractor-hire services and transportation.

vi. With the provision of inputs, services and administrative guidance, at cost, commercialization has to be maintained through encouraging the tenants to adopt yield-increasing technology on their low productive cotton and non-cotton fields. Commercialization will strengthen the repayment capacity of the individual tenant.

vii. Enforcement of the administrative ruling which is embodied in the Tenancy Agreement toward tenants who fail to operate their farms efficiently including eviction when the deteriorating outcome is attributed to mere negligence.

The Rationale of the Work Plans

The Agricultural Corporations normally work according to standard administrative procedures. They offer services on a "no profit - no loss" basis and are generally accountable to the Sectoral Ministry. The operating budget and the capital investment expenditure are determined through different channels including the Board of Directors, MOA and the Ministry of Finance and Economic Planning (MOFEP).

The Agricultural Corporations play the intermediary role between the government and the tenants and their responsibilities and functions are to serve the interests of the government. Once the government interventions are sized down their role will atomically come down.

The Responses of the Tenants

Against the background spelled out for the relationships under the existing institutional setting, the tenants and their leaders have to respond to the regimental statutes governing the cropping pattern in the scheme area. Their involvement in decision making is tailored to fit the role of mobilizer of labor resources.

A key variable shaping tenants' behavior in irrigation schemes is their reaction to the existing circumstances with the assumption that the situation will be worse with others than being with the government and, therefore, it is best to try to get as much as possible while it is still bad. Another variable is related to the behavior of the tenants' leaders who at any given time, are allowed to defend or promote the interests of the tenants through negotiations with the management of the corporation or its Board of Directors or the Ministers of Agriculture and Finance. They believe that, besides the gains they grasp in these negotiations, they are allowed to broaden their role in larger national issues i.e., more political influence.

GOVERNMENT RESPONSIBILITIES AND MANAGEMENT PERFORMANCE

In order to gain further insight into the irrigation systems, the responsibilities related to the government interventions are to be explained with the implications of management performance.

Policy Setting

The policy setting of the government interventions in the irrigation schemes give a definite role to the Corporation in decisions regarding rotations to the crop relations and cropping area targets. This would entail vesting responsibility with the scheme management for the identification of the cost components of the crops selected by the government for controlled financing through the Bank of Sudan or through the consortium of Commercial Banks. The selected crops are subject to controlled marketing and pricing arrangements, the responsibilities of which are delegated to various government agencies and committees. Crops like cotton and wheat satisfy this nature of captive crops which can easily be managed under the controlled system. They allow various deductions to be settled under the loan repayment arrangements including the service charges of both the Corporation and the Ministry of Irrigation.

A key variable in the system is the link between government responsibilities and cost-effectiveness. The internal regulations under the Corporations under the Corporation policy failed to produce satisfactory recovery standard and, hence, it was unable to meet its obligations. The recent accounting policy improvements introduced with the collaboration of the Advisory Unit for Agricultural Corporations (AUAC),

a newly established unit in MOA with World Bank assistance, and the variables under the new terms of financing from the commercial banks that restrict the size of the loan to the repayment capacity initiated more commitment to cost-effectiveness. Nevertheless, it is to be noted that some institutional factors still work against manageable cost-recovery mechanisms stemming from the service variabilities of both the Corporation and the Ministry of Irrigation.

Land Tenure and Production Relations

The rights and obligations of the partners in the irrigation systems, mainly of the scheme management and the tenants are defined in the Tenancy Agreements. They are designed to relate the tenancy or individual holding to performance standards against certain service variables.

In response to service variability due to financial pressures and increasing cropping diversification and intensification and the changes in the tenants' attitude toward ownership and the accompanying increase in the number of tenancies, both sides became less motivated to pursue enforcement of the administrative ruling embodied in the Tenancy Agreement.

The influence of economic incentives is manifested in the cotton production relationship which is reflected in the Individual Account System introduced by the beginning of the 1980s replacing the share cropping arrangements on the cotton proceeds.

A key variable in the relationship is to levy a land and water charge on each crop grown and harvested at field level which when valued at the ruling price will cover the ruling costs. The land and water charge is to be set annually in accordance with certain modalities agreed upon in the committee nominated by the Minister of Agriculture. Other variables of the relationship are related to the adequate delivery of input and services to the cotton crop and the announcement of a fair price calculated by the same committee for setting the land and water charges.

Beside the service variability, the tenants are sometimes subjected to unfair ruling costs and prices which will nullify the influence of economic
incentives in the production relations and instead create a situation of indebtedness.

An analysis of a recent Gezira tenants' survey showed that the highly indebted tenants are characterized by lower holding size and lower land utilization capacity of which almost 50 percent under sorghum is destined mostly for home consumption (80 percent). On adequacy of services provided, 81 percent of the tenants claim that they are not satisfied with the Corporation's land preparation and 30 percent claim that they are unhappy with irrigation performance. Eighty nine percent of these consider cotton prices to be unfair and 96 percent think the same for wheat prices. On controlled credit arrangement, 94 percent claim that the cash advances for cotton are inadequate and 53 percent claim the same for credit arrangements for wheat.

The Service Provision Responsibilities

The government's responsibilities toward service provision should have been confined to its role in irrigation management covering necessarily the maintenance and rehabilitation components. Due to its commitment to satisfy certain national goals, the government is to stick to the role of setting objectives and priorities to the users. By doing so, it is shouldering other service provision responsibilities relevant to the magnitude of its intervention in the system operations. The cotton program in particular and to some extent the wheat program shape the magnitude of government involvement. The interventions are expressed either as direct involvement by the services units of the corporations in matters like inputs management and land preparation or contractual dealings with the private sector through the scheme management for some mechanization activities. In either case, the magnitude and the quality of the service are decided by the management and not by the tenants.

Starting from the controlled regulations of the government on foreign exchange requirements of the cotton and wheat production programs up to the government-controlled outlets of their marketing, the tenants are left to build their own demand according to the management's plans.

With respect to the irrigation services, the functional responsibilities are divided between the Irrigation Services Administration of MOI and the Agricultural Administrations of MOI and the Agricultural Administration of the Corporations. The first is to adjust the water control up to the minor canal head structures and the second has to monitor levels in the system from that point onwards. Moreover, MOI is entrusted with the role of maintaining the irrigation system at adequate levels with the understanding that the various levels of O&M are done timely and properly.

PRIORITY SETTING FOR PRIVATIZATION

Based on the current state of knowledge about the institutional development of the irrigation systems in Sudan, we will present the arguments for the priority setting and its conceptual framework.

Irrigation Assets and Services

The nature of irrigation water being a collective good distributed among different users, there is a tendency to impose some measure of government control. Therefore, it should be understood from the beginning that not all management functions and ownership are to be transferred to the private sector.

Here we have to differentiate between the controlled gravity flow irrigation infrastructure servicing large scheme areas like the Gezira (2.1 million feddans) New Halfa (330,000 feddans), and the electric or diesel-driven pump installations supporting smaller scheme areas ranging from less than 5,000 feddans to 50,000 in the Blue and White Nile areas up to 80,000 feddans (Suki Scheme). While the ownership and most of the irrigation services will be retained in the first category, both ownership and irrigation services in the second category could be transferred to the private sector. Therefore, the responsibilities and management practices now entrusted to MOI in Gezira, Rahad and New Halfa will continue under the existing institutional arrangements with the possibility of the turnover of O&M of the minor canals to the Tenant's Associations (now a disputed area between the Agricultural Corporation and MOI).

Regarding the responsibilities and management functions of MOI in the pump schemes, it is preferable to shift them to an irrigation water authority (could be the existing Agricultural Corporation), and after rehabilitation, the turnover of both the ownership of assets and the irrigation services to the private sector should be considered (preferably to an institutional alternative with tenants' participation). An alternative arrangement to the role of the Cooperation's field staff in both water indenting and monitoring of water management should be developed with the changes in the institutional arrangements. Moreover, the role of the collection of water charges should also be emphasized in any alternative.

The turnover should not hamper any constructive effort concerning improvement in water management means or irrigation design options envisaged in the various rehabilitation and modernization plans.

The Agricultural Corporation's Management Functions and Services

First, we have to recognize the relationship between the scale of the management functions and services and the government policy functions. Second, we have to differentiate between the patterns of changes in the management functions and those related to the service provision. Both will follow as a consequence to policy changes. Therefore, the priority setting here relies on a set of policy issues conducive to more participation of the tenants in decision making. While the tenants will continue building technical capabilities for some years to come, the Agricultural Corporation's Management functions are either to be retained as they are with the possibility of the turnover of its service units to the private sector or to be transformed into a new institution composed of technical advisory units directly responsible to MOA's line agencies. The Advisory Units will cover the fields or input management, agricultural mechanization,

training and extension and crop protection. Other fields of importance which are often neglected and need to be included in the management functions are environment and nutrition. Some executive functions will also be retained concerning land tenure regulations and other major policy functions preferably to be sponsored by a Production Council composed of representatives of the Technical Advisory Units and members of the Tenants' Associations nominated by them to interact in the management functions. This Council is to be chaired by a prominent experienced candidate nominated by the Ministry of Agriculture who besides holding the Chairmanship will coordinate the activities of the Advisory Units. This alternative setup will replace the Corporation. (A decision is already taken to dismantle four corporations). In both cases, the tenants will pay administrative charges (now termed land charge) to cover the costs incurred in performing the above functions. Outside the sphere of the above management functions, the door will be wide-open for the participation of the private sector. This will imply the following:

i. Evaluation of the Corporations' service units as independent cost centers and either to be commercialized or disposed of to the private sector. This will include seed processing units, the agricultural machinery, the ginneries and transport and handling means like the Gezira Light Railway.

ii. A due respect is to be given to the wide experience gained by the Gezira Tenants' Union through managing various enterprises like flour and textile mills and in the field of individual management of various tractor operations. Their recent initiative in mobilizing the resources of the farming community to build their own banking institution should also be appreciated and encouraged. This endeavor by the tenants should be accompanied by policies advocating more stable land tenure relationships, more conducive exchange rate regiments, more flexible foreign exchange regulations, more stable price setting and freedom to handle various contractual dealings, including the mortgage and sale of their holdings.

iii. The role of the Agricultural Corporation as a credit channel and the role of the Sudan Cotton Company as a marketing channel may cease as far as the tenants are concerned because they will respond to the best terms offered and not necessarily through these channels. A transitional period will elapse before the conditions allow such shift in responsibilities. During this period it is preferable for the Corporation to work as a shopping window for inputs on a cash-and-carry basis and the Sudan Cotton Company to limit its role in the handling of cotton lint once channeled through their office.

iv. Due consideration should also be given to the private sector participation, needs for institutional support from the government in the form of training farming and skill-building

capacities. This will minimize the risk of the turnover of some of the service provision functions to the private sector.

CONCLUDING REMARKS

The main discussion theme in this paper was meant to address the following:

First, documentation of government responsibilities in the irrigation systems of Sudan with slight indicative measurement of management performance. Second, distinction between the pattern of changes in management functions and the possibilities of turnover of service provision functions to the private sector. Third, definition of the policy elements that will lead to more involvement of the tenant in decision making. Fourth, presentation of the likely pattern of the priority setting for privatization of the irrigation schemes.

We have to admit that the management turnover in the irrigation systems in Sudan might bring more risky and complicated implications than experienced in other countries. That is due to the special characteristics of the systems that successfully imposed economies of scale in the operation of small-sized holdings.

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CHAPTER 6

Statement from IIMI

Nanda Abeywickrema[5]

Mr. Chairman, Honorable Ministers, Distinguished Ladies and Gentlemen

It is a great pleasure and a privilege for me to be invited to participate in this national workshop on privatization of irrigation schemes in Sudan. On behalf of my colleagues and on behalf of the International Irrigation Management Institute (IIMI) and its Director General, I wish to thank the sponsors and organizers of this enormously important workshop, for having invited us to collaborate in this event. I also take this opportunity to congratulate the organizers, on the excellent arrangements made to make this event a success. I am particularly delighted that the Arab Organization for Agricultural Development (AOAD) with whom IIMI has signed a collaborative agreement is a partner in this important activity. We appreciate the cooperation of this organization.

On a request made by the Honorable Minister of Irrigation and Water Resources, Dr. Abu Shora and the Honorable Minister of Agriculture and Natural Resources, Dr. Geneif to our Resident Scientist, Dr. Muhamed Shafique to assist in the workshop, we at IIMI made every effort to provide the best available talents and to share with you our recent international experience, in efforts at irrigation turnover and privatization. My Director General Dr. Roberto Lenton who is taking a keen interest in developments in Sudan regrets that he is unable to be physically present here today, but he sends his good wishes for the success of the workshop. More important, he has sent several staff members to contribute to this workshop.

Present with us today are Dr. Wijayaratna, our Head of Field Operations in the Philippines who will present to you the Philippine experience in turnover and privatization efforts; Dr. Douglas Vermillion, Institutional Specialist who will present a synthesis of current global efforts toward turnover and privatization; Mr. H. Farbrother, who is well-known, and whom we invited as a Consultant on account of his long and wide experience, both international and Sudanese. The views and experiences these experts present will be their own since IIMI does not as yet have or advocate any particular official line on privatization. In addition, I will table a short paper in which one of my colleagues Mr. Charles Abernethy whom many of you know raises some important points for discussion.

[5] The Director of Field Operations, IIMI.

Our endeavor is to analyze the global environment and present the prospects and constraints in an objective, yet neutral manner for discussion and debate, in order for policymakers to make realistic decisions suited to their own physical, economic and sociopolitical environment.

IIMI, as many of you are aware, was established in 1984 as an international organization with its headquarters in Sri Lanka and is now a member of the prestigious Consultative Group on International Agricultural Research (CGIAR).

IIMI's declared mission is "to strengthen national efforts to improve and sustain the performance of irrigation systems through the development of management innovations." To achieve this objective, we have developed a strategy, an important characteristic of which is to work in leading irrigation environments in a collaborative mode with the national institutions.

Given the vital importance of irrigation and irrigated agriculture to the economy and to the people of Sudan, it was quite logical for IIMI to negotiate for the establishment of a field office in this country early on. The large investments made in irrigation both before and after Independence, the large extent of irrigation, which I believe is one of the largest in the African Continent, the sheer size of the systems and managing organizations and the enormous number of rural people dependent on irrigation, were very compelling reasons for IIMI to collaborate with you, and both to contribute our knowledge, if any, and perhaps more important, to learn from your experiences. It is for this reason that Dr. Mohamed Shafique took up residence in Sudan in mid-1989 as Head, Field Operations. He was joined by Dr. Azharul Haq in mid- 1990. He is away today attending on AOAD workshop in Rabat, Morocco.

In chalking out a collaborative research program for Sudanese Irrigation Management, Dr. Shafique's first task was to invite the views of leading Sudanese professionals on the kind of program IIMI should embark on. The high-level National Workshop held in October 1989, which had representation and active participation of Sudanese professionals came up with a long list of the most pressing research issues and a menu of research topics. This consultation was arranged on the premise that national professionals were in the best position to identify the critical management issues and that IIMI's role was to catalyze the process of finding solutions.

Later in the same year, the Sudan IIMI Consultative Committee made up of the leading managers and professionals in the irrigated agriculture sector was constituted with a mandate to formalize a long-term work plan and to set priorities for IIMI's collaborative activities. I am pleased to place on record that the Consultative Committee has provided excellent leadership in the direction, taken an active interest in the affairs of IIMI and is poised to make an outstanding contribution in making our collaborative efforts a success.

In mid-1990, Dr. Shafique was joined by Dr. Azharul Haq as Senior Water Management Advisor to work specifically with the Sudan Gezira Board. His research findings have already been presented to the SGB and to the Consultative Committee. It is our expectation that these findings will have wider

application and that his work will be integrated as part of the overall Sudan Program. To further strengthen this kind of effort, IIMI has been able to bring in specialists in various fields of irrigation management from time to time. This is an important and significant part of our operational strategy. IIMI also endeavors to provide opportunities for Sudanese professionals to get an exposure to developments in the rest of the world.

During our short period of stay in Sudan we have been able to focus on three vital areas of activity: firstly, in establishing priorities for collaborative activities, through the measures referred to earlier; secondly, in field research, the kind of work we are now undertaking in the Rahad and Gezira schemes; and thirdly, in the area of policy studies. The current workshop is an outstanding example in this direction. Prior to that we collaborated with the AUAC in the Ministry of Agriculture in a workshop on Land and Water Charges which I understand has helped to surface a wide range of policy issues on which future work is now contemplated.

It is my duty at this moment to place on record the excellent support and cooperation my staff and I have received from all concerned, from the highest levels in the administration to the field levels, to facilitate us to conduct our work in an objective and professional manner. I wish to thank all those present here and those not present for their active and unqualified support.

I am recounting these developments, essentially to put you in the picture about IIMI's mode of operation. IIMI is not a donor; we are dependent on the goodwill of donors for our funding, which will be naturally dependent on the excellence of our performance. We do not work in a consultancy mode or on short-term activities. We like to develop as a center of excellence, where we can share our knowledge and experience in a long-term collaborative relationship. We like to be in a position to contribute our knowledge and experience in a neutral and objective manner to help national policymakers and managers to make their own decisions. We also want to learn from your experience.

It is for these reasons that we agreed to participate in this workshop on privatization which is a widely discussed topic today all over the world.

To avoid risks of repetitions, I shall not deal with the topic of privatization and turnover per se, as my colleagues who are specialists in these fields will present to you the state-of-the-art in this important area. I shall only refer to two aspects which are based on my own experience and observation.

The first is that, the past few decades have demonstrated clearly that the performance of irrigation systems in the large majority of the developing countries (and may be even some of the developed countries) has been disappointingly low. Resources for further investment in new irrigation, or for that matter even for rehabilitation or for maintenance are drying up, leading to neglect of systems and untold hardship for the people dependent on them, especially the rural poor. We think that improved management, institutional changes and more forward-looking policies through modest investments in

research and human resources can bring about significant salutary changes to improve performance and the living conditions of people who are our ultimate target group.

The second is that, as irrigation systems mature and as the farming community becomes more knowledgeable about their functioning, the water users and farmers volunteer to play a more active role in the decision-making process. We have reached a stage where the farmers have to be treated not merely as part of the problem but as a part of the solution as well! The interest in participatory management, in joint-management, in self-management and in system turnover is sweeping across Asia. There have been successes and failures. There are opportunities and constraints. It is in such a context that we have to address the issues before us.

An important point to remember, however, as my colleagues will elaborate, is that management turnover or privatization does not necessarily mean a total withdrawal of the government's role in irrigation. Water being a natural resource and a public good, public institutions will continue to have a vital role to play, especially in our developing countries. I would go to the extent of saying that with privatization, public institutions will have a wider and even more responsible role to play than now, to ensure that the overall long-term national benefits are guaranteed.

Mr. Chairman, we at IIMI, therefore, welcome the opportunity to work with you and share experiences with Sudan's policymakers and look forward to strengthening our association with Sudan. I hope and trust that this workshop will provide the forum to crystallize the wide-ranging ideas and views on the subject and help you to arrive at a rational and practical set of policies, on what can be a highly sensitive issue.

I wish to emphasize again that IIMI's role is to place before this assembly the international experience, both positive and negative, and thereby facilitate a workable set of strategies for yourselves to adopt.

Let me conclude by thanking the Honorable Ministers for their keen interest in arriving at policy decisions through a process of consultation and consensus and the organizations for their confidence in IIMI. Our mission will continue to be "to strengthen national capacity through collaboration."

I wish the workshop all success.

LIST OF ACRONYMS

AAPP - Accelerated Agricultural Production Project
AOI - Articles of Incorporation
APDS - Assistance Programs Development Section
BLDC - Basic Leadership Development Course
BMS - Benefit Monitoring Section
CIS - Communal Irrigation System
CISS - Communal Irrigation Projects/Systems Section
FIOP - Farmer Irrigators' Organization Program
FMST - Financial Management System Training
FSDC - Farm System Development Course
FSCC - Final Statement of Chargeable Cost
IA - Irrigators' Associations
IAD - Irrigators' Assistance Division
ICO - Irrigation Community Organizer
ICOP - Irrigation Community Organization Program
IDD - Institutional Development Department
IDO - Institutional Development Officer
IDP - Institutional Development Program
IOD - Irrigators' Organization Division
IS - Irrigation Superintendent
ISF - Irrigation Service Fees
IT - Irrigation Technician
LIPA - List of Irrigated and Planted Areas
MC - Memorandum Circular
MOA - Memorandum of Agreement
NWRB - National Water Resources Board
NIA - National Irrigation Administration
NIS - National Irrigation Systems
NISS - National Irrigation Projects/Systems Section
NIP - National Irrigation Project
O&M - Operation and Maintenance
PACD - Presidential Assistance on Community Development
PAP - Participatory Approach Program
PE - Project Engineer
PIE - Provincial Irrigation Engineer
PIO - Provincial Irrigation Office
PMS - Program Monitoring Section
RIM - Regional Irrigation Manager
RIO - Regional Irrigation Office
SEC - Securities and Exchange Commission
SFD - Supplementary Farm Ditch
SMT - System Management Training
SMW - System Management Workshop

CHAPTER 7

Irrigation System Turnover: The Philippine Experience

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INTRODUCTION

Turnover of management responsibilities of irrigation systems to Irrigators' Associations (IAs) has been a primary policy objective of the National Irrigation Administration (NIA) of the Philippines. Instead of treating "turnover" in isolation or as a separate issue, NIA has always considered it as an integral component of the Institutional Development Program (IDP). The IDP has as its goal, the formation, development and sustenance of functional, cohesive and viable IAs which are highly capable of managing partially or fully the operation and maintenance (O&M) of irrigation systems under formal contractual agreements with NIA.

Most of the Communal Irrigation Systems (CIS) covering approximately 47 percent of the total irrigated area in the country are *managed by the farmers*. While the systems vary in scope and type of structure, most serve less than 1,000 hectares of farmland. As a tradition, the communal systems are constructed and developed jointly by NIA and IAs. At the completion of this phase, the systems are turned over to farmers. Most of the National Irrigation Systems, on the other hand, are managed jointly by NIA and IAs. Upon the acquisition of a legal status, an IA can enter into a contract with NIA. Aside from this, the IA to prove that it is capable of managing its affairs, particularly, the system's maintenance and the collection of Irrigation Service Fees (ISF). There are three types of contracts governing the NIA-IA partnership in the management of National Irrigation Systems. Type I contract entitles the IA to undertake canal maintenance while Type II contract allows the IA to collect ISF and retain a portion of the collection according to the NIA-IA incentive schedule. Type III contract stipulates that the IA amortizes the cost of construction. Such type of contract can be executed based either on a *partial or total turnover of management.* NIAs' current programs and future plans are aimed at achieving full turnover or Type III status in the majority of National Irrigation Systems.

The objective of this paper is to *describe* briefly the strategies and processes adopted by NIA in achieving its IDP goals with special reference to the turnover of management responsibilities to IAs. The

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paper is organized in eight parts. After this introductory section, Part II will briefly describe the evolution of the NIA-IA partnership and the participatory approach in irrigation management. Part III is devoted to a strategy in the NISs for handing over management responsibilities to beneficiaries namely the Irrigators' Organizations. Part IV discusses the turnover experience of NISs. Part V of this paper discusses briefly the role of training in developing and sustaining IA capability of irrigation system management. Part VI outlines NIA's organizational structure to support institutional development and turnover. NIA's current plans regarding the turnover of irrigation systems to Irrigators' Associations are outlined in part VII. The final section of the paper will provide a summary of all the strategies.

EVOLUTION OF THE NIA-IA PARTNERSHIP AND THE PARTICIPATORY APPROACH IN IRRIGATION MANAGEMENT

Early Irrigation of Cooperatives -- The Zanjeras

Historical evidence suggests that certain indigenous small-scale irrigation systems in the Philippines had been constructed and managed by irrigation societies. For example, in the 17th century, cooperative societies by the name of "Zanjeras" were involved in constructing irrigation systems by means of locally constructed bamboo and rock diversion structures placed across streams or rivers. Usually, such an indigenous irrigation society comprised members from two or more villages. In some instances, the members were all landowners, in others, landowners and tenants, and in several, all were tenants. The costs of construction of dams, main canals and other minor structures were all shared by the members either by giving construction materials or by contributing labor. This practice of sharing also governed the repair and maintenance of the systems. Moreover, the society had an internal mechanism to resolve conflicts among individuals or groups of Zanjeras. Hence, the operation of these irrigation societies resembles that of a complex organizational enterprise which involves engineering and construction activities, soil-water-crop relations, management and allocation of water rights to groups and individuals, physical maintenance activities, conflict management, etc.

State Intervention and the Legal Recognition of Irrigation Societies

In 1912, the Philippine legislature passed an Irrigation Act (Act No. 2152) authorizing the irrigation division of the Bureau of Public Works to manage irrigation systems it had built. Another provision of the new law provided for the regulation of rights to public waters, including water used in national, communal and

private irrigation systems. The Irrigation Act also formalized the concept of Irrigators' Association (IA) as a legal body authorized to manage a CIS. These associations were registered under the nation's Corporation Law (Act 1459) with powers to manage their irrigation systems subject to the approval of the Secretary of Public Works, to elect officials and to compel members to contribute to the cost of managing the irrigation systems in proportion to the benefits derived.

This Act also provided an indirect incentive for community management of irrigation since it stipulated that farmers served by CISs would not be charged with irrigation fees by the government. The reason cited was the fact that these systems were not built with government funds.

After the country regained Independence in 1945, the Irrigation Division of the Bureau of Public Works was empowered not only to continue the construction and management of National Irrigation Systems (NIS) but also to provide construction assistance to CISs. The aid to communals was usually in the form of replacing a log and stone diversion weir with a concrete one and constructing canals to expand the irrigated area.

The funds for the early communal irrigation assistance program came from yearly appropriations in the "pork barrel" fund of members of the Congress, which also covered outlays for other public works, projects such as roads, schools, river control works, etc. In most cases, these projects were pursued as rewards for political support garnered in certain areas. Since these, in general, were inadequately funded and poorly designed and managed, many proved unresponsive to the farmers' needs. In addition, this system, in which communal irrigation facilities were built without any arrangement for the recovery of costs from the beneficiaries, had fostered farmers' dependence upon the government.

Mainly because of these shortcomings, the "pork barrel" approach was later eliminated and was replaced with "Community Assistance Allotment" under the program called the "Presidential Assistance of Community Development (PACD)." Under this arrangement farmers were required to contribute labor and local materials available in the community in exchange for the PACD's free cement and reinforcing steel bars. And the Bureau of Public Works (and later NIA, since its establishment in 1963) provided technical assistance in design preparation and supervised construction. Even at this stage, the farmer beneficiaries were not obliged to pay back for the costs of services and construction incurred in the development of irrigation systems and, hence, these can be considered as "dole-outs."

Recovery of Irrigation Costs and Efforts toward Cost Minimization

On September 11, in 1974, the Presidential Decree 552 was issued amending certain sections of the original NIA charter. Among other things, it granted NIA the power to:

...charge and collect from the beneficiaries (of water) from all Irrigation Systems constructed by or under its administration such as may be necessary to cover the cost of operation, maintenance and insurance, and to recover the cost of construction within a reasonable period of time to the extent consistent with government policy; to recover funds or portions thereof expanded for the construction and/or rehabilitation of communal irrigation systems which funds shall accrue to a special fund for irrigation development under section 2.

In addition to the provision for the recovery of costs of construction and O&M, the decree also laid the foundation for NIA to minimize expenses by developing *joint management of systems with Irrigators' Associations* covering the operation and maintenance needs for substantial parts of the systems and NIA focusing mainly on the headworks and the main canal. NIA's amended charter laid the foundation for precisely such a strategy by explicitly authorizing the agency to delegate partial or full management of its NISs to the IAs. For CISs the new policies neutralized the adverse effects of the earlier approaches.

NIA's Organized Efforts toward Institutional Development

Institutional strengthening was considered to be a prerequisite for the realization of NIA's objectives under the amended charter. Moreover, NIA, as a corporate agency, was confronted with the problem of inadequate funding support to sustain efficient operation. The situation was aggravated due to the withdrawal of the government's subsidy to NIA. A strong NIA-IA partnership was deemed necessary for other reasons as well. For example, irrigation service delivery requires a 24-hour availability of NIA's O&M staff in the field but because of bureaucratic constraints (i.e., of the government or corporations), workers are only paid for an 8-hour service; and, O&M staff had to work on the prescribed hours, otherwise there would have been no fees for overtime work. Also, mainly as a result of insufficiency of funds to support systems' O&M, a problem of "inadequate functionality of systems" had been observed thereby leading to inefficient and inadequate water distribution in such systems. But the foremost of the problems was the inadequate participation of farmers who are the recipients of irrigation services. Some farmers were highly dissatisfied and frustrated and these were manifested in terms of the farmers' reluctance to pay amortization and ISF, destruction of irrigation structures and facilities by some farmers, the utter disregard of NIA's O&M policies by farmers as well as reduced attendance in NIA-initiated meetings. Many farmers remained merely as spectators rather than as active partners of NIA in its developmental efforts.

Low irrigation service and amortization fee collection efficiency became a major cause for NIA's financial predicament and these posed the greatest challenge to NIA's survival as a viable government corporation. To service as an organization, and, more importantly, to be able to perform effectively and efficiently its mandated functions, NIA must now do something to break the vicious circle in irrigation. It must institutionalize positive organizational responses, strengthen the IAs and operationalize the NIA-IA partnership concept. In response to the challenge, NIA launched in the late 70s a program which employed farmers' participation in all aspects of irrigation system management.

This was first piloted in the communal irrigation systems and the process is described briefly in the next section.

NIA's INSTITUTIONAL DEVELOPMENT PROGRAM AND IRRIGATION SYSTEM TURNOVER:EXPERIENCE IN THE COMMUNAL IRRIGATION SYSTEMS[7]

In 1975, a year after the Presidential Decree 552 was proclaimed, NIA entered into contract with the Farm System Development Corporation (FSDC), a nongovernmental organization, to organize farmers in communal irrigation systems while NIA concentrated on physical construction of the irrigation system.[8] In 1976, the participatory approach program was launched in two communal irrigation systems in Laur Nueva Ecija. The results were encouraging and NIA decided to expand the program.

NIA's Communal Irrigation Systems Development and Turnover Program aimed to organize water users into an Irrigators' Association which can responsibly operate and maintain, and own the irrigation systems. In order to implement this program successfully, NIA follows four phases in the development of communal irrigation projects/systems. They are (1) identification, investigation and selection phase; (2) pre-construction phase; (3) construction phase and (4) operation and maintenance phase. These different phases are designed carefully to prepare the water users in their roles and responsibilities in the operation and maintenance of the system upon project completion and turnover to the Irrigators' Association. This implies that there are two major components of NIA's Communal Irrigation Development and Turnover

[7]Communal Irrigation Systems in the Philippines are classified by NIA under three categories: private, amortizing, and nonamortizing. Private CISs are those schemes constructed by the rich landowners or private entities, usually for their exclusive use. These are not included in the discussion of the present paper. Amortizing CISs are those constructed or rehabilitated with NIA's initiative under its Participatory Approach Program (PAP) and turned over to IAs. The farmer-beneficiaries of such systems pay back a portion of the cost of construction/rehabilitation. Non-amortizing CISs, on the other hand, fall under the category of dole-out systems since they were constructed by agencies without any cost-recovery arrangement. Most of the communals constructed before the creation of NIA (1963) belong to this category.

[8]This arrangement, however, did not succeed: it was learned by experiences that the engineering and organizing tasks should be closely integrated. Consequently, NIA used its own community organizers at later stages.

Program: the physical and institutional. A brief summary of the different institutional and technical activities undertaken in the four phases of communal irrigation development and turnover is given below:

Identification, Investigation and Selection Phase

It is in this phase that the National Irrigation Administration identifies projects for future implementation. Projects identified were lined up for further investigation, selection and feasibility studies. The project identification is being undertaken by the Provincial Irrigation Office (PIO) and the Regional Irrigation Office (RIO). During the feasibility phase of the project, NIA is fielding its technical men to gather agro-climatic data in order to know if water supply is sufficient to irrigate the identified potential irrigable area. And a profile writer is also fielded to write the profile describing the technical, institutional and socioeconomic status of the proposed project. This project profile will then be used in project feasibility preparation and in the selection and prioritization workshop at the Provincial Irrigation Office (PIO) and later at the Regional Irrigation Office. After final selection of the project, the Regional Annual Program will be prepared and submitted to NIA Central Office for funding. It should be noted here that NIA's technical men approach usually the *barangay* (village captain), consult him and seek the assistance of the community in the identification and investigation of the project.

Pre-Construction Phase

This is the phase during which NIA hires and trains Irrigation Community Organizers (ICOs), at present known as Institutional Development Officers (IDOs), based on the number of projects to be implemented by NIA. The ICOs/IDOs are trained and undergo orientation at the Provincial Irrigation Office. The major institutional and technical activities undertaken in this phase are as follows: (1) ICO/IDO integrates with the community and with IA and starts the mobilization; (2) forms/reactivates committees for pre-construction; (3) recruits/firm-ups IA membership; (4) formulates/ disseminates Articles of Incorporation (AOI) and IA bylaws; (5) conducts organizational meeting to form IA and ratify IA bylaws; 6) prepares/submits IA registration papers and water permit application; (7) processes and approves IA registration at SEC (Securities and Exchange Commission) and water application at NWRB (National Water Resources Board); (8) conducts training needs analyses; (9) trains ICOs/IDOs for the Construction Phase; (10) presents first pre-construction conference and POW/design: (11) forms/reactivates the committees for construction; (12) formulates the NIA-IA policies and systems for construction, develops i) schemes for counterpart contribution, and ii) systems of recording and monitoring of equity; (13) holds

final pre-construction conference; (14) prepares and submits certificate for project construction and final discussion and signing of MOA (Memorandum of Agreement). During this phase, training such as (1) group dynamics; (2) organizational and financial management; and cost reconciliation must be given to the Irrigators' Association (IA). Ideally, this phase takes about 6-9 months and before the construction phase starts, NIA evaluates IA viability.

Construction Phase

Before construction starts, the Project Engineer (PE) orients both the NIA and IA skilled workers and the ICO/IDO mobilizes the different committees to participate in the construction activities. Following are the major institutional and technical activities under this phase: (1) evaluation of bids and awards on civil contracts; (2) canvassing and bidding for construction materials; (3) procurement and delivery of construction materials; (4) moving-in manpower and equipment; (5) construction of major irrigation facilities and canal structures. While construction is going on, both the IA and NIA conduct i) equity generation, recording and monitoring; and ii) cost and equity reconciliation; (6) after the construction, NIA-IA conducts i) an inventory of completed irrigation structures and facilities; ii) pre-O&M conference in order to reactivate the O&M committee and appoint O&M personnel; and iii) test-runs and verifies functionality of completed irrigation structures and facilities; (7) if there are some defective structures, NIA repairs defective canals, and other irrigation structures and facilities; (8) the NIA-IA also conducts final cost reconciliation, prepares the Final Statement of Chargeable Cost (FSCC); and formulates the repayment scheme and turnover of irrigation system to the Irrigators' Association (IA). Time duration in undertaking this phase depends on the extent of work to be done and the availability of funds. But normally, it takes one year to complete one communal irrigation system.

Turnover, Operation and Maintenance and Cost Recovery Phase

According to the Memorandum Circular No. 22 series of 1988 (MC 22 s.1988), the turnover of a communal irrigation system to the Irrigators' Association is an activity where NIA gives the full responsibility to the IA in operation and maintenance of the irrigation systems. NIA, however, continues to develop and strengthen the capability of the IA to operate and maintain the completed and/or partially completed irrigation systems using the IA's own resources.

After the turnover of the irrigation systems, NIA conducts a System Management Training/Workshop (SMT/SMW) to the Irrigators' Association (IA). The System Management Training/Workshop aims at

formulating plans for the operation and maintenance of the irrigation system. This includes the proper and timely delivery of irrigation water to the service area, and proper selection of O&M personnel who will implement the plans. And at this stage, O&M policies formulated during the pre-O&M conference will be firmed-up during the IA Board of Directors'sectoral and general assembly meetings. The first cropping following the systems' turnover is where the formulated plans are implemented. Following are the activities undertaken in this phase: (1) implement/update system management and financial management plans; (2) continue education and training; (3) conduct regular IA meetings; (4) implement/update conflict management mechanisms; (5) issue water service bill and collect irrigation fee while IA pays amortization to NIA; (6) perform in-season monitoring and evaluation (the IA with the assistance of the Irrigation Technician (IT) should establish linkages/coordination with other government/private agencies and the IAs regarding O&M activities); (7) conduct the annual post-evaluation and planning session through the IA Board of Director's, sectoral and general assembly meetings; and (8) revise and amend IA Bylaws. After two cropping seasons, the ICO/IDO will be pulled out of the area.

In handing over the communal irrigation systems to the Irrigators' Association (IA), NIA adopts two schemes to facilitate immediate turnover and cost recovery. The first scheme is the 30 percent equity participation which could be availed of by any Irrigators' Association in place of the regular amortization of the chargeable cost under the following conditions (MC 27 s. 1991).[9]

i. That the IA is willing and capable to raise within the construction/rehabilitation period its equity participation which is defined as the amount of money equivalent to 30 percent of the chargeable cost.[10]

ii. That the money value of the IA's equity participation may come from (1) the cost of labor valued at NIA rates furnished by the IA without payment from NIA; (2) the labor from construction of diversion works, canals, and other works done by the IA on the project; (3) the cost of construction materials and supplies provided by the IA; (4) the cost of right-of-way for canals, diversion works, structures, or access roads negotiated and acquired by the IA and (5) cash contributed by the IA.

[9]In other words, the repayment can begin during project construction in the form of equity contribution which may include labor participation, supplies, materials and cash.

[10]Chargeable costs include the costs of diversion works, canals, structures and terminal facilities, etc. These chargeable costs have been estimated to be 90 percent of the total project cost.

iii. Where the IA agrees to contribute a portion of the wages of its members and authorizes the Provincial Irrigation Office to withhold the amount from the payroll of the IA members working on the project.

iv. If, during the construction/rehabilitation period the required 30 percent equity participation is not met, then the IA shall be given a maximum grace period of one cropping season after project completion and turnover to raise the remaining amount.

It should be noted that at 30 percent equity, the loan is considered fully paid.

The second scheme is the amortization of the chargeable cost whose benefit has been availed of by most of the communal IAs. This is a long-term arrangement and the IA is required to put up an equity participation of not less than 10 percent of the chargeable cost during construction and rehabilitation. The duration/or period of amortization shall not exceed fifty years. The equity participation of the IA shall consist of the money value of the items mentioned under Scheme I.

The other provisions/arrangements stipulated in MC 27 s. 1991 are:

i. If the Irrigators' Associations currently amortizing opt to convert from Scheme II to Scheme I (both communal and fully turned-over nationals), the IA should forward its intention through a Board Resolution addressed to the Regional Irrigation Manager (RIM) (Attention: The Provincial Irrigation Engineer and/or The Irrigation Superintendent). The other requirements are: (a) the IA Board Resolution shall be endorsed and submitted by the Provincial Irrigation Engineer and/or the Irrigation Superintendent (PIE/IS) to the RIM attaching a copy of the current status of amortization payment of the requesting IA which shall be duly certified by the Regional Accountant; (b) the equity of the requesting IA shall be 30 percent of the balance of the amortizable amount plus the back account, if any, and (c) the equity participation of the requesting IA shall be payable in cash within a maximum period of six months whose effectivity shall start from the date the IA receives the notice of the RIM approving the IA's request. Any unpaid amount within the designated period shall be subjected to a maximum interest of 1 percent per month to be settled by the IA within the following six months.

ii. If Irrigators' Associations request for assistance from NIA for the rehabilitation/or improvement of their irrigation systems while they are currently amortizing the previous development cost incurred, the requesting IA could avail of the benefits of one or both schemes or of a combination of the two.

iii. If the IAs request for the adjustment of the date of amortization payment it should coincide with their harvesting season. The responsibility for approval of the request is delegated to the RIM and a copy of the duly approved request will be sent to the office of the Assistant Administrator for Systems Operations and Equipment Management, [Attention: The Manager, Institutional Development Department (IDD)].

Upon completion of the payment of amortization and/or equity participation, a *Certificate of System Ownership* will be awarded to the Irrigators' Association.

TURNOVER EXPERIENCE OF NATIONAL IRRIGATION SYSTEMS

With successful experience in CISs, in 1980, NIA piloted the Participatory Approach Program in the National Irrigation Systems. First, it was named as the Irrigation Community Organization Program (ICOP). The ICOP adopted the concept of fielding community organizers in the communals. The ICOP pilot project yielded encouraging results such as: 1) organization of cohesive Irrigators' Associations capable of system maintenance; 2) reduced O&M costs through the reduction of O&M personnel; 3) farmers' partial or full management of the irrigation system; 4) more equitable distribution of water; and 5) effective resolution of internal conflicts. With this positive impact the program was expanded to cover more NISs.

But in 1983, with NIA's policy on system "viability," the agency started to reduce its O&M costs and find ways to increase the irrigation service fee collection (Jopillo and de los Reyes 1988). To effect implementation of the agency's policy on systems "viability," NIA programmed to turnover the operation and maintenance responsibilities to the Irrigators' Association. Just like in the communal irrigation systems, an Irrigators' Association has to undergo a development process before NIA turns over the O&M responsibilities to the IA. Once the Irrigators' Association is ready to assume O&M, the NIA representative negotiates with the IA as to what type of O&M contract the IA should enter into depending upon the level of the IA preparedness. The following are the different types and arrangements on systems' O&M contract: in Type I contract, the IA undertakes the routine maintenance works of a certain length of the irrigation canal systems; in Type II contract, the IA undertakes the systems operation and collection of irrigation service fee (ISF) from its members; in Type III contract, the IA assumes full management (O&M) of systems. Further, the IAs under Type I and Type II are given incentives for their participation in the O&M and irrigation service fee collection. Under Type III contract, the IA shall amortize the investment and rehabilitation costs of the whole or part of the system in not more than 50 years (MC 41 s. 1990).

The different types of contracts in systems' turnover in the National Irrigation Systems are being undertaken with the premise that the water users are organized and duly registered with the Securities and Exchange Commission (SEC). Awarding of what type of contracts also depends on the level of the associations' capacity and capability to undertake the responsibilities. Some of the obligations and incentives/or remunerations under each type of contract are given in Annex I.

In developing the Irrigators' Associations in the National Irrigation Systems, NIA has used different strategies: the Irrigation Community Organization Program (ICOP) using professional community organizers and (at present) the Farmer Irrigators' Organization Program (FIOP) using farmers as organizers. The FIOP organizing process is given in Annex II.

DEVELOPING AND SUSTAINING IRRIGATORS' ASSOCIATIONS' CAPACITY FOR IRRIGATION MANAGEMENT: THE ROLE OF TRAINING

With the IAs' assumption of O&M in irrigation systems, NIA, through its IDP has recognized the necessity to provide *continuous interventions* geared toward the development and strengthening of the IAs' capacity to manage irrigation systems. These capacity-building program are envisioned to ensure a higher level of competence and commitment of the IAs in the execution of their responsibilities. Hence, the installation and institutionalization of IA training programs were considered to be major components of the IDP. These training programs are provided to augment the organization works performed by the community organizers.

The process of developing IA capabilities are developmental -- this means that the activities are normative and iterative in nature: and continuous for as long as the IA organization exists. Each learning activity is unique in itself and always results in a qualitative leap meaning although the activity is of the same nature, new and better learning is achieved thus resulting in an improvement over the past activities.

The capability-building programs are provided both formally and informally. The informal type of training is operationalized in venues like a planning meeting of the IA before the conduct of an O&M mobilization meeting or a Board of Directors' (BOD) meeting to formulate IA policies. The process is usually informal in the early stage of IA formation or during the organizing phase. The formal type of training takes place once a set of IA officers has been selected and once the IA has gained legal recognition. Several training methodologies are employed to attain the goals of the training. Many of these methods are of the experiential learning type of methodologies. These include the use of lectures, group-sharing, the small group task, case analysis, etc. In the implementation of the IA training program, NIA uses existing organizational units of the Central Office and Regional, Provincial and Irrigation Systems Offices. *Under*

each office, a core group is organized to attend to responsibilities related to the management of IA training programs.

The formal training package provided to the IAs include:

i. The Basic Leadership Development Course (BLDC);
ii. The Financial Management Systems' Training (FMST); and
iii. The Systems Management Training/Workshop (SMT/SMW).

Basic Leadership Development Course

The concept of leadership development is an essential component of the IDP and the turnover process. It seeks to develop and sustain the IA leaders' ability to spearhead and influence IA membership toward active participation in the O&M activities, membership expansion and strengthening as well as coordinating with other organizations where the IA does business with.

In both NISs and CISs, a four-day live-in formal training intervention of BLDC is given to the turnout service area leader and other IA officials soon after their election/selection to office. The BLDC for communal irrigation systems is conducted during the pre-construction stage while in the NISs this training is being currently given to IAs organized under Farmer Irrigators' Organization Program (FIOP) at the formative stage (Annex II).

The BLDC also aims at helping the participants to demonstrate basic and enhanced organizational and leadership skills which can be operationalized to develop appropriate attitudes which would ensure effective and efficient performance of the IAs' responsibilities stipulated in the O&M contracts with NIA. In other words, the BLDC is conceptualized upon the IAs' functions in the O&M contracts. It consists of the following modules:

Module	I.	An Overview of the Leadership Development;
Module	II.	NIA's Institutional Development Program;
Module	III.	The IA and Its Operations;
Module	IV.	The IA Leaders (roles and functions);
Module	V.	The IA Leaders' Skills Area; and
Module	VI.	Action Planning.

Systems' Management Training/Workshop (SMT/SMW)

The IA management of O&M of irrigation systems requires certain knowledge and skills which will facilitate effective performance of the IAs' O&M obligations. It is recognized that training opportunities to facilitate knowledge and skills building on systems' management are imperative. Hence, the SMT/SMW.

The overall objective of the SMT/SMW is to provide the IAs with opportunities to acquire knowledge and demonstrate skills on systems' management, thus developing a proper attitude in the performance of their roles and functions. The four-day live-in training activity contains several modules:

Module	I.	Overview of System's Management;
Module	II.	Cropping Calendar and Pattern of Planting;
Module	III.	Water Delivery and Distribution;
Module	IV.	Maintenance and Repair;
Module	V.	Collection of Irrigation Service Fee (ISF);
Module	VI.	Water Crisis and Conflict Management; and
Module	VII.	Re-entry Planning

Financial Management Systems Training (FMST)

The involvement of organized farmers in irrigation development creates a condition in which the IA assumes responsibilities over irrigation system operation and maintenance. Thus, FMST is designed with the aim of institutionalization of the financial management system of the IA.

In general, FMST attempts to operationalize IA policies concerning IA fund generation and utilization. Installation of the IA financial management system can provide a strong foundation in attaining and sustaining entrepreneurial objectives or other income-generating enterprises which the IA may engage in, once it has reached a level of maturity.[11]

More specifically, the FMST addresses the following concerns:

i. Development of the IAs' financial plans;

ii. Maintenance of IAs' records on financial transactions;

iii. Preparation of financial statements for presentation to the general assembly and for submission to the registration process;

[11]The present trend is for NIA to assist the IAS in undertaking important/profitable non-water functions once they have demonstrated their capacity in successfully dealing with Irrigation Systems' Management (refer next section). Such IAs may form into cooperatives (without disturbing their primary functions or "the IA identity"). Accordingly, the FMST is being modified.

iv. Assessment of the IAs' financial activities;

v. Establishment of an adequate and effective system of internal control; and

vi. On-the-spot and periodic audit of the IA funds, other assets and records.

Additionally, FMST covers such topics as budgeting/fund allocation, disbursement and project preparation, etc. The participants of FMST include IA Board of Directors, Treasurer and Auditor as well as the members of finance and audit and inventory committees.

NIA's ORGANIZATIONAL STRUCTURE TO SUPPORT INSTITUTIONAL DEVELOPMENT AND TURNOVER PROCESS

Before 1986, several groups/divisions were functioning within NIA to support its Institutional Development Program. Some of them were project- specific. In 1986, all institutional groups in both communal and national irrigation systems were grouped into one department of the National Irrigation Administration known as the Institutional Development Department (IDD). The organizational chart of IDD is given in Annex III.

The functions of IDD are as follows:

i. Develop programs and formulate policies, strategies and operational guidelines in the organization, development and provision of assistance services to Irrigators' Associations.

ii. Formulate policies and procedures in preparing IAs to assume the operation and management of systems or parts thereof.

iii. Formulate guidelines in the preparation and operationalization of agri-institutional development programs for irrigation projects.

iv. Design and conduct appropriate training, seminars, workshops and similar undertakings to develop the capability of concerned staff in the management of institutional development programs.

v. Design appropriate training and assistance programs for Irrigators' Associations to develop their functionality and enhance their organizational viability.

vi. Develop guidelines in the monitoring and evaluation of agri-institutional development programs and the functionality and viability of Irrigators' Associations.

vii. Coordinate with other agencies for the provision of support services to irrigation users.

At present, IDD has two divisions: the Irrigators' Organization Division (IOD) and the Irrigators' Assistance Division (IAD). The IOD has functional responsibility over the organization and training of Irrigators' Associations in both national and communal projects/systems. In order to operationalize its functional responsibility, there are three sections established under this division namely: 1) National Irrigation Projects/Systems Section (NISS); 2) Communal Irrigation Projects/Systems Section (CISS); and 3) Program Monitoring Section (PMS). The functional responsibilities of the three sections as well as the role of line institutions at regional, provincial and irrigation systems levels are given in Annex III.

PRESENT TRENDS

This section describes briefly two important objectives (as observed by the authors) in NIA's continuing efforts toward institutional development and turnover of irrigation systems to IAs.

i. The National Irrigation Administration plans to turnover all the National Irrigation Systems with service areas below 3,000 ha to IAs or federation of IAs. Full turnover means a complete devolution of the O&M functions. According to the NIA's plans this will be the third phase of a 3-phase program which is very much similar to the three types of contracts mentioned earlier in this report (and in Annex I). Phase I will be the IA development which includes the federation of IAs, while in phase II (namely the phase of "jointly NIA-IA management"), devolution of the O&M responsibilities to the IA will take place depending on the complexity of irrigation systems and the capability of IAs. Subsequently, the turnover would be affected based on laterals of irrigation systems when the federation of IAs would takeover O&M functions and NIA's role will be similar to a "wholesaler" at headgates, when finally, system-wide federation of IAs is established.

ii. Since there is a great deal of interdependence between irrigation and the provision of other production-related support services, some of the innovative IAs are now enhancing their collective capacity to facilitate the acquisition of inputs such as fertilizer, credit and other services. Moreover, several of them are engaged in marketing and processing of their agricultural products. NIA facilitates such efforts and has also launched pilot projects to learn how it could help

individual IAs and IA federations to enhance their capacity in facilitating the supply of agri-support services to the farming community.

SUMMARY

Several stages can be identified in the evolution of the process of irrigation systems' turnover in the Philippines. Prior to the governments' intervention, there existed indigenous irrigation societies that constructed and managed their own irrigation systems. The Irrigation Act of 1912 can be regarded as a notable step in government intervention. The Act authorized the Irrigation Division of the Bureau of Public Works to manage irrigation systems it had built. Another provision of the new law provided for the regulation of rights to public waters, including water used in national, communal and private irrigation systems. The Irrigation Act also formalized the concept of Irrigators' Association (IA) as a legal body authorized to manage a communal irrigation system. These associations were registered under the nation's Corporation Law with powers to manage their irrigation systems, to elect officials and to compel members to contribute to the cost of managing the irrigation systems in proportion to the benefits derived.

In 1963, a corporate agency, namely the National Irrigation Administration (NIA), was established with the mandate of development of irrigation systems and to provide timely, adequate and reliable delivery of irrigation services. NIA was confronted with the problem of inadequate funding to support and sustain efficient operation. The situation was aggravated due to farmers' hesitance to pay irrigation service fees, destruction of irrigation facilities in some cases and the governments' withdrawal of subsidy to NIA. Additionally, this has posed a challenge to NIA's survival as a viable corporation.

In response to this challenge, in the late 1970s, NIA launched its Institutional Development Program (or the participatory approach) which was aimed at the formation, development and sustenance of functional, cohesive and viable Irrigators' Associations (IAs) which are highly capable of managing partially or fully the operation and maintenance of irrigation systems.

Under NIA's Communal Irrigation Development Program, the agency constructs irrigation systems with the active participation of farmer beneficiaries and upon completion of this phase, the systems are turned over to IAs, subject to a cost-recovery arrangement. Farmers participate in all stages of communal irrigation development, that is, from project identification, feasibility studies, construction, etc., up to the O&M of the completed systems. This process has helped in developing the capacity of the IAs in efficient system management and in instilling the system of ownership among the farmers.

With the successful experience in the communal (small) systems, NIA applied the participatory management strategy employed in large-scale national systems as well. Upon the acquisition of a legal status, the IA can enter into a contract with NIA. Aside from this, the association has to prove that it is

capable of managing its affairs, particularly the system's maintenance and the collection of Irrigation Service Fees (ISF). As has been mentioned earlier there are three types of contracts governing the NIA-IA partnership in the management of National Irrigation Systems. Type I contract entitles the IA to undertake canal maintenance while Type II contract allows the association to collect ISF and retain a portion of the collection according to the NIA-IA incentive schedule. Type III contract stipulates that the IA amortizes the cost of construction. Such type of contract can be executed either on a *partial or total turnover of management*. The IA's contracting of irrigation systems management with NIA resulted in the operationalization of the NIA-IA partnership concept. The partnership requires certain responsibilities from both parties. NIA's current programs and future plans are aimed at achieving full turnover of Type III status in the majority of National Irrigation Systems. Once the system-wide federation of IAs is established the complete turnover will take place. This means a complete devolution of the O&M functions.

An important lesson that can be learned from the NIA-IA experience is that the "turnover" has been considered (not in isolation but) as an integral component of the Institutional Development Process through which the IAs gain the capacity to deal with the complex socio-technical issues associated with the agricultural production process in general, and, the irrigation systems management in particular. Once the recipient institution or the IA reaches this status, systems' turnover would naturally appear as the next logical step.

The NIA-IA Obligations in the Three Types of O&M Contracts

Type I Contract: Maintenance Contract

Under this contract, an Irrigators' Association (IA) undertakes routine maintenance works of a certain length of the irrigation canal systems. The following are an IA's obligations:

i. IA undertakes grass cutting, clearing, desilting and reshaping slopes for the entire length of canals for at least once a month;

ii. Fills up potholes and open cuts along canal embankments as well as drains accumulated water from depressed portions of canal embankments;

iii. Undertakes minor repairs of irrigation facilities, which do not require equipment and construction materials;

vi. Undertakes on a monthly basis, as the need requires, oiling and greasing of steel gates including turnout gates, particularly the lifting mechanisms;

v. Protects and safeguards from destruction all irrigation facilities and structures;

vi. Prevents any person from the construction of open cuts and/or installing additional turnouts without joint clearance from both NIA and the IA; and

vii. Removes debris from canals and conveyance structures that restrict the normal flow of irrigation water.

In undertaking Type I contract an Irrigators' Association will be paid with P1,100 upon satisfactory maintenance, weeding, trimming canal embankments, reshaping and removal of debris of 3.5 km of unlined canals or 7 km for lined canals. Desilting activities undertaken will be paid for by volume of accomplishment as per agreement entered between NIA and IA.

NIA's Obligations in Type I Contract

i. Provides the IA with a list of facilities and structures for maintenance as contained in the inventory, jointly undertaken by both parties.

ii. Undertakes repair/restoration works of facilities and structures jointly with the IA.

iii. Provides the IA with regular supply of used oil and grease for the maintenance of irrigation facilities.

iv. Develops and implements programs to build up the organizational capability of the IA, particularly in effectively implementing the maintenance activities.

v Conducts regular inspection of the facilities and structures under contract by the IA and provides necessary guidance, should there be deficiencies.

vi. Assists the IA in the preparation of its policies and procedures in undertaking its maintenance responsibilities.

Type II Contract - Systems' Operation and ISF Collection

IA's Obligations on Systems' Operations

i. IA formulates and firms up with NIA, an operations and maintenance plan one month before the start of the next cropping season and discusses monthly status of O&M plan implementation with NIA;

ii. Disseminates information on water delivery and planting schedule to the irrigation water users within the IA contracted service area;

iii. Delivers and distributes irrigation water equitably to the IA farmer-members;

iv. Monitors the status of farming activities and submits to NIA weekly reports of irrigated and planted areas;

v. Resolves a) conflicts arising from water distribution between and among IA members and b) other IA internal conflicts that may arise;

vi. Informs NIA through its representative(s), problems and conflicts on operations beyond the IA's capacity to resolve; and

vii. Attends meetings and conferences called by NIA to discuss major problems encountered and formulates solutions to them.

IA's Obligations in ISF Collection

i. Provides NIA before the start of each season an updated master list of farmer-member beneficiaries, should there be changes in the existing master list;

ii. Formulates effective and workable policies to effect a systematic ISF collection scheme with the concurrence of the Irrigation Superintendent (IS);

iii. Distributes promptly Irrigation Service Fee (ISF) bills to each of the farmer-member beneficiaries including members' back accounts;

iv. Collects ISF (current and back accounts) from farmer-member beneficiaries and remits to NIA such collection every Friday. IA must obtain and use its own Official Receipts for ISF collection and for financial control purposes, duly countersigned by the IS;

v. Assist NIA in the verification and assessment of farm lots requested for exemption from payment of ISF; and

vi. Presents to IA members either through a general assembly or per turnout service area meeting, an update status of members' ISF payment, within one month of the end of the cropping period.

The incentives received by IA under Type II contract in all national irrigation systems (NIS) are as follows:

Collection efficiency (in %)	Incentives to IA (in %)
0 - 50	0
51 - 60	2
61 - 70	5
71 - 90	10
91 -100	15

NIA's Obligations in System Operation

I. To prepare plans and programs on water delivery schedules in consultation with the IA;

ii. To provide the IA with all relevant training programs to enhance IA leaders'/members' capabilities to manage systems operations and ISF collection activities effectively and efficiently;

iii. To provide technical assistance and recommendations based on submitted reports of the IAs to improve their management and technical activities;

iv. Appraise IA on NIA's current policies relative to systems operations and ISF collection when the need arises.

v. To undertake all rehabilitation works and repairs of major damages to the main/lateral canals and other appurtenant structures including the access/service roads;

vi. To authorize IA to expand the service area of the system without sacrificing any portion of the programmed area;

vii. To facilitate resolution of problems and conflicts beyond the IA's capacity to resolve;

viii. To formulate with the IA systems an operations plan within one month before the start of the cropping season;

ix. To assist in the preparation of plans/feasibility studies of projects IA may wish to venture in;

x. To conduct regular audit of the IA's books of accounts;

xi. To review and approve implementation plans for operations within one month after submission to NIA by IA;

xii. To monitor IA's activities in the implementation of joint water delivery and planting schedules; and

xiii. To allocate and deliver the adequate amount of water up to the lateral headgate for the Association's Contracted Area programmed for irrigation in a particular cropping season.

NIA's Obligation in ISF Collection

i. To prepare Irrigation Service Fee (ISF) bills based on the verified list of irrigated planted area (LIPA) submitted by the IA President. The said LIPA must be duly approved by the Irrigation Superintendent;

ii. To assess and verify farm lots requested for exemptions from payment of ISF;

iii. To issue a NIA Official Receipt to IA for all collections remitted by the IA;

iv. To apply the present discounting policies under a procedure to be worked out between NIA and IA; and

v. To grant to the IA a collection incentive bonus as provided for in the contract.

Type III Contract: Turnover of the Whole or Part of the Irrigation System

In this type of contract, IA assumes full management of the system operations and maintenance; it will amortize the development cost incurred in the construction and rehabilitation of the whole or part of the system before the expiring of 50 years. Listed below are some of the obligations of both NIA and IA.

Obligations of the Irrigators' Association

I. Provides the best talents, skills and judgement in accordance with known accepted management practices, and exercises utmost care, diligence and efficiency in the discharge of its duties and tasks; works for and in the best interest of the farmers in general; and takes all reasonable steps to keep expenses to a minimum consistent with sound financial practices.

ii. Undertakes and manages water allocation and distribution to the different rotational areas from the main lateral canal of the system. This includes water distribution from turnouts and its main farm ditches to the different supplementary farm ditches. This water distribution scheme to be adopted is based on the NIA-IA jointly approved cropping pattern.

iii. Performs maintenance of the main and lateral canals and main/ supplementary farm ditches: cutting of grass, removal of silt and other materials that obstruct normal water flow in the canals. The maintenance will cover the entire length of the main canal and laterals including main and supplementary farm ditches within the system.

iv. Undertakes repair works which are considered minor and within IA's capacity. Minor damages to canals will be repaired by the IA provided, however, that in case there is a need for materials, the same shall be supplied by NIA after the need has been verified. For damages to canal structures and other facilities, construction materials that the IA cannot provide shall be supplied by NIA while the labor will be provided by the IA. This provision by NIA of construction materials for repair shall be for a period of two years from the date of turnover of the system to the IA.

v. Undertakes all maintenance and repair works of the terminal facilities.

vi. Prepares the list of irrigated and planted areas through the rotational area leaders which shall be submitted by the IA President to NIA for preparation of bills.

vii. Distributes bills for ISF to the farmer-beneficiaries through the rotational area leaders.

viii. Collects irrigation service fees (ISF) from irrigation users at the rate of one and a half cavans.[12] of palay for the wet-season crop, and two cavans of palay for the dry-season crop, or its equivalent in cash based on the prevailing government-support price of palay. Collection shall be done by

[12]Cavan = 50 kilograms

rotational area bill collectors who shall remit the same to the IA treasurer, who in turn, shall remit the same to NIA every Friday or any other day that may be agreed upon.

ix. Resolves a conflicts between and among IA members arising from water distribution and allocation, organization management, and b) other IA internal conflicts that may arise.

x. Informs NIA through its representative on problems and conflicts on operation and maintenance beyond the IA's capacity to resolve.

xi. Attends meetings/conferences called by NIA to discuss major problems encountered and to formulate solutions to them.

xii. Makes available to NIA for training all persons who shall be ultimately responsible for operation, maintenance and management of the irrigation system.

xiii. Submits for approval to NIA all plans on the management of operation and maintenance of the system two months before the start of the cropping season and submits a) reports on these plans for implementation on specified periods and b) other reports that may be required by NIA from time to time.

NIA's Obligations

i. Provides available managerial and technical training and development programs for all levels to the Irrigators' Association necessary in managing the operation and maintenance of the system and development of the IA toward its viability.

ii. Appraises IA of current policies of the contracting agency and/or laws and decrees affecting NIA concerning irrigation and organization management.

iii. Authorizes IA to expand service area of the system without sacrificing any portion of the programmed service areas.

iv. Undertakes all rehabilitation works and repairs of major damages to the main and lateral/sub-lateral canals and other major appurtenant structures including the access and service roads, subject to repayment in accordance with the NIA policies.

v. Provides IA necessary and available supplies, tools, equipment and vehicles and other resources based on the approved plans, provided, IA will shoulder the cost for such supplies and other resources including equipment rentals, in accordance with existing NIA policies.

vi. Provides technical analysis and recommendation based on the submitted reports of IA to improve its management and technical activities.

vii. Facilitates resolutions of problems and conflicts beyond IA's capacity of to resolve.

viii. Facilitates resolutions of production/marketing-related problems presented by IA to NIA.

ix. Reviews and approves implementation plans for operation within one month after submission to NIA by IA.

FIOP Organizing Process

In organizing irrigators' Associations and in facilitating the turnover process, NIA has used different types of Change Agents/Community Organizers or *catalysts* at different times. First, they hired the services of a specialized Nongovernmental Organization (NGO) namely, the Farms System Development Corporation (FSDC). Later, NIA used its own catalysts of different types; Irrigation Community Organizer (ICO), Irrigation Organization Worker (IOW), and Irrigation Development Officer (IDO). In 1983, NIA used farmers as organizers on a pilot basis in one system. In 1988, with the assistance of USAID and the World Bank, NIA expanded the use of farmers as organizers to cover all regions of the country. This is in progress at present. This organizing process has five major phases namely: (1) pre-organization; (2) turnout service area (TSA) organization; (3) IA organization and registration; (4) The NIA-IA contract formalization; and (5) operation and maintenance. Brief descriptions of the activities conducted in each phase of IA development are listed below.

Pre-Organization Phase

In the pre-organization phase there are three major activities: (1) FIO identification and selection; (2) hiring and training of FIOs; and (3) orientation of FIOs at the Irrigation Systems Office. These activities are undertaken before the deployment of FIOs in the area of assignment. The criteria of selection of FIOs are that they (1) must not be more than 60 years old; (2) must be residents of the area where they will be deployed; (3) must be physically fit. Training and orientation include such topics as (1) Training Program Orientation; (2) History, Function and Organization of NIS; and (3) the NIA-IA Partnership Strengthening Program.

Turnout Service Area Organization

The turnout service area organization phase has three major activities: (1) integration and social investigation; (2) core group and committee formation and (3) TSA formation. While these activities are being undertaken, technical activities are also being done simultaneously in preparation for the implementation of minor repair works. The technical activities are: (1) The NIA-IA walk-thrus to the systems identifying nonfunctional structures and facilities; (2) prioritization of identified nonfunctional

structures and facilities to be rehabilitated; (3) preparation of program of work (POW); (4) submission of POW to the Regional Irrigation Office and then to the Central Office; and (5) presentation of the approved of POW to TSAs and IA members.

IA Organization and Registration Phase

This phase is being undertaken with technical activities while the IA is in the formative stage of development. The activities under this phase are: (1) the continuous formulation, revision and dissemination of Articles of Incorporation (AOI) and bylaws; (2) preparatory activities for conducting Basic Leadership and ad hoc council for TSA chairmen; (4) IA formation and ratification of IA bylaws; (5) discussion and dissemination of procedures and policies on NIA-IA contracting; (6) preparation and submission of IA SEC registration documents to the Irrigation Systems Office and up to the Securities and Exchange Commission (SEC); (7) processing and approval of SEC registration papers; (8) conduct of system management training/workshops (SMT/SMW) to IAs and (9) the implementation of minor repairs.

NIA-IA Contract Formalization

Before the Irrigators' Association (IA) could enter into any of the three types of contracts with the National Irrigation Administration, the IA has to be registered with the Securities and Exchange Commission (SEC). The three types of contracts are: Type I, Type II and Type III. Type I is a maintenance contract. Under this type of contract, the IA undertakes the routine maintenance works of a certain length of the irrigation canal systems. Upon accomplishing maintenance work such as weeding, trimming of canal embankments, shaping and removal of debris, the association will receive a remuneration amounting to P 1,100 for work on 3.5 km of unlined canals or 7 km of lined canals. Type II contract covers systems' operation and ISF collection. In this type of contract the IA undertakes systems' operation and maintenance and collection of Irrigation Service Fee (ISF) of its members. Incentives given to the IA for assisting NIA in systems' operation and in the collection of Irrigation Service Fee (ISF) in all national irrigation systems are as follows:

Collection efficiency (in %)	Incentives to IA (in %)
0 - 50	0
51 - 60	2
61 - 70	5
71 - 90	10
91 - 100	15

And Type III contract is the turnover of the whole or part of the irrigation system. With this contract, the Irrigators' Association assumes full management of the systems' operation and maintenance. The Irrigators' Association amortizes the development costs incurred during the construction/or rehabilitation of the irrigation system or part of the system.

Granting of what type of contract the IA has to undertake depends mainly on the IA's level of capacity/capability to assume operation and maintenance activities as well as responsibilities.

Operation and Maintenance Phase

The activities lined up are only applicable to National Irrigation Systems (NIS) under Type III contract pattern after the Communal Irrigation Systems (CIS). Following is a brief description of the suggested O&M activities with the assumption that (1) the system has undergone a system management training/workshop; and (2) NIS must be on Type III contract:

i. After System Management Workshop/System Management Training, FIO helps the IA officers to call an orientation and organizational meeting regarding operation and maintenance.

ii. Election of O&M officers and formation/or reactivation of committees that will be responsible in the implementation of daily activities connected to O&M in accordance with the IA bylaws.

iii. The FIO assists TSA leaders and membership committees in updating the membership of the Irrigators' Association (IA).

iv. The FIOS/IDO[13] assists FIO, TSA leaders and IA bylaws committee in revision and amendment of bylaws. Any revision and amendment made should be presented and approved by the members in a general assembly meeting.

v. During the first cropping season, the following O&M activities should be done by the IA with the assistance of the FIO, FIOS and IDO:

a. Implement/update the system management plan;

b. Implement/update the financial management plan;

c. Continue/or re-echo education and training;

d. Conduct regular IA meetings such as TSA leaders' meeting, Board of Directors' meeting and IA officers' meeting;

e. Implement/update water distribution plan and cropping calendar;

f. Implement/update conflict management plan;

g. Prepare a list of irrigated and planted areas/issuance of water service bill;

h. Collect Irrigation Service Fee;

j. The IA with the assistance of the NIA personnel should establish linkages/coordination with other government and private agencies and other adjacent IAs regarding O&M; and

k. In-season monitoring and evaluation.

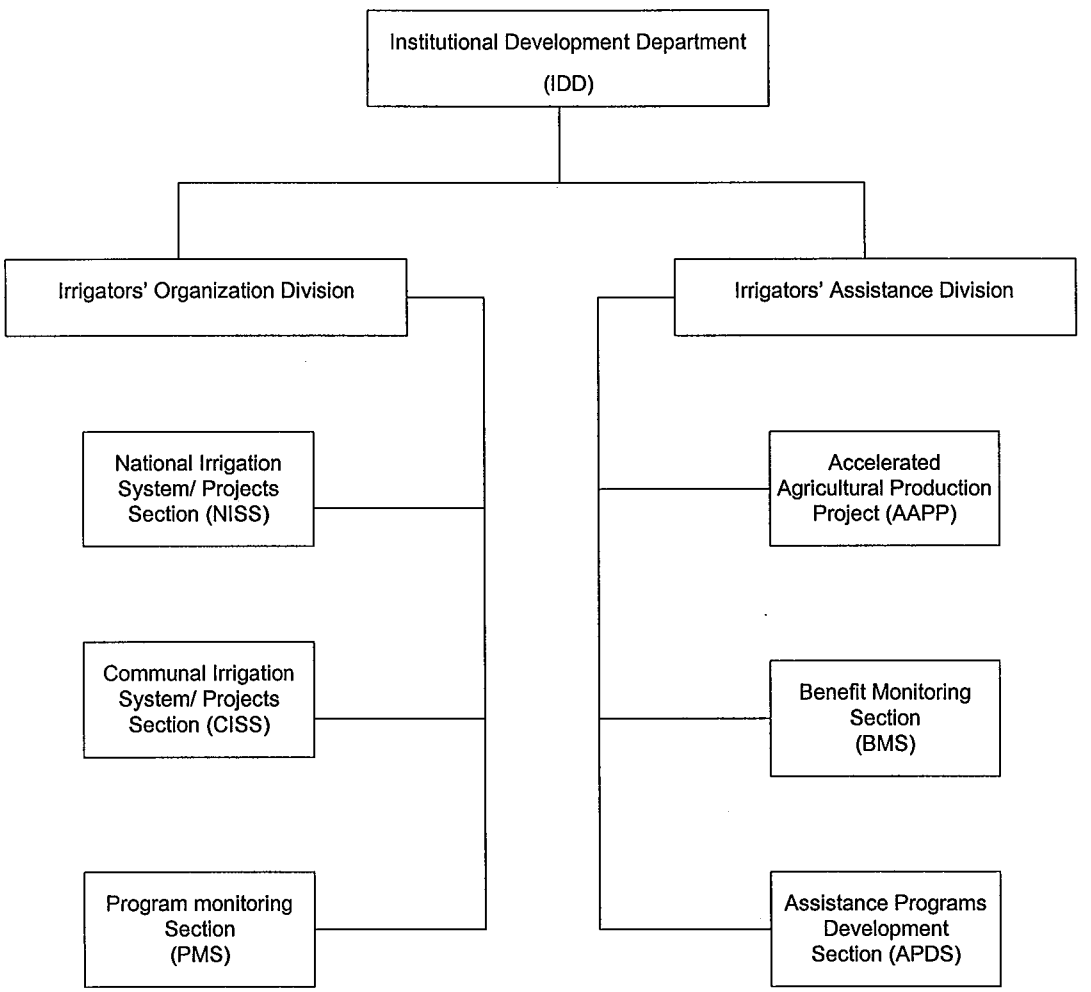
After the cropping season, the NIA personnel together with FIO and IA leaders conduct evaluation and planning sessions regarding the implementation of plans and activities on operation and maintenance through TSA/BOD and general assembly meetings. And if there are changes and revisions made on the plans and activities, they should be incorporated/or implemented in the next cropping season. In the next cropping season activities 9.5.1 to 9.5.10 should be followed and after seasonal/annual evaluation and planning sessions through TSA/BOD and general assembly meetings, the IA will decide if they would want the FIO to be their Board of Adviser (BOA).

[13]FIOS is a supervisor of the FIO while IDO is a technical adviser of the Irrigation Superintendent and at the same time a supervisor of the FIOs.

NIA's Organizational Structure to Support Institutional Development Program (IDP)

The organizational chart of the Institutional Development Department is given in Figure 3 (P 96) while the roles and functions of its divisions are indicated below.

Figure 3. Organizational setup of the Institutional Development Department (IDD) of NIA.



National Irrigation Projects/Systems Section

i. Development of IDP for National Irrigation Systems and projects.

ii. Development and implementation of training programs and workshops to develop and sustain capability of regional and other field staff in the NIA-IDP implementation.

iii. Development of policies and guidelines on IDP in NIS.

iv. Monitoring and evaluation of IDP in NIS.

v. Conduct of periodic regional visits to validate accomplishments and provide assistance to regional offices.

Communal Irrigation Projects/Systems Section

i. Development of IDP for Communal Irrigation Systems.

ii. Development and implementation of training programs and workshops to develop and sustain capability of regional and other field staff in the CIS-IDP implementation.

iii. Development of policies and guidelines on IDP in CIS.

iv. Monitoring and evaluation of IDP in CIS.

v. Conduct of periodic regional visits to validate accomplishments and provide assistance to regional offices.

Program Monitoring Section

i. Development of programs relative to the overall function of IDP.

ii. Assessment of the overall programs on institutional development programs (IDP).

iii. Preparation of overall IDP reports/status for management.

iv. Review, evaluate and processing of registration papers of IAs to the Securities and Exchange Commission (SEC).

v. Follow-up water permit applications of IAs to the National Water Resources Board (NWRB).

vi. Maintain a record of registered IAs.

vii. Process, monitor and evaluate financial releases for IDP.

The Irrigators' Assistance Division complements the efforts on the organizational aspects of Irrigators' Association with the provision of assistance services to IAs. It has three sections: 1) Assistance Programs Development Section (APDS); 2) Benefit Monitoring Section (BMS); and 3) Accelerated Agricultural Production Project (AAPP). Below are the functional responsibilities of the three sections.

Assistance Programs Development Section (APDS)

i. Formulate policies for the guidance of field units in entering into linkages/arrangements with other agencies in the provision of support services to IAS.

ii. Explore areas of collaboration with other agencies in the provision of assistance services to irrigation water users.

iii. Review proposed tie-ups with other agencies relative to agricultural support services to organized IAs.

iv. Monitor and evaluate the implementation of assistance programs.

v. Provide periodic technical assistance to regional units in the implementation of assistance programs.

vi. Maintain close coordination with cooperating agencies in the implementation of assistance programs.

vii. Prepare management reports on implementation assistance programs.

viii. Develop procedures and guidelines in the monitoring of the NIA-IA contract performance.

ix. In collaboration with other organization units, formulate policies on the terms and conditions of the NIA-IA under all stages.

Benefit Monitoring Section (BMS)

i. Formulate a framework and guidelines in the monitoring and evaluation of benefits accruing from the construction of irrigation projects.

ii. Conduct orientation trainings to field units in the implementation of project benefit and evaluation.

iii. Provide periodic technical assistance to field units in the implementation of project benefit monitoring and evaluation.

iv. Maintain a periodic profile of development indicators in irrigation projects.

v. Develop guidelines and systems for the conduct of project inventory and preparation of project completion report of completed irrigation projects relative to agri-institutional development.

vi. Review project completion reports relative to agri-institutional development.

Accelerated Agricultural Production Project (AAPP)

i. Supervises the planning and monitoring of AAPP (minor repairs and institutional activities) in regions V, VI, and X.

ii. Do the same functions as those of APDS and BMS in regions V, VI and X.

iii. The AAPP is a special project covering only three regions.

Some Responsibilities of the Provincial Irrigation Offices (PIOs) and Irrigation Systems Offices (ISOs)[14] relevant to IA development are:

i. To conduct regular audit of books of account and other financial records of the IAs;

ii. To facilitate the timely preparation and submission by the IAs of annual SEC requirements;

iii. To ensure that smooth BOD meetings of IAs are held regularly to discuss important issues and concerns as well as to formulate appropriate solutions thereto for ratification of the general assembly if necessary and to ensure that duly audited monthly status report is rendered by the IA treasurer.

iv. To require the IA treasurer to circularize an audited IA financial statement to the general membership at least every quarter;

v. To closely monitor holding of regular general assembly meetings and elections and all other provisions indicated in the IA set of bylaws;

vi. To require the IAs to attend to all obligations on the terms and conditions stipulated in the MOA or O&M contracts; and

vii. To initiate periodic meetings/conferences of IA presidents and O&M staff on the planning, implementation and evaluation of O&M activities and performances.

The Regional Irrigation Offices (RIO) are responsible to the NIA Administrator for the compliance by both the PIOs and ISOs to the above provisions. Besides, it is an inherent responsibility and duty of the Regional Irrigation Manager (RIM) to supervise and monitor both.`

[14]The Provincial Irrigation Office (PIO) is the organizational unit of the NIA at the provincial level responsible for Communal Irrigation Systems while the Irrigation Systems Office (ISO) is the organization at the systems level responsible for O&M (jointly with the respective IA) of a given National Irrigation System (NIS).

CHAPTER 8

Recommendations

General

1. PARTICIPANTS OF THE workshop have stressed the objectives of the turnover, i.e., increasing productivity, well-being and equity of the tenants.

2. For any mode of turnover, the tenants and/or their representatives should be given effective roles in the decision-making process so that their interests are safeguarded.

3. For successful implementation, it is recommended to identify different processes and levels of turnover for various types of irrigation schemes depending on their sizes, levels of capital investments, and management responsibilities.

4. Macro-economic adjustment policies, prices, marketing, production relationships, etc., in particular, ought to be pursued and implemented in order to make the turnover process successful and sustainable.

5. Competition should be encouraged to ensure efficiency in the system for delivering inputs and services.

6. Monitoring and evaluation of turnover processes are recommended to ensure that the declared objectives are achieved.

Specific

1. To pursue socioeconomic development it is recommended that the turnover should encourage self-management by helping the tenants to become farmers.

2. Operation and maintenance responsibilities for small and scattered irrigation schemes are to be handed over to new management with the Ministry of Irrigation providing some services during an agreed transitional period.

3. After an agreed transitional period back-up services of a technical, financial and social nature could be extended to small schemes, if requested. Such services include technical assistance, credit and soft loans for upgrading and renovating irrigation facilities, training, repairing and servicing of pumps, maintenance procedures, channel construction and irrigation management, etc.

4. Establishment and institutionalization of water users' associations are recommended. Management functions to be turned over to these associations should be identified and agreed upon.

5. Pilot-testing of turnover of management functions through the water users' associations is recommended. The scope of such testing should, inter alia, include integration of related production activities and optimum size and level of such associations.

6. Residual functions of agricultural corporations should be identified and different institutional arrangements should be suggested.