THE TURNOVER AND SELF MANAGEMENT OF IRRIGATION INSTITUTIONS IN DEVELOPING COUNTRIES

A Discussion Paper for a New Program of the

International Irrigation Management institute

by

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I I M I

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TABLE OF CONTENTS

Part Two: The Proposed Program

THE TURNOVER AND SELF MANAGEMENT OF IRRIGATION INSTITUTIONS IN DEVELOPING COUNTRIES'

Introduction

This is a discussion paper describing a new IIMI program for research, information and institutional support services concerning the turnover, privatization and self management of irrigation systems in developing countries. Many countries in Asia, Africa and Latin America are either implementing or considering implementing irrigation management turnover programs. This interest is largely because of 1) government financial constraints, 2) a perception of poor management performance by government bureaucracies and 3) an expectation that nongovernment organizations, such as water users associations, will likely manage irrigation at least as well as government agencies.

By the term, irrigation manaaement 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. By the term, privatization, we mean the transition from governmental to private-sector ownership of irrigation system assets. World-wide, 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 of management functions by an institution whose boundaries and membership are based on local irrigation system functional management requirements.

Despite the widespread interest in irrigation management turnover throughout the developing countries, it is a very recent phenomenon in practice. There is very little documentation about the processes used and results obtained from irrigation management turnover. Many policy makers, development agencies and water users associations are groping for viable private-sector management options, but are constrained by lack of experience and information.

The overall purpose of the Program on Turnover and Self-Management of Irrigation Institutions in Developing Countries (abbreviated hereafter as the TSM Program) is to determine the prospects for successful results from irrigation management turnover. It is not the purpose of this Program to promote or advocate management turnover, privatization or self-managed irrigation institutions as ends in

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themselves. The TSM Program will comparatively assess nongovernmental management models, turnover processes and their results and impacts. Special attention will be given to assessing the impacts of turnover on equity of access of farmers to water, irrigated land and related resources. International exchange of information and institutional support services will be provided to enable governments and private-sector irrigation institutions to make better choices about management transfer and to achieve more sustainable and productive irrigation. We recognize that there may be other private-sector alternatives than locally self-managed or autonomous institutions. However, special emphasis is given to this form in accordance with the international attention which is moving in this direction. Other options will be documented, to the extent they are found in the study.

The TSM Program will be implemented by IIMI's Research Division as an international thematic program. As such it will play a supervisory or implementing role in the comparative, thematic activities, and will play an advisory and integrating role relative to IIMI country programs. The TSM Program will consist of two phases. The first phase is a comparative assessment of turnover processes and private-sector management arrangements. The First Phase is expected to require three years. The Second Phase will involve a series of in-depth impact assessments in a number of countries which have extensive experience in irrigation turnover or privatization. The Second Phase may be initiated prior to the completion of the First Phase, depending on availability of funding and staff.

Specific objectives under the First Phase of the TSM Program are as follows:

1) Obtain concise information on a broad range of non-governmental irrigation management alternatives which are being used worldwide;

2) In selected countries conduct a comparative analysis of turnover approaches, management and policy environments and results of turnover;

3) In selected countries do a comparative assessment of policy and regulatory environments effecting turnover;

4) Establish a center of information on irrigation management turnover and disseminate widely reports and publications;

5) Facilitate exchange of information between countries through country level seminars and workshops, presentations at international workshops and conferences and publications in existing newsletters and IIMI and non-IIMI outlets:

6) Provide institutional support services for irrigation management turnover to countries through preparation and presentation of general guides for policy and program formulation, training curricula guides and provision of direct advisory support (primarily to countries where IIMI has country programs).

The Program will involve the following activities:

1) *Program direction*--which includes establishment of an Advisory Committee, annual meetings and use of external consultants for advisory support;

2) *Comparative assessment*--which includes case studies of non-governmental management models in numerous countries and a comparative assessment of irrigation management turnover;

3) *Country research*--which includes rapid appraisals, process documentation, performance assessment in several irrigation systems and an examination of regulatory, policy and market environments;

4) *Information services*--which includes country-level workshops, participation in international conferences and external publications, a series o research notes and reports, and other publications; and

5) *Institutional suppon services*--which includes providing advisory assistance to governments and other organizations in developing turnover policies and programs and in developing training materials and assessment methods.

The Program will require both full-time and temporary staff. It will involve extensive collaboration with other governmental and research organizations. And it will be guided by an Advisory Committee of government officials and professionals having experience in irrigation management turnover in several developing countries.

Part One: Research and Development Issues for Irrigation Turnover and Self Management

1. Management Performance and Institutions

1.1 The problem management turnover is meant to address

Poor management performance There are about **220** million hectares 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 (Kepetto, 1986, p.3) About 158 million hectares 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. (See 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 rarely available in lower-end sections. Water deliveries are often untimely and unreliable (Murray-Rust & Vermillion, 1989). 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).

Since the green revolution the world has slowly been learning several important lessons about irrigation management. These lessons tend to prompt interest in the potential for a reduction in the state's role in irrigation management and a corresponding expansion ***of*** the role of water users or third parties.

One lesson learned is that large government bureaucracies frequently are not very effective at managing irrigation systems without the help of farmers. This is particularly true where irrigation *is* managed more according *to* standard administrative procedures than by local, variable management needs. Many large agencies oriented towards construction have little experience in or motivation to achieve management performance standards acceptable to farmers.

A second lesson is that the large bureaucracies are often a severe drain on national budgets. Recurring costs for irrigation operations and maintenance are more difficult to finance than new construction, so they tend to he deferred or ignored, making the need for new construction or major rehabilitation occur sooner than should be the case.

A third lesson is that with appropriate training and support, nongovernment organizations, such as water users associations, frequently can be effective managers of natural resources, under certain conditions. It has also become widely apparent in recent years that inappropriate processes to assist farmers in managing or repairing irrigation can create or perpetuate local dependence of water users upon governments.

The world is also learning that mismanagement of irrigated agriculture can result in harmful environmental impacts. Evidence is mounting that improper management of water acquisition, delivery or drainage, or poor coordination between irrigation operations and the use of agricultural inputs, can result in soil erosion, waterlogging, salinization, pollution and so on. In India, about 10 million hectares are now uncultivable due to waterlogging. An FAO report estimates that about one half of the world's irrigated land is salinized enough to suppress the yields of crops (Carruthers, op cit.,p.70).

Attempts to improve performance It is now widely recognized that by improving irrigation management performance alone (ie. without new construction or rehabilitation), substantial progress would result in productivity, equity and environmental sustainability. Indeed, improved management would considerably lessen the need for costly new irrigation projects (Repetto, ibid; Murray-Rust, et all, 1989).

Various approaches have been attempted to improve the performance of irrigation systems. Attempting to improve performance through construction or rehabilitation is the most common approach. Adding channel lining to improve water use efficiency and extension of irrigated area is a common prescription. However, rehabilitation of irrigation systems occurs in frequently repeating cycles. This is partly because implementing agencies tend to defer maintenance and partly because many rehabilitation programs are more driven by supply of funds, than local demand for them. Sometimes sophisticated water conveyance and division structures are proposed or used in order to reduce the need for intensive management. Often the response is misuse or breaking of structures because they limit desired flexibility or other management objectives of users or managers. Poor returns on investment are often the results of the physical improvement approach. Continuing poor performance then is often attributed to poor management, especially management by farmers.

Another approach frequently attempted is training. A key assumption is that implementing staff do not manage systems well, primarily because they lack the skills to do so. Over the last two decades there has been a profusion of training courses for irrigation management in developing countries. There has not been a widespread, significant improvement in management performance as a result.

Another approach has been the call for "farmer participation" or "participatory management." Arising in the 1970s, this movement originally emphasized improving irrigation performance through involving farmers in decision making and resource mobilization. The results of this were often positive, hut they seldom spread beyond intensive pilot experiments, where abnormal and non-generalizable pressures were placed on agencies to operate in this way. A main constraint on achieving the full benefits of farmer participation was found to be the implementing agencies themselves. Due to lack of agency incentives, restrictive financial or administrative rules, or conflicts of priorities between agencies and farmers, farmer participation has generally floundered, where government bureaucracies were the primary management organizations.

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 effective management. More attention is turning to the nature of the managing organizations themselves, and in particular to the question of, "What are the institutional incentives to manage in such a way as to achieve good performance, however defined?"

Institutional causes of poor performance Government line agencies are normally centrally funded organizations which operate according to top-down and standard administrative procedures. They tend to seek to maximize budgets and staff. Budgets, staff advancements, salaries and benefits are not normally related to management performance. Line agencies are generally accountable only to other government institutions and do not have an economic market for their "outputs". The result is a proliferation of standard procedures and hierarchical controls. Staff performance, to the extent that it is evaluated, tends to be based not on producing outputs, but on conformity to higher authorities regarding the use of inputs (Rainey,. 1983). The existence of low and fixed salaries which are not related to performance outcomes creates a condition often leading to corrupt practices. Management. behavior is. often constrained by rigid regulations and is based more on top-down quotas and plans than on dynamic field conditions and demand for services.

The operating budgets and capital investment budgets of government "service delivery" organizations are normally determined through different channels in the public sector. Government agencies generally seek to maximize their budgets, irrespective of actual demand. This situation tends to preclude the public sector bureaucracies from making long-term, rational trade-offs between operating and capital investment budgets. One implication of this for irrigation is the problem of maintenance being deferred until rehabilitation. This seriously interferes with operational performance, leads to wasteful spending on a large scale, and makes LDC governments ever more dependent on external loans.

Perhaps the most profound weakness of public sector service delivery organizations is that their survival and growth normally does not directly depend on satisfying clients, attaining performance standards, or ameliorating problems. Worldwide, health department budgets soar as diseases spread, police departments flourish as crime rises, labor ministries thrive as unemployment goes up, and agriculture ministries enjoy abundant special project funding as long as rural poverty and hunger remain widespread. Contrastingly, the survival and prosperity of private-sector organizations tends to depend on customer satisfaction and meeting social demands. If these demands diminish, non-governmental enterprises tend to move into other directions, in search of new social demands to be satisfied.

Repetto (Ibid, p.3) compares the performance of public and private irrigation systems as follows:

> ...acreage irrigated, yield increase, and efficiency in water use, are typically less than projected when investments were made, less than reasonably achievable, and less than attained by private irrigators who operate more controllable decentralized systems....performance comparisons are...interesting because they also reflect important differences in management, control, and the influence of economic incentives.

1.2 Management turnover as a solution

By the late 1980s, the emphasis on participation shifted in many countries to a different and more thorough-going 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 non-governmental institutions, many governments in developing countries are privatizing irrigation institutions and turning over their management to water users organizations, or other non-governmental institutions.

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 OBM 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.

What is it? Irrigation management turnover is defined broadly herein as the contraction of the government's role in irrigation management and the corresponding expansion of the role of nongovernment institutions in irrigation management. Turnover includes various types of institutional changes which support greater private-sector control, authority, responsibility, resource mobilization, ownership and/or profit-sharicg in irrigation.

An important point to remember is that management turnover does not necessarily mean the total withdrawal of government from all activities. It need not necessarily mean total loss of public control over a natural 'resource. It can be selective, in accordance with local management contexts. The government may retain its role as financial sponsor or authorizer of a public service while transferring the role of service delivery to the private sector (Roth, ibid).

im 'rrigati orm ? 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 non-governmental 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 OBM 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 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 to 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 coming to be 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 acontext 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 OLM.

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 leads to:

1) improved profitability and production at the farm level,

2) improved and 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 incomes and greater efficiency in the use of government resources, including the cost of capital.

Turnover in the context of structural adjustment Irrigation management turnover is part of a broader process of structural adjustment programs in developing countries in the 1980s and 1990s. Privatization, liberalization and deregulation are the key aspects of the structural adjustment policies which emerged in the 1980s and continue to evolve in the 1990s. The purpose of these reforms is to reduce the role of government in the economy and allow the private sector to take over more management of the production of goods and services. It is argued that this will lead to greater efficiency, productivity and responsiveness to demand.

Privatization is oriented toward managing organizations and generally refers to the' turnover of management or ownership from governments to private-sector organizations (Savas, 1087, p.3). Liberalization and deregulation relate to enhancing diversification and competition in the private sector in the provision of goods and services. Observers have noted that there has been more liberalization and deregulation in the less developed countries (LDCs) and more talk about privatization, than there has been actual privatization of government assets (Cook and Kirkpatrick, 1988, p.28).

Preliminary evidence indicates that fostering competition may be more effective in improving productive and distributional efficiency than privatization per se and that various policy and regulatory changes often need to be made in order to "prepare the terrain for privatization" (Nellis and Kikeri, 1989, p.670; also Van De Walle, 1989). Competition is often viewed as a substitute for regulation where effective regulation is not possible (Savas, ibid). However especially in rural areas of the LDCs, powerful interests and inequalities may suppress open competition in the delivery of public services. The consensus so far seems to be that privatization needs to be accompanied by either effective regulation or liberalization in order to produce socially positive consequences.

A commonly-mentioned fear or criticism of privatization is that it will transfer public assets and access to resources into the hands of the wealthy few. Cowan (1990: 102) reports however, that many LDC governments are learning by experience that

privatization does not mean that they have to give up total control. Governments are searching for effective means for minimal regulation which do not stifle private initiative, yet which protect key social values.

One example of this which has had apparent preliminary success is Nigeria. In 1988 Nigeria initiated an ambitious program to privatize 92 state-owned enterprises, 67 of which involved complete divestment of government ownership. 50 were for sale on the Nigerian stock exchange. Divestiture arrangements encouraged mass purchases. By 1989 it was reported that over 75 percent of the available shares to date were sold to buyers seeking only between 200 and 1,000 shares each. Within only one year there were over 300,000 new private shareholders for the enterprises. Zayyad concludes that, 'To those who saw privatization as a transfix of public property to a few rich people, the message is loud and clear, that it is not. It is in fact a program of mass participation of popular capitalism" (Zayyad, 1989:21).

Structural adjustments in the LDCs have brought about an expansion of various forms of non-governmental management of services which were previously administered by state agencies. These include producers' or consumers' cooperatives, users' associations, public utility companies, private voluntary organizations, management and service-providing contractors and agricultural development corporations (Roth, 1987). Coffee and tea producers' cooperatives in Kenya, the National Dairy Development Program in India, community agroforestry management and the West African affermage system of private management of publicly-financed municipal water supply are only a few examples of the expanding non-governmental management of natural resources in LDCs.

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 non-governmenial management more challenging in irrigation than in many other sectors. They require new solutions not directly translatable from other sectors. Some of these key features are listed as follows.

1) g has si ic varied kinds (li g (salinity, waterlogging, ıı which originate from group d

2) While the demand for io and ng of /at / l varies b individual, it is ft or impossible t n charges l deli/e ies at tl in l el u ilik electricity or municipal water pply, Water often flows between fields. Farmers often use more than one water source. More ıft h o i l developing ı ies the "transaction cost" (f measuring ı pricing wate deli ies w l exceed the benefits, eve if h technical a l actica l ı i s d 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 paver 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 non-paying free riders from OLM services.

5) irrigation often has extensive indirect and variable forms of subsidization and taxation by governments, markets, and powerful interesls.

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 (See Young, 1985).

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

9) Resistant bureaucracies lack incentives to reorient themselves for turnover arid for post-turnover roles (See 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.

2. Experiences with Management Turnover in Developing Countries

2.1 Examples in Asia

Water users associations in Japan, South Korea and Taiwan often have considerable politically strength and elaborate rules and procedures. They achieve among 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 farmer 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 & 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 foodgrain 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 (See Dhawan, 1985; Repetto, 1986:5).

Another recent study comparing publicand 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, Saxena, & Shah, 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 in 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 that time NIA has accelerated its institutional efforts to create water users associations and raise the collection rates of water service charges. NIA staff generally acknowledge that the best way to improve the collection rate (which is about 50 to 55 percent nation-wide) 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 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 farmer 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 fifteen year program to turn over full management to water users for all of its public irrigation systems below 500 hectare 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 frompilot areas to distributaries of large-scale systems throughout the country. Financial pressures and the recognition of the potential for effective farmer management has led to adoption of this policy, which includes formation and development of water users associations, transfer of O&M responsibilities to users associations and development of new division of responsibilities between the government and 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 is also on the policy agenda in Pakistan (Chaudhry & Young, 1988).

2.2 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 fifty 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 expansion of private-sector pump irrigation management in the fadama sector (ie. 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 reportsof 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 anincentive 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 (ie. O&M sponsorship) in 187 of them. Of these, 176 systems, or 8,000 hectare, 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 and 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).

2.3 Examples in Latin America

Latin America has had longer experience with transferring irrigation management to the private sector than have Asia or Africa. But until recently, much of it has been in pilot areas rather than as nation-wide policies (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 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 five to ten 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 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 basedonopen information about the actual costs of O&M at the system level. As Savas 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 has 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 which have assisted several Latin American countries with irrigation management turnover initiatives.

3. A Framework for Comparative Assessment of Irrigation Turnover and Self Management

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

1) *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.

2) *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 set of rules and incentives. This will be done to help build a typology of institutional alternatives for full or partially self-managed irrigation.

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

4) *Criteria for effective turnover processes and 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.

3.1 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, it's 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 & 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, hut 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 good, or a collective good (See Savas, ibid, Ch. 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 (See Figure 1). 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 the water.

Perhaps the most difficult situation for the development ofprivate-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 national defense, a lighthouse, or advertisements. An example of irrigation approximating a collective good would he where there is unrestricted access to flood recession land. A less extreme hut 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, toll, common pool or 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 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 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, ibid).

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, areal 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 freyuently, or where functional measurement structuresdo not existorwould be toocostly. In such cases, size of landholding, cropping intensity, or other simpler bases for fee assessment levels can be used (Small & Carruthers, ibid).

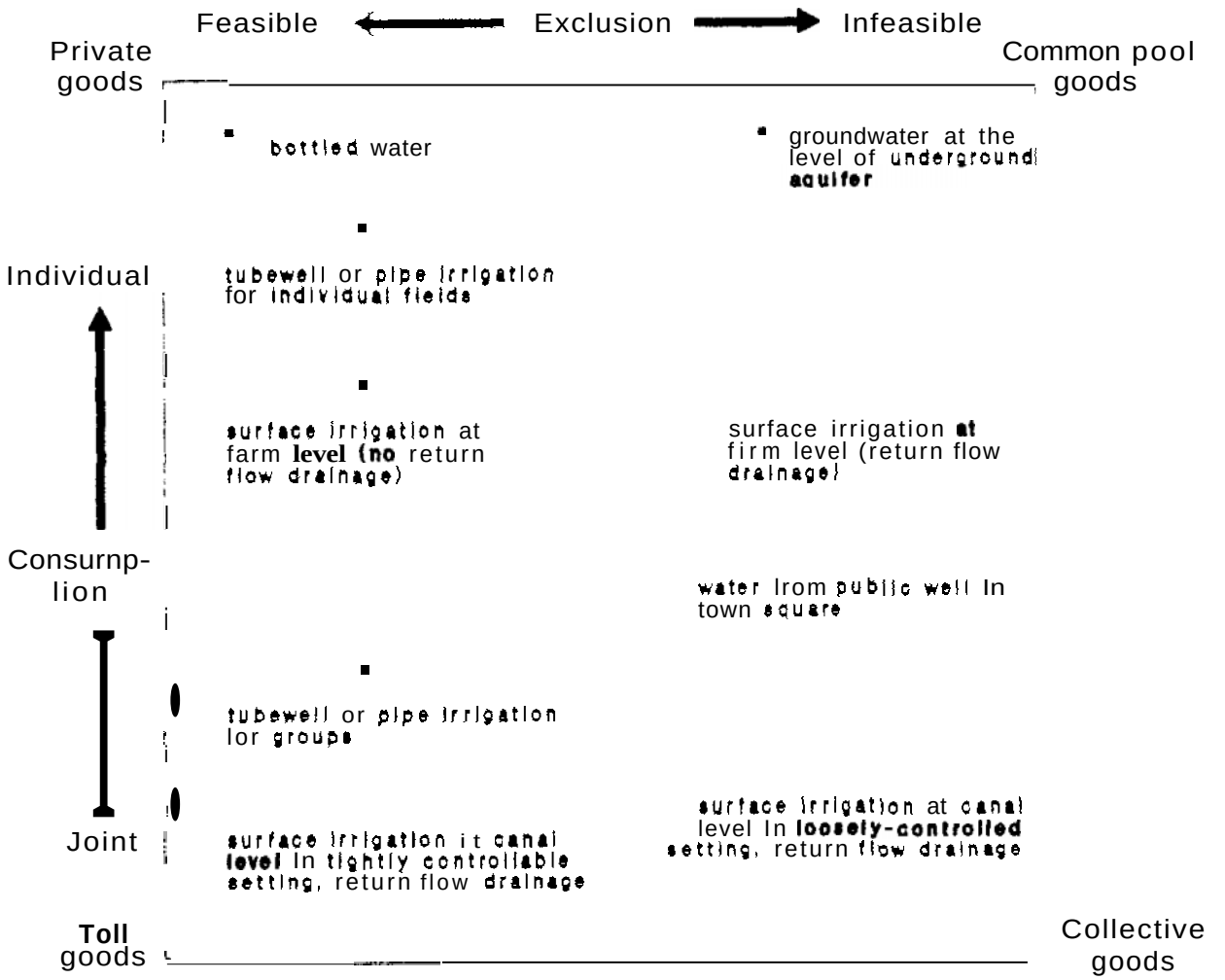

Figure 1 THE NATURE OF EXCLUSION AND CONSUMPTION OF WATER RESOURCES IN DIFFERENT ENVIRONMENTS

(Adapted from Savas ibid, p.39)

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 (see Svendsen, et al, 1990; Bautista, ibid). 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.

It is important to note that 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.

Inacomparativeanalysisof irrigation institutions, Ostroni (1990b) implies in her argument about how local institutions develop, that the more collective the good, the more "social capital" (ie. organizing and organizational investment) is likely to be required to craft effective institutions. However. we do not say 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 negotiating lead to the emergence of site specific institutional forms, which continue to evolve over time.

As Ostrom (1990a) further points out, the variety of situational factors and potential institutional outcomes make the development of specific arrangements in given settings essentially unpredictable. Studies have shown that even within similar environments, a diversity of rules can emerge, such as in the case of water allocation, resource mobilization (Hilton, 1990) or irrigation design options (Vermillion, 1990).

3.2 Management functions and institutions

Much of the discussion about 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 (ibid.) 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 bas no government or ho 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 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 nongovernment 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 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 are listed as follows.

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

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

3) *Commissioning the service* fyi g w pe services , ., O& f, system i. provei nt) a under what terms, conditions, and standards of perfc ce.

4) *Regulating and auditing* l he ıratıv ı g r l i r of ı to ıat i g ntitie in accordance with l above legal rights and ε ıpoı ε s Also, ı ıg tl ıı tl l ıg l ıights and p ibilities are complied with, through inspection, performance assessment and application of sanctions

5) *4 ource access and use* Legally defining basic rights and 'e fo er access and use.

6) *hwning facilities* The ıc 'ities of ı rchasıı ng, paying taxes, inventoryıı reporting to auditors etc.

Functions one through five can he 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 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.

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.

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 & Auditing	O				
	M				
	SI				
Authorizing Resource Access & Use	O				
	M				
	SI				
Owning System Facilities	O				
	M				
	SI				

O (Operations) M (Maintenance) SI (System Improvement)

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. Govt. area development authority	Command Area Dev. Authorities (India) Sudan Gezira Board
6. Semi-independent area development agency	ORMVA (Morocco), Mahaweli Dev. Authority (Sri Lanka)
7. Agribusiness corporation	Agrl. 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

Table 1 can also be used in another way--to relate basic institutional rules and incentives to different functions. Rules end 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 dry season thanduring 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 financiallyviable. The fact that the average recovery rate is about 55 percent indicates weaknesses exist in the current set of incentives or rules for farmers to pay the fees. The facts 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, or the perception that the O&M service is poor—are each 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 can not 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 a greater challenge in some countries than the challenge of how to create effective local, self-managing institutions.

3.3 Institutional performance

The performance of irrigation institutions can be assessed in terms of management outcomes and impacts. By outcomes, we mean the accomplishment or not 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 four performance criteria, as essential elements of a comparative assessment of outcomes of irrigation turnover or self management: reliability, manageability, financial viability and physical sustainability.

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

2) *Manageability* -- Are the management procedures practical and implementable, given physical and resource constraints?

3) *ancial via* -- Is the t 'st financially self for all necessary management i How cost ffecti are in s in pe ions, ce, and system improvement- in terms of meetin a ecti and rall ctivit /?

4) *Physical sustainability* -- Is the ution ep g th ri system's hy i l structures a u land in favorable o r the , so as to achieve i g i l bj of irrigation? c specifically, are n and system improvement activities able to ke p l system functional h tc e to meet i l jectives?

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

1) *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?

2) *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).

3) *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.

4) *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.

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.

3.4 Criteria for effective turnover processes and self management

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 non-governmental 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 non-governmental institutions. The following are some steps which governments take in the process of irrigation management turnover. The steps are listed roughly in order of going from conservative to more complete measures.

1) *Introducing irrigation service fees* --The government begins charging fees to water users to begin paying for part of 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.

2) *Fostering competition in service delivery* -- llie 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.

3) *Contracting* -- The government specifies the scope of work, terms, and conditions and pays non-governmental 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.

4) *Vending* -- The government produces a service upon request and payment by a non-governmental entity. Vending differs from when governments charge a service fee in that the user requests for and specifies the terms for the service, otherwise the service will not be defined and delivered. An example is 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.

5) *Franchises* -- The government awards rights to non-governmental 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.

6) *Grants* -- The government provides a subsidy to a local organization, which could be either 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 & Hayami, 1979).

7) *Joint agency/users investment* -- In this case the investment by 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 agree to provide the necessary labor. Other arrangements are based on proportional equity investment, such as 50/50 sharing of costs.

8) *Agency becomes financially autonomous* -- In this case the agency, which was funded by central government revenues, is converted into a semi 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.

9) *Joint agency/users munagement* -- This 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.

10) *Devolution of responsibility and/or control* --This is where 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 size limit. The agency retains a management role at the mainsystem 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.

11) *Loud shedding of functions* -- This is when the government agency totally withdraws from an activity or sector, at all levels. An example is the withdrawal of the Government of Senegal from the function of irrigation O&M management. However, this would not he a total withdrawal from the irrigation sector if the state still retains a role in regulating water use.

12). *Privatization of assets* --This is the conversion ofownership of irrigation property from the government to non-government organizations or individuals. Such property may include irrigation infrastructure and/or water rights. Privatization may be implemented through sale of assets. sale of stock, or legal transferal of ownership. Examples are the sale of public tubewells in Bangladesh and Pakistan.

Whatever steps are taken in a country to implement a turnover process reflect official images of intended outcomes and assumptions about how best to achieve them. One perspective on how turnover should he done is similar to the metaphor of teaching a child to swim by throwing it in the water. In this view, abrupt withdrawal of the state will create a sense of urgency to which farmers will respond rationally. While this view may have some merit, it is countered by others that farmers do not always respond rationally at a group level even when it is in their interest to do so, because of various social inequalities and constraints.

Another perspective emphasizes that farmers organizational capacities need to be nurtured step by step by the agency. Hence, irrigation agencies must see that irrigation systems are in good technical condition, farmers must be trained, and operations and maintenance tasks must be handed over incrementally and implemented by farmers according to proper engineering principles. Detractors from this view counter that a turnover process based on too much outside authority, expertise, and resources only perpetuates local dependency on the state.

In a comparative review of turnover processes it will be important to assess the differing perspectives of the various actors involved. This will include such diverse people as officials from planning, finance, and irrigation agencies, field operations staff of agencies, institutional organizers, farmers and their "representatives," agricultural consumers, and other groups. We hold the assumption that an important aspect of virtually all strategies for management turnover will be a series of dialogues between agency staff and farmer representatives to define and reach agreements on new roles, responsibilities, incentives and sanctions.

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 baaed on currently available literature about irrigation management turnover and autonomy (Wolf, 1991; Svendsen, et al., 1991; Cowan, 1990, Vermillion, 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: **1)** new roles have been identified for the agency which substantially replace management roles being turned over and *2)* 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 local, 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 specify working hypothksesto 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* (see Savas, 1987; Cowan, 1990; Roth, 1987; Small & Carruthers, forthcoming),

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

3) *Irrigation management performance* (Chambers, 1988; Small & Carruthers, ibid; Small & Svendsen, 1990; Uphoff, 1986; also see Drucker, 1974 and Brinkerhoff & Dressler, 1990 on management performance assessment generally).

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. Several 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 effected 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 arrangemenrs,

8) Whether irrigators have the legal rights 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 expectations of irrigators, are visible to irrigators and have no serious negative side effects.

These working hypotheses can be used to provide a preliminary framework for comparative interpretation of the results of different approaches to irrigation management turnover.

Part Two: The Proposed Program

4. Need for a Program on the Turnover and Self Management of Irrigation Institutions

4.1 Research

The above examples show how recent and extensive irrigation management turnover is throughout the world. They suggest that there is potential for success under certain conditions. However there is an urgent need for a systematic, comparative assessment about the range of approaches being used, constraints to implementation and the impacts on performance of transferring irrigation management to nongovernmental institutions. Special attention is needed to assess what supportive legal, policy or regulatory requirements are needed, the need and potential for bureaucratic reorientation due to turnover, and the suitability of different turnover processes in different environments. And there is an urgent need to systematically and comparatively assess the impacts of management turnover on the equity of access to water, irrigated land and related resources. There is a need to document under what circumstances such institutional reform can lead to empowerment and greater well-being for the rural poor, as opposed to marginalization of the poor and greater concentration of resources in the hands of the few. In brief, the immediate need, especially regarding IIMI's role, is not to advocate and promote turnover, privatization or even self management, but to objecrively assess their results and to identify effective institutional strategies.

4.2 Information

Manypolicy-maken do not know how to turnover management of their irrigation institutions in an effective way. They typically have very little, if any, awareness of the range of organizational options which could be used. There is uncertainty and some skepticismabout what the effects of these changes will be on management performance. Information is urgently needed among government agencies, donors and centers of expertise which addresses such questions as the following:

- Does turnover lead to better operational performance or only more sustainable management *at* roughly the same levels of performance? Under what conditions and arrangements do eirher outcome tend to occur?

- Which aspects of performance are sensitive to the effects of management turnover? These may be such aspects as physical sustainability through long-term investment patterns of users, O&M cost recovery, equity of water distribution, cropping intensities, productivity, better water delivery timing and reliability.

- In what situations should turnover of management authority versus ownership of system assets be implemented together or separately?

- What features of turnover policies and implementing processes lead to successful outcomes?

- How can interested governments and farmers' organizations best be served by national and international exchanges of information and experience about turnover, training and technical assistance?

Given the lack of documented information about actual implementation and results, some of these urgent questions can only be addressed by comparative research. There needs **to** be widespread exchange of information through workshops, conferences, seminars, and research and advisory publications.

43 Institutional **support services**

Institutions either turning over or taking over irrigation management can be strengthened by gaining access to information about turnover experiences in other countries and by enabling officials to visit countries with more developed turnover programs. Policy makers and planners who are inexperienced with turnover but are nevertheless engaged in formulating turnover programs could benefit greatly by having guidelines **for** assisting in decision-making about policy and program formulation. There is also **a** need for turnover training guides for both agencies turning over management and for nongovernment institution, taking over management. Finally there is a need for provision of technical or advisory assistance whish is **based** on an international pooling of information and experience. To date, such services are not being provided by other organizations.

The establishment of an advisory service on TSM should be preceeded **by** two things:

1) **an** assessment of the needs of prospective clients (which could include both agencies and irrigators' associations) and

2) development of a fully effective service to meet the needs identified.

5. Purpose and Objectives of the Program

5.1 Purpose

The overall purpose of the Program on the Turnover and Self Management of Irrigation Institutions is to determine the prospects for successful results from irrigation management turnover. The Program will comparatively assess nongovernmental management models, turnover processes and their results and impacts. International exchange of information and institutional support services will be provided to enable governments and private-sector irrigation institutions to make better choices and achieve more sustainable and productive irrigation.

The Program will be implemented by IIMI's Research Division a5 an international thematic program. As such it will play a supervisory or implementing role in the comparative, thematic activities. It will play an advisory and integrative role relative to turnover activities in IIMI country programs. The Program will consist of two phases. The First Phase is expected to require three years. The Second Phase will involve a series of in-depth impact assessments in a number of countries which have extensive experience in irrigation turnover or privatization, such as in Latin America, China, and the Philippines. It is possible that the Second Phase may be initiated prior to the completion of the first phase, depending on availability of funding and staff.

5.2 Objectives

The TSM Program will have the following objectives.

1) Obtain concise information on a broad range of non-governmental irrigation management alternatives which are being used worldwide;

2) In selected countries conduct a comparative analysis of turnover approaches, management and policy environments and results of turnover;

3) In selected countries do a comparative assessment of policy and regulatory environments effecting turnover;

4) Establish a center of information on irrigation management turnover and disseminate widely reports and publications;

5) Facilitate exchange of information between countries through country level seminars and workshops, presentations at international workshops and conferences and publications in existing newsletters and other outlets;

6) Provide institutional support services tor irrigation management turnover to countries through preparation and presentation of general guides for policy and program formulation, training curricula guides and provision of direct advisory support (primarily to countries where IIMI has country programs).

6. A Suggested Program Strategy

It is recommended that at the outset of this Program a Program Advisory Committee should be formed, consisting of a small group of policy makers, planners or agency directors from LDC governments, representatives of select development agencies and other professionals. Emphasis will be on including individuals with direct experience in implementing turnover programs, and perhaps representatives of successfully self-managed irrigation institutions. The Committee will meet at least once per year to review activities and provide suggestions for the program.

The following set of activities proposed for the TSM Program is based on discussions with individuals involved in irrigation management turnover in several countries and on reports about management turnover. Future adjustments in activities may be made on the basis of budgetary constraints or recommendations of the Advisory Committee, representatives of involved governments or donors.

The four operational components of the TSM Program will be: comparative assessment, country research, information services and institutional support services. Activities described below under the comparative assessment, information and institutional support services components will be sponsored by the Program (unless specifically noted otherwise). The country research component will be funded through respective IIMI country programs in the IIMI Field Operations Division. Hence, the IIMI country program research activities will be a programmatic component of the overall TSM Program but will primarily be funded separately from TSM Program funds. However certain activities, such as special contract studies or participation by non-resident IIMI staff or others in country program workshops, may be sponsored by the TSM Program.

6.1 Comparative assessment

The first component of comparative assessment will be a series of relatively concise case studies of irrigation turnover and self manaeement (TSM) in different management environments, including examples from more developed countries. These will provide informationon the range of institutional alternatives and transfer processes

and some indication of their results. Most countries in the sample will be from the developing countries but some will include more developed countries, such the USA, southern Europe or Pacific Basin countries. The case studies will be based on a comparative framework for data collection which will emphasize management functions such as resource mobilization and financing, water delivery, maintenance, crop planning, regulatory policies and turnover models.

The case studies will include well-documented data and policy statements, but will be relatively brief. Data collected from the profiles will be used for a comparative analysis of private-sector management arrangements and turnover process. and their management environments. Many of the case studies may be implemented through small contracts, to local experts, NGO, or university personnel.

A second type of activity under the comparative assessment component will be a series of several issue-oriented rapid appraisals of turnover processes. These will be rapid assessments of irrigation management transfer in selected countries. They will he carried out primarily in order to identify the important issues and perspectives of farmers, agency staff, planners, policy makers, finance ministry officials and others. They will also serve to elicit a set of comparative assessment indicators for turnover. They will generally be implemented by one or two IIMI staff together with national-level research and government collaborators.

The comparative assessment will produce a synthesis of the case studies, rapid appraisals, country-level research and findings from other IIMI and non-IIMI research. The research will develop a typology of management transfer processes and management environments. The types of approaches used in different countries will he tentatively assessed relative to performance criteria elicited in the study (including criteria of both farmers and agencies).

6.2 Country research

Country research on turnover will be carried out in several IIMI country programs in Asia and Africa, and perhaps in Latin America in the future. Funding for these country research programs are being sought separately from the TSM Program.

The TSM Program will provide the comparative assessment framework and thematic direction for country-level programs involved in turnover. It will also sponsor international exchange visits and other international input into national workshops and other country-level information and institutional support activities. We describe below the key aspects of this Comparative framework.

In the country research programs, IIMI and national NGOs or research organizations will be the primary implementers in each country, working closely with counterparts in the government. It is expected that the work will start with performance-oriented rapid appraisals in several irrigation systems and interviews with government officials. This will produce locally-relevant turnover performance criteria and subsequent development of indicators for research.

In each country program, between 12 to 20 systems (or subsystems) being privatized or turned over will be selected for Comparative. repeating rapid assessments. The assessments will focus on documenting key aspects **of** the turnover process and on a set of about eight locally-derived performance indicators. The assessments will be repeated at least twice per season. After the first year the number of systems in the research sample will be decreased by focusingon the systems determined to be the best 25 percent and worst 25 percent of the systems, according to the performance criteria.

Research will be continued through the remainder of the TSM Program and mey be continued further under future country-level research programs. The longitudinal nature of the research is essential in order to assess problems of implementation and performance results. Sampling may also be shaped where the governmentwould like to experiment with two or more turnover models. Research should take on an "action" orientation, with the collahorating agency, NGO or research organization also having an advisory or training role to play. Assessment visits by farmers or other nongovernmental irrigation managers to irrigation systems successfully managed by private sector organizations will he encouraged.

Another aspect of the country research programs will be an assessment of national level factors effecting management turnover. This will include an analysis of: 1)legal and regulatory policy environments and 2) economic aspects of competition and profitability as related to management turnover. The research program will involve quarterly meetings of a working group of representatives **of** the government (preferably from irrigation, agriculture and planning ministries) and involved NGOs and research institutes. National workshops on the research and the country's turnover program in general will be held annually, perhaps with partial sponsorship from IIMI cuuntry programs.

Special contract studies will be providzd under the TSM Program to assess important policy and regulatory aspects **of** turnover issues. They will be done in countries other than where IIMI has country programs, such as China (where O&M franchises are used), Colombia (where system-level, needs-based tees act as farmer incentives for management takeover) or Madagascar (where rehabilitation *is* conditional on turnover). IIMI will contract and interact closely with national centers of expertise to produce tightly-focused studies requiring less than a year to complete.

6.3 Information services

IIMI will develop a library of publications, reports and training materials related to irrigation management turnover and will actively disseminate information on IIMI library holdings on management transfer *to* a wide range of appropriate representatives of governments, development and foreign assistance agencies, NGOs, institutes, some large-scale water users associations and other centers of expertise or interest. IIMI will identify a network of both interested rtcipients and suppliers of information and will produce and disseminate to the network a series of short reports and case study summaries.

Other publications will be produced both from country research and the comparative assessment, including short management briefs, country papers (funded by country programs), technical papers, comparative research monographs and policy and program planning guidelines. The guidelines will synthesize general lessons and matters for planners to consider and plan for in different settings worldwide, when developing turnover programs.

IIMI staffwill provide international input into national workshops and seminars for informing and influencing policy-makers. This will be done through visits by experienced people from other countries and through presentations about management transfer in other countries. People with direct experience with **turnover** and successful self-managed irrigation institutions will be sponsored to attend international conferences and other meetings to disseminate findings from the Program. Funds for sponsoringan international workshop on irrigation management turnover will be sought **for** the **TSM** Program.

6.4 Institutional support services

It is expected that the international exposure of government representatives to information and ideas, through the program's information services mentioned above, **will** strengthen the capacity of many countries *to* undertake effective irrigation management turnover programs. Expanding the awareness of the broad range of options and theirsuitability indifferent types of environments will enable more effective decision-making, planning and implementation of turnover.

To further enable governments to develop locally-effective turnover programs, IIMI will sponsor short-term needs assessments and advisory missions for countries requesting assistance, especially those in which IIMI has resident country programs. Such assessments will involve IIMI staff and others with expertise in implementing turnover in LDCs. Such assessments will focus on: 1) identifying what needs exist for program development (given national policy objectives) and *2)* clarifying to

governments a range of feasible options and their implications. Such needs might be training for agency staff or water users association leaders, staff mobilization, policy or regulatory options, alternative methods of implementation, monitoring and evaluation, and so on.

The Program will produce two kinds of planning materials to assist governments in developing effective turnover programs: 1) a policy guidelines report and 2) a program development guidelines report. These guidelines would be based on a comparative assessment of turnover and will identify a potential range of problems, resource needs, and options for officials to consider in formulating and implementing turnover programs.

Such guidelines will include a "social methodology" for creating the conditions for effective collective action, where irrigation management is to be turned over to water users associations. They will also include an "institutional methodology" which will identify optional strategies and their implications for preparing the agency itself to plan and implement turnover programs and reorient its mandate.

The program will produce two kinds of training materials. These will be basic guides on how to develop training curricula for training programs for: 1) agencies implementing turnover and for 2) leaders of nongovernmental institutions taking over management from the government. The TSM Program will also support special awardees to write case studies and exchange information on their experiences with management turnover in different countries.

Annex: IIMI Country Activities in Privatization and Turnover

IIMI has country programs involved, or about to be involved, in management turnover in Sri Lanka, Bangladesh, Nepal and Nigeria. This is likely to expand to other countries in the future.

Sri Lanka In Sri Lanka, IIMI is conducting an assessment of distributary canal management turnover activities in INMAS project areas in the North-Central Province. During 1992, IIMI's Sri Lanka Country Program expects to initiate an assessment of management turnover nation-wide. IIMI's role in the Sri Lankan turnover program will be to act as researcher/observer and as catalyst to facilitate effective change.

IIMI will monitor field level implementation of the turnover process, measure the impact of the process on irrigation system performance and sustainability and facilitate independent feedback to agencies. IIMI will support a learning process which will address the following questions: 1) How well are the distributaries arid field channels turned over to farmers' organizations being operated and maintained?, 2) How well are the state agencies and farmers' organizations cooperating?, 3) How effective are the linkages between the project management committees and the irrigation department?, 4) What factors constrain or support successful farmer management and 5) What is the impact of this process on irrigation performance and sustainability?

Nepal In Nepal, IIMI is currently assisting the Government to carry out its plans for system turnover and participatory management. It is helping to develop procedures, guidelines and selection criteria for subprojects to be developed under the Participatory Management Program and the Turnover Program, both of which are financed by the Asian Development Bank. IIMI will also assess the need for institutional support and training for water users's organizations and department staff. It is expected that IIMI will be involved in continuing research, advisory and institutional support services for turnover in the future.

Bangladesh In Bangladesh, IIMI expects to soon embark on a two-year, intensive research project regarding minor irrigation privatization in one of the least developed areas of Bangladesh. The program will monitor and assess minor irrigation equipment distribution, servicing and operation in the various districts of the northeastern part of the country. This is the site of the ADB-funded Northeast Minor Irrigation Project. IIMI will monitor and assess the performance of the markets for irrigation equipment (including credit necessary for pump purchases) and for irrigation support services at the local level. The role of the Bangladesh Agricultural Development Corporation (long associated with the public provision of irrigation equipment) and other Government agencies in the new local privatized market will also be examined. The management performance of selected tubewells is expected to answer questions about the efficiency

and equity of privately supplied and managed tubewells. The focus of this study is at the pump command area and district levels, hut the project will facilitate development of national policy and program guidelines for privatizing minor irrigation in Bangladesh.

Nigeria During 1991, IIMI is initiating a country program in Nigeria, with funding from the Ford Foundation. The first emphasis of the program will be on management turnover of components of large-scale schemes of the River Basin Development Authorities in the north. IIMI will assist the Government of Nigeria to develop and field-test a viable joint RBDA-farmer management model. IIMI's program will first focus on the key Hadejia-Jamaare RBDA, located near Kano. Turnover methods and procedures developed will be refined and disseminated for use in other areas of northern Nigeria. IIMI will help the Government examine the effect on management performance of making the RBDAs financially autonomous and of turning over management of distributary canals to the farmers' organizations. IIMI will gradually shift more of its attention in Nigeria toward private-sector, small-scale pump irrigation.

Senegal IIMI is anticipating establishing a program of action research on irrigation management turnover in the near future, in collaboration with the National Organization for Land and Water Management in the Senegal River Valley (SAED), the Senegal Institute of Agricultural Research (ISRA) and the Association of Walo Farmers (ASESCAW). The four-year program focuses on efficient irrigation management of existing systems and on turnover of management to users' groups. IIMI will assist the Government in: 1) identifying ways to strengthen the capability of farmer associations to own, operate and maintain relevant portions of irrigation systems; 2) analyzing and field testing alternative ways of turning over ownership and management of systems to farmer groups; and 3) strengthening the ability of rural development agencies to perform their new functions under the emerging post-construction and post-turnover situation.

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