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Considerations in Formulating the Transfer of Services in the Water Sector

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IWMI

INTERNATIONAL WATER MANAGEMENT INSTITUTE

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Preface

This paper reports work that is somewhat unusual for IWMI, in the sense that, although based on research carried out by the authors in six countries, it really reflects the wisdom and experience of two senior practitioners They have used the data collected, plus their knowledge about other international experiences, to argue that if a country plans to implement an irrigation management transfer policy, it should be based on a comprehensive and well-planned approach They have tried to provide a detailed outline of tasks, considerations, and other factors that policy makers need to address to increase the likelihood of successful transfer and long-term sustainability They analyze the six cases to demonstrate the advantages of addressing all the considerations identified, and the consequences of not doing so

IWMI commissioned the work as a support for work already underway under a project entitled 'Program of Support Systems for Local Management in Irrigation" Completed in 1997, that project aimed to define the necessary critical elements of the support systems required for sustainable local management of irrigation systems The project was supported by the Government of Germany and involved detailed studies in six countries, mostly in partnership with national research institutions and water user associations, combined with workshops and professional development We are grateful to the Ministry for Economic Development and Cooperation of the Federal Republic of Germany for its generous support for this project and to the Deutsche Gesellschaft fur Technische Zusammenarbeit GmbH (GTZ), which supported project implementation on behalf of the Ministry

Although the present study was financed from the unrestricted budget of IWMI the report was conceived as a direct contribution to achieving the goals of the Support Systems Project, and its results were used in the final report on that project Furthermore, we would like to thank the many people in the countries studied—too numerous to list here—who have assisted the authors in carrying out the study

The audience for this paper comprises policy makers planners and senior managers in developing countries in the water or irrigated agriculture sectors and the technical staff of donors and multilateral development banks which are supporting policy reform in the irrigation and water sectors We hope that readers find the study useful and look forward to receiving comments and observations on the contents and usefulness of the report

Finally IWMI wishes to thank the authors who have worked on this as a labor of love far beyond the requirements of their contracts

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Summary

Numerous countries have launched programs to transfer certain government responsibilities for the management of irrigation services to Water Service Entities (WSEs) composed of the customers or beneficiaries of the services Each management transfer program is different from the others in extent and composition The countries engaged in or contemplating transfers and international lenders funding the efforts are keen to learn what the principles of successful programs are and what the best approach is to ensure maintenance of a viable effective service

Over the last several years, the results of several of these transfer programs have been examined by various investigators Unfortunately the level of success attained in most of these transfers remains uncertain In part, this is due to the short life of the programs However, it is apparent that many lack the features necessary to provide a reliable service that will meet the customers needs at reasonable cost and will be sustainable into the future

The history of water-related services in the broader water sector and long-established WSEs in all service areas of the water sector throughout the world were examined This effort focused on the institutional framework, the roles of governments and WSEs, and the principles consistently adopted in the partnerships that were successful Relatively few principles apply but it was evident that all of the principles must be satisfied for success Governments must have a comprehensive regulatory function in place adequately funded and enforced It should ensure that the resources are actively managed at the basin level In addition to a set of institutional and operational characteristics, WSEs must have firm water rights, financing powers, and a breadth of services to match the area's present and future needs

Findings of the examination and other information were used to devise a framework for creating successful transfer programs for all services in the agriculture-related water sector and the resulting WSEs

Using this framework as a basis for successful management transfer, the programs and present features of established WSEs and their services in six countries were examined All dealt with irrigation distribution, though three included related water services to the farmers There were significant differences in the scope of transfer among several Five exhibited serious flaws that, uncorrected, place the survival of the WSEs, as now conceived, at risk Some flaws were caused by the nature and extent of the transferred responsibilities and powers The same five suffered from inadequacy of essential government institutions and several from the current level of support

Considerations in Formulating the Transfer of Services in the Water Sector

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INTRODUCTION

Claims on water and changes in water use are increasing throughout the world There is increasing pressure on governments and political leaders to get irrigation and related water service systems to work The penalties for failure are becoming more serious One of the approaches taken by governments to improve water services is the transfer of management of some facilities to local entities

In recent years, governments throughout the world have initiated programs to transfer some or all responsibilities for management of irrigation and related water services to local entities The level of program preparation the scope of responsibilities transferred the physical conditions underpinning the services, and the institutional elements under which the transfers have been launched have varied among the countries

The programs have produced a range of results to date Most programs have not been in place for a sufficient time to confirm the final outcome The absence of features proven to be essential to success however suggests that many are at risk A few may be judged failures Nevertheless, the benefits of transferring responsibilities to lower levels of government or to Water Service Entities (WSEs) directly or indirectly owned by the beneficiaries, support the transfers At the same time, it is essential that a sound comprehensive program be followed so that the transfers will result in effective services being provided to the beneficiaries at a reasonable cost and through a means sustainable into the future

A successful management transfer program will require fulfillment of a set of well-defined tasks and the installation of a proper complement of institutional elements As has proven true these tasks and institutional elements in general will have the same basic characteristics regardless of the form of entity managing the transferred systems

The perspective of this paper is more than a review of management transfer processes and performance This paper also examines how the programs came into being what institutional structures existed at the time of program initiation and the appropriateness of institutional structures now in place to handle future service requirements and policy changes

The primary purpose of this paper is to identify the essential features of successfully transferred services and to set forth considerations to be weighed and the list of tasks to be carried out as an aid in clarifying what must be done for the successful transfer of manage-

ment of irrigation and related water services systems A second purpose is to apply the considerations set forth for formulating a transfer program and assess the actual features of the transfers in six countries

The basis for this paper was established by examining the institutional financial and physical aspects of responsible entities which have provided long-established and successful services Common characteristics of these entities were identified The history of long-established services better ensures a reliable basis for evaluating and comparing new and existing services And it allows the evaluation of the scope of preparatory and support effort that gov ernments require if transfers are to attain success Information available from other investigations of management transfer programs was also used in this paper

The institutional elements, water management tasks, and the programs for transfer of management were examined in six countries (Indonesia, Mexico, Nepal, Sri Lanka, Turkey, and the United States of America) on this basis for successful management transfer Although specific projects or river basins were selected in each country the review also examined the overall water resources institutions and turnover programs of the country

The detailed field data collected in the review of the six countries are contained in six papers one for each country These six papers are available in the library of the International Water Management Institute (IWMI) The appendix to this paper contains a summary of the field data contained in the six country reports

This paper is divided into two parts Part I provides a brief historical perspective of the evolution of the agriculture-related water services sector the possible nature of services in the future and the characteristics of successful institutions for rendering sustainable services Part I also defines the institutional framework necessary for a successful transfer program for irrigation and related water services Part II outlines eight key factors for success Information collected from visits to river basins in the six countries and from other readily available sources was then examined to determine how adequately, in each case the eight key factors had been implemented

Part I

Programs, Institutions, and Support for the Transfer of Services in the Water Sector

BACKGROUND

Many papers have been written about the nature and performance of programs to transfer various responsibilities for irrigation services from governments to WSEs WSEs can range from small farmer organizations commanding a few hundred hectares where the farmers provide the labor and management input, to large utilities' of several thousand hectares where farmers hire professionals to do the operation and maintenance of the system Almost all the papers are based on studies of recent transfers Some investigators found failures or pending failures However in many cases the questions of whether the transfer was successful (assured of long-term sustainability) and whether the specific approach to the transfer was effective remain open (Vermillion 1997)

There is a sound reason for the uncertainty the insufficient time interval that had elapsed since responsibilities were transferred under most of the programs reported in the literature Some conditions and the level of performance that characterize sustainability cannot evolve in such a short time

The adequacy of maintenance the dominant cost item and the key to a reliable service over the longer period cannot be determined by evaluating conditions during the few initial years Financial self-sufficiency depends on the adequacy of revenues and a reliable means of financing major expenditures It may take years to verify whether customers will continue to support the new arrangements and whether receipts from service charges will cover costs plus reserves And there must be comprehensive regulatory legislation covering a range of matters and the means to ensure its application often promised but not implemented

Indeed one can say that a transfer is doomed if some of the primary features essential to success are completely lacking at the time of transfer For example the water supply in the quantities assumed when transfer was formulated is at risk if the WSE has an uncertain source or right to water As other demands on the common source increase the irrigation service of unprotected WSEs the very reason for their existence will deteriorate Firm water rights are essential and perhaps of greatest importance to the success of irrigation transfers (Molden 1995, Pande 1995 Vani 1995 Nagata 1994 Barnes 1987)

The preparation of the framework of actions and suggested steps for a successful trans fer offered herein are based on information on WSEs that have successfully functioned for several decades if not centuries in many countries This information has been obtained from recent studies, documents issued by successful WSEs and governments, and through the di rect involvement of the authors

This chapter commences with a discussion of transfer objectives followed by a description of future water services that WSEs must provide The historical roles of governmental and nongovernmental entities and some proven government/WSE organizational arrangements will be summarized The conditions under which long-established WSEs have evolved and successfully functioned will provide the basis for recommendations on formulating and imple menting a transfer program and the ongoing government support system

The information and approaches offered are not original or new, as they have been de vised and proven by practitioners in many countries over a great many years—indeed, for centuries (Frederiksen 1984 1994) That material is essentially a compilation of experiences

TRANSFER OBJECTIVES, POLICIES, AND MEANS TO BE CONSIDERED

The primary service of the six examples discussed later was the distribution of irrigation water Some also were to provide ancillary services The examples represent programs undertaken by governments in different regions of the world, at different levels of economic development and with different cultures Yet all stated one common objective of the transfers—reduce the governments irrigation O&M budgets Additional objectives relating to broader decentralization policies increased agricultural production, and increased involvement of the customer in rendering the service were implied in a few

However the fundamental objective of every WSE should be to provide quality service to customers on a sustainable basis while remaining financially independent This should be a universal objective governing all services and all transfers of services to WSEs

Yet, this underlying objective of every service is not found to be explicit in most transfer programs today The lack of a prominent statement of this objective of the service seems to contribute to fundamental deficiencies displayed in many Rarely are modifications to government services and regulatory policies programs or agencies addressed or even mentioned as key elements for the creation of WSEs to assuredly enable them to meet this objective And rarely is this the basis by which the front end of the process has been or is formulated—or the program evaluated The focus of most internal and external agencies is simply to institute a program that will divorce local O&M activities—and save money

Viewed from the perspective of providing the customer with the best overall service sustainable into the future the most appropriate improvement may be to modernize the government line agencies that currently provide all or a part of the service Or indeed it may be to transfer full ownership and responsibilities to local service entities Many government agencies operating as independent utilities do provide efficient services and collect charges from customers/beneficiaries that cover all their costs Unfortunately many others will remain of necessity with their shortcomings unaddressed

These facts should not be forgotten in the rush to transfer responsibilities, particularly where a range of services is needed or the size or complexity of the facilities dictates that services be rendered by the government For the objective should always be to provide the best services at least cost—with the proviso of cost recovery from the beneficiary Accordingly, this paper will treat the subject of upgrading government utility agencies to a limited extent

The underlying objective is service quality and sustainability, but removing subsidies from government budgets is a valid though narrower second objective and a necessary move by all countries today And properly conceived and executed transfers can help governments satisfy that objective too However, governments must recognize that, initially, costs may increase, because the preparation and implementation of management transfer may require rehabilitation of facilities, and certainly require training, reorganization, and staff transfer and management Many government agencies encounter strong opposition to levying charges that recover the full cost of providing services, particularly when political pressures bear heavily on agency actions It is evident that transfers can help overcome this obstacle as customers are usually more amenable to pay full costs when they are involved in the management decisions And usually they realize a simultaneous improvement in the service

Where transfers are the chosen mechanism to meet overall objectives, governments must provide a support system at every stage of transfer for the WSEs to survive The support system will be an essential component of the framework within which the government and the customers function as partners to form the best organizational arrangements for rendering agreed services at least cost The local WSEs must have rules and regulations that customers understand and that the WSEs can and will enforce (Brewer, Sakthivadivel and Raju 1997 SID 1980, YCFCWCD 1983)

The formulation of transfers is complex since transfer programs must deal with the institutional, physical, and financial means of providing the services The range of services to be transferred in most settings must expand beyond irrigation The underlying justification for transferring irrigation responsibilities is equally valid for the transfer of local services for agricultural drainage, storm drainage, and flood control—in some cases even the transfer of bulk services in regional supply and drainage Governments cannot afford the costs of subsidizing these any more than the cost of providing irrigation services, subsidies are not warranted for these Indeed, many beneficiaries of storm drainage and flood control realize greater direct benefits than do irrigators And many of these services are less complex than distributing irrigation water

Thus before a government formulates a program for transferring irrigation services—or any other single purpose service it should determine the generic policies and programs for transferring responsibilities in all fields of services in the water resources sector It should enact broad legislation including the legal structure and powers of WSEs suitable for all common services and undertake actions that will be consistent and applicable as a support system for all services And it should initiate the actions for transferring all the services in parallel although they may follow different schedules for implementation A great many countries such as Indonesia and Vietnam have adopted and codified such polices, but have not finalized the politically difficult program for implementation

CURRENT AND FUTURE SERVICES

No irrigation or other single purpose service transfer should be contemplated without making a careful assessment of the future economic and demographic conditions in the service area This admonition has been repeated earlier and warrants attention, given the water management problems confronting most countries The examination should look at the services under consideration for transfer and at expanded or new water-related services that may be required Opportunities will arise to combine services under one WSE, particularly irrigation drainage and aspects of flood control (Davis 1984 Gorriz Subramanian and Simas 1995) Three of the example country programs demonstrate the need for addressing combined services whenever contemplating a transfer of irrigation service responsibilities

In the future if not today, most "irrigation" systems will have additional service functions of supplying bulk water through the primary facilities to several different classes of customers—irrigators and villages are but two—as well as distributing irrigation in the agricultural service areas (van de Ven 1993, SID 1988) Even if the groundwater resources do not diminish the increasing levels of nitrites in the groundwater render many current well supplies to villages unfit for human consumption in vast areas of Europe Central US the Middle East, South Asia and East Asia The bulk supply function will dictate fundamental changes in the operation of the main supply facilities, while the operation of the distribution system may or may not change, depending on whether villages are to be served or not

The O&M costs of the WSE will increase because of the higher priority and need for year round reliability in services to the villages and urban areas These factors have implications for structuring the WSE, O&M responsibilities cost-recovery mechanisms, costing of services and the government and customer roles Changes in drainage and flood control services may be more subtle As villages and urban areas expand into farmlands higher levels of services will be desired Capital investment O&M costs classes of beneficiaries, and customer responsibilities in the protected areas will change accordingly

The combination of other services with water supply and irrigation is common in many locations considered for transfer Drainage is an obvious candidate Irrigated lands require drainage to control water levels and often water quality The more-effective and less-costly water supply is usually possible with reuse of captured drainage The obvious benefits of conjunctive management should be realized wherever possible Unfortunately, this is not reflected in the modifications to the regulatory functions of governments or the powers of the WSEs in the vast majority of transfer programs—none to the level necessary for success as defined earlier

ROLES OF GOVERNMENTS AND CUSTOMERS/BENEFICIARIES

As stated earlier it is well to examine closely the experiences in providing services in various countries before devising a framework for transfers Historically, farmers have developed and managed much of the world's local irrigation and agricultural drainage infrastructure Beneficiaries have also played an important role in building and maintaining local storm drainage and flood control works The larger irrigation schemes particularly the primary storage

and conveyance features of the last five decades, have been usually built by governments Governments have likewise taken the lead in building and maintaining the large flood control systems serving extensive or high-value areas along major rivers But even these government roles have been modified in recent times and now are best described as a central government O&M and financial partnership with the beneficiaries through their local entities Both governments and the local WSEs will continue to have a role in active water management

The Historical Role of Local Entities

Irrigation in most countries began with small schemes developed by local groups—several now in existence for centuries in China, Indonesia, Sri Lanka, the Middle East, and North Africa to mention a few They established administrative and operating procedures, scheme water rights to the primary source of supply, individual rights within the group's service area the responsibilities of members amounts and methods for service payments, and the means for enforcing the entity s rules Informal group rights to the primary water supply usually determined by the chronological order of development were recognized among the various diverters drawing from the same stream The concept of rights their basic provisions, and their enforcement in farmer systems is found in countries as diverse as Japan (Nagata 1994, Teerink and Nakashima 1993), Nepal (Yoder and Martin 1987, Molden 1995), India (Vani 1995, Pande 1995) and the United States (Teerink and Nakashima 1993)

In the United States, local WSEs were formed to finance, construct and operate systems serving up to 100 000 hectares, independent of the usual government agencies (Davis 1984, Barnes 1987) Local WSEs, without government assistance, built systems serving over 80 percent of the lands irrigated in California today—the vast majority completed in the late 1800s Irrigators, gold miners, and cities in the state conceived new water laws tailored to support this development and the entities that have proven effective, abandoning the European riparian laws (Teerink and Nakashima 1993, Barnes 1987, California DWR 1978)

The provision of storm and agricultural drainage services has a similar history with beneficiary entities created following principles similar to those found in the irrigation sector In widely separated countries, people living in areas prone to inundation by storm water organized and dealt with flood control in the same manner These schemes commenced in 1100 in the Netherlands (van de Ven 1993) and from 1200 onward in the rest of Europe Earlier developments were pursued in Asia and North Africa

Farmer WSEs, mostly created under statutes for establishing "municipal corporations, ' or similar forms, financed and built many thousands of small drainage schemes that serve 60 million hectares in the US Most were built from the mid-1800s to the early part of this century, and they are still maintained by the WSEs In many areas, the local government the county administered these undertakings, levying an additional increment to the farmers' property tax to cover the costs The role of the county was largely to focus the efforts serve as the administrator of what was primarily a one-time activity and to provide a vehicle for securing bond financing for the farmers drainage systems There was no government financial assistance, with the exception of the actions taken in response to the impacts of economic events such as the depression of the 1930s At that time many farms went into bankruptcy and became tax-delinquent Some states assisted counties with interest payments on these and

other types of bonds during these times to maintain an acceptable credit rating for all public entities that used bond financing particularly schools and cities Often small flood control schemes were constructed by local governments and costs recovered in the same manner

Unfortunately, drainage systems were not constructed on irrigation systems in all countries, particularly in the more recent large schemes, many now causing waterlogging and salinity problems This affects several million hectares in Northwestern India and the adjoining lands in Pakistan Only the governments have the powers and means to solve these problems

However, experience in Colombia on small schemes shows the same deficiencies and the lack of effective drainage facilities on recently constructed small schemes And though the conditions are noted no remedial actions were included in recent transfer programs (Vermillion and Garces-Restrepo 1994) The efforts focus on irrigation only

Besides playing the role of WSE service provider with cost recovery assessed through taxes local governments and the local judicial WSEs have served as the administrator for flood control systems constructed by the beneficiaries (Singh forthcoming, Calif DWR 1978) This evolved as a means to ensure safety inspections and the occasional maintenance, since the lack of day-to-day operations precluded the need for a full-time capable staff and the maintenance need did not receive the attention of the beneficiaries

The Historical Role of Governments

Regional or national rulers developed large irrigation schemes beginning many centuries ago Immense areas came under irrigation in the 1800s for the purpose of alleviating widespread hunger and to provide farming opportunities in sparsely settled regions Most government projects served bulk supplies to villages and cities on an equal basis with farmers Only governments could devote the immense funds required for these large long-maturing undertakings

However it was during the rapid expansion from the 1950s into the 1980s that governments throughout the world undertook the massive development programs under which most of the service systems were built that are now considered for transfer Not only were most of these facilities constructed without cost or obligation to customers, but the ongoing O&M were heavily subsidized The dominant political persuasion during the period even led some governments to nationalize long-established, locally owned schemes

Typically drainage is not necessary during the early years of irrigation and investments are postponed—most of them for too long But large-scale government programs were launched for groundwater control or land reclamation in China Egypt Indonesia and Pakistan For the most part these large schemes were pursued under the same policies regarding customer responsibilities or lack thereof as applied to irrigation

Governments' roles in recent flood control work have been significant The reclamation of shallow estuaries, the levee systems along large rivers, and the major flood retention reservoirs in a great many countries have allowed agricultural urban, and industrial development worth billions of dollars The governments' roles have been dictated by the magnitude, complexity and multi-jurisdictional nature of these systems (van de Ven 1993)

Separate from services some governments have played a critical role in framing the legal structure of WSEs and in providing the essential regulatory functions that must continue regardless of who manages the WSEs Indeed it is the effectiveness of the regulatory

function, more than any other government action that is the determinant of WSE success or failure under transfer programs in the irrigation and bulk supply areas

Many governments have been negligent in creating formal water rights and water quality control systems and enforcement of the regulatory provisions They have not prepared and enforced water resources plans on which to base a rational allocation of water and effective management of wastes Most do not have financial audit procedures in place, and if found are inadequately enforced Fortunately, even in this field there are exceptions that prove what can be done Ecuador, many years ago, legislated the means and its WSEs formed their own mechanisms to provide financial audit of WSEs to help ensure financial integrity and better secure external financing (Frederiksen 1996)

Constraints on Governments

A number of factors will influence the future role of governments in water resources management Problems far greater than irrigation issues are legion and should remind us that their solutions also impinge on the programs to create WSEs Two of the constraints are the severe and growing pressure on the available water and on financial resources

Within the water resources sector, the expansion of urban infrastructure receives high priority for government financing It diverts attention and funds from water projects that serve rural areas, further hobbling the governments' ability to sustain subsides for irrigation and drainage services

Diminishing budgets if the need to improve efficiency is not sufficient motivation will require modernization of the existing government agencies Present personnel policies lagging staff compensation, and excessive levels of staffing stymie efforts to improve agency efficiency Established agencies must introduce advanced office technology and instill a forward-looking business attitude if the service is to meet today's and tomorrow s needs at least cost Modernizing agencies require strong leadership political support and sufficient time for institutional change The success with this task has direct implications for the extent of responsibilities that can and should be transferred to the beneficiaries and for the ease of execution

Some remedies to the financial constraints apply to both government and local WSEs All services entities, regardless of ownership, will have to charge the full costs of services including O&M and capital investments to the customers They will both have to secure most of their capital financing through loans and bonds placed in the private sector Accordingly both government- and customer-owned WSEs will have to be structured and operated as independent utilities with full governmental audits and public scrutiny

Fortunately the needed changes in government agencies are often facilitated by transferring local responsibilities to WSEs First budget reductions are a high priority of the programs as has been noted But WSEs also bring pressure to bear on the remaining service agencies to improve through fear of further losses and perhaps more effectively through customers' scrutiny of the agency's performance

Future Role of Governments

Although many government activities are transferable and customer participation in agency decisions will make services more effective, one should reiterate several functions involved in water resources management that only governments can provide This point may repeat earlier statements but the importance of the matter warrants the repetition

Only governments can provide what is perhaps the most important and most difficult function the regulatory framework and broad oversight required to manage a nation s water resources This is a key component of the required support system for successful transfers It entails

- the comprehensive monitoring of rivers, groundwater, and conveyances to determine water availability and uses
- a rights system to bring order to management and a means of accounting for the allocations
- the effective and prompt enforcement of those rights
- setting monitoring and enforcing compliance with water quality standards

Wise conjunctive management of the surface water and groundwater requires that governments establish a licensing system for both surface water and groundwater use The regulatory role for conjunctive management requires government incentives or rules for users to pump where groundwater is rising It will require strong controls where demands on the groundwater may exceed safe yield but while permitting controlled overdraft in periods of drought and firm restraint to ensure recharge during periods of above average precipitation

In some countries equitable deliveries are ensured by an honest government execution of the operations function, that is the government controlled operation serves as both the quasi rights system and its enforcement To remove the government from service operations with out replacing it with an enforced rights system, ensures chaos (Bandaragorda 1995) And without government oversight this may occur even within small WSE service areas where a few powerful users usurp the rights of others

Governments must ensure reliable primary services that are not easily transferred to the customers They usually retain ownership of major storage and conveyance facilities for bulk supply, flood control, and drainage The complexity of these operations and maintenance dic tates that the governments should have the power to ensure the integrity of the facilities and the reliability of the operations Governments may have to continue to pump groundwater to control the level of poor-quality water unsuitable for use because the benefits gained usually cover more than any single group of beneficiaries and often include both urban and rural areas The fact that the benefits are widespread, however does not mean that the costs of the large scale services cannot be recovered through assessments to local service entities or through property taxes in the benefited area (World Bank 1984)

In some instances governments may consider retaining ownership of smaller system components for a period after transfer, but after setting a fixed date in the transfer agreement for relinquishing title Governments can thus ensure that the WSEs conduct proper O&M or

can reassume these responsibilities and increase the charges to customers to fully cover the added costs However, customers will not have as great a sense of commitment to maintenance or feel a legal obligation if the governments retain permanent title Indeed, with ownership, governments risk inheriting all responsibility for ongoing maintenance, replacement, and rehabilitation

In most countries, governments will have to finance and construct any large new bulk service facilities and the components to modernize major works as in the past, but subsequently recovering the investment costs from the beneficiary through service charges and property taxes Governments may also have to help finance (not subsidize) major expenditures by WSEs at least in the early years Larger works, particularly repair under emergency conditions, cannot be completed by local labor and the treasuries of small WSEs may not be able to meet all needs, particularly during their early life In these instances governments can help WSEs by guaranteeing their privately placed loans or offering direct government loans But the governments should refrain from giving subsidies or grants, as this will undo the financial discipline essential for successful transfers Full repayment responsibility must rest with the WSEs and their members

The Future Role of Local WSEs

The introduction of full cost recovery by governments is a strong stimulus for gaining the support of customers for transfers Customers can reduce costs incurred by government service entities through the lower unit wages of local hires and their own direct labor They may realize substantial gains from the improved efficiencies of locally directed efforts And customers will, with time, be better able to determine the level of investment in improvements and changes in O&M practices that will yield the greatest return to their farming operations (Zaag 1993) As mentioned, customers will gain from their greater oversight of any remaining government operations to maximize quality and minimize costs Governments must ensure that their economic policies allow for full cost recovery For example, price constraints or crop quotas must be removed to enable WSEs to pay full costs

For these and other reasons, customers should assume responsibility for as many of the O&M tasks as they can manage effectively as a group However, they should not overreach, as transferring even a small portion of the scheme can present enough problems until experience is gained The prevailing conditions in each case will determine the appropriate scope of WSE responsibilities As competence grows, the WSEs can expand their areas of responsibility by either merging with other entities or creating federations of WSEs

SUGGESTED ORGANIZATIONAL ARRANGEMENTS

Institutional Choices for Government and Local WSEs

In some instances, there have been erroneous assumptions indeed oversimplification of the tasks that must be carried out to realize successful transfers Some people see unquestionable virtue in stripping governments of power and promoting "privatization —so to them trans-

fers must be good and should be carried out regardless of the institutional cultural or physical characteristics of the country At the same time, some who promote transfers seem to believe customer-ownership or direction is a recent innovation It must be studied and tested at length They are unaware of the vast experience with such entities that have long existed in most countries and do not search for that source of insight to effective institutional arrangements

One should recognize that governments have played key roles in bringing public services to people and to regions that were without these services In some situations, they remain the best providers particularly the large bulk services in water drainage, and flood control A nation's services are usually provided by a mix of government and nongovernment entities that are assigned responsibilities best fitting the circumstances

It may be well to repeat the type of WSEs to be considered herein Most commonly, successful WSEs are units of local government or quasi-government entities functioning as a utility The first is typical of subunits of municipal or regional governments The second is by far the most common for local services in irrigation, drainage, and flood control The successful are usually created as independent units of government for the express purpose of providing services and being granted taxation authority and other powers similar to the common government line agencies (Singh forthcoming, California DWR 1978) The customers and/or residents within the service area select the governing board of directors The umbrella organizations that serve member WSEs also are of the second type

In limited situations customers have formed 'mutual' companies, essentially nonprofit customer-owned organizations for providing services in a small area These often predate legislation that created the basis for 'districts ' They are registered entities in many countries though arrangements created by local farmers or villagers many decades, even centuries ago may still function in an informal manner

Privatization is often suggested as a solution to providing services But for-profit companies' providing irrigation services in some countries in the late 1800s fared poorly, indeed, almost universally failed (The primary purpose of most investor-owned irrigation companies was to improve lands to enhance prices for their subsequent sale) For-profit companies are rarely found in the field being discussed and neither mutual companies nor for-profit companies will be addressed in further detail The vast majority of transfers are not privatization in the legal sense China is formulating trials some of which have been launched, of various types of privatized bulk water supply and irrigation distribution schemes No conclusive results have been obtained and no attempts have been made to include drainage or flood control services

The existing cultural and institutional framework will narrow the range of organizational structures available in a given country As implied in the earlier sections each category of service may lend itself to somewhat different structures procedures, and roles of the governments and the WSEs Yet combined services such as irrigation distribution and drainage collection can be accommodated readily under one WSE A country's legal basis for forming service entities should accommodate the range of structures needed for all contemplated services that may be transferred

Central/Provincial Government Entities

The different classes of customers the required equitability of services and the potential changes in the future will continue to make governments the usual providers of major bulk water supplies—at least in the immediate future Bulk storm drainage and outlets for agricultural drainage from large areas as well as flood control usually also can best be provided by governments entities—at least during the early stages of transfer programs

For all services, the government unit should be structured as a self-sufficient utility Rigid cost accounting, cost allocation and transparency in operations and financial performance—all formalized through a public oversight commission—can ensure efficiency The governments' access to lower-cost financing should reduce customers' costs of capital expenditures And full cost recovery, utilizing service charges and property taxes paid directly to and for the sole use of the governments' individual service utilities will clearly link customer costs to services provided

Local Entities

The distribution of irrigation water is a service that is readily observed and measured The customers' benefits are immediate and substantial Of all services, irrigation distribution lends itself most readily to a WSE provider structured as a utility The legal basis operating rules and members responsibilities are straightforward and easily understood and enforceable at the local level The facilities of operation and maintenance at most levels can be executed by personnel from the community Full cost recovery through service charges and property taxes again can clearly link customer costs to services received All revenues can be deposited in the WSE's bank account for use in meeting its annual and long-term budget needs

The collection and disposal of localized drainage in small areas and the collection of agricultural drainage in service areas within large drainage projects are not unlike irrigation distribution services The primary difference is that the benefits are not as immediate or obvious as those derived from irrigation Nevertheless, assigning the responsibility for operation and maintenance to a WSE as a sole service or as a joint service is appropriate The legal structure, operating rules and member responsibilities are similar in principle to those of irrigation entities Farmers can maintain their on farm works and join in clearing larger collector channels The WSE can employ private sector contractors for heavy maintenance and major cleaning of channels Full cost recovery can be derived through a dedicated local property tax assessment deposited in the WSE s bank account to meet O&M budget needs

Many WSEs assume responsibility in a majority of irrigation projects for both water distribution and drainage collection—agricultural and storm water The service area the customers the maintenance of the physical works and to a large extent the location and operation of the supply and drainage systems are the same This encourages better overall water management to minimize the combined costs of water application and drainage Savings in O&M general administration and collection of charges will be apparent The combination of irrigation and drainage should be sought where possible as it greatly reduces both the initial transfer costs and the subsequent O&M expenses More important it better ensures complete year-around water control for crop production

Storm drainage and flood control are often inseparable The assignment of responsi bilities for protecting smaller service areas to the beneficiaries encourages the use of the previously described arrangements for WSEs Often local government units will serve as the WSEs where protective works serve larger villages and cities WSEs separate from the irrigation function are necessary in those cases where the irrigation and nonirrigation services do not follow the same boundaries

"Umbrella' organizations constituting a federation of smaller WSEs and/or local government entities can take responsibility for some of the government functions cited above This form of WSE has been successful in supplying bulk water to groupings of irrigation WSEs villages and cities Under these arrangements each member WSE retains full responsibility for all services within its boundaries including any independent supplies it may already have developed The extent and importance of these services dictate that the federation secure highly trained managers and skilled employees The management of the umbrella entity reports to a board of directors composed of representatives of the member WSEs Each member WSE pays its share of the costs to the federation on behalf of its service area

A federation can develop the political power and operating competence to meet the members objectives better than the individual WSEs by themselves By federating, WSEs can jointly solve their common supply problems and avoid costly conflicts and duplication of facilities By remaining independent of the activities of the individual member WSEs the federation can provide a highly efficient and cost effective service Local drainage and flood control WSEs can realize similar results where conditions permit

As can be seen there are a number of primary organizational arrangements to choose from when considering the creation of WSEs All are managed by officials elected by the customers and if appropriate, by the community Examples of each of those cited here can be found in practice

SUGGESTED POLICIES FOR SERVICE COSTS, CHARGES, AND FINANCING

Governments and WSEs should institute charges for all types of water-related services that they provide at a level sufficient to avoid subsidies (As mentioned earlier, there are situations where the poor will require subsidized services but that may often be provided by an internal tariff structure) In addition to the objective of removing service costs from the government s general budget charges for all types of services treat all classes of beneficiaries of water sector services equitably Customers will understand that they will have to pay for services regardless of who provides them an additional incentive for customers to sup port transfers of current government responsibilities

A breakdown of the cost of bulk and local service for each type and class of customer before transfers are launched helps clarify the primary benefit gained by the customers when they accept responsibility for part of the system—that is the removal of the associated cost component of the government's total charges If there is no logical way to compare the cost of the services being considered for transfer with the charges that will be imposed by the government without transfers there is less incentive for customers to act In support of that

customers should be informed that even after a transfer there will be charges for any remaining government services, they should also be informed of the basis and estimated amount for those charges

Drainage and flood control have two characteristics different from irrigation that affect aspects of the entity's legal structure and cost recovery provisions Storm drainage benefits may vary significantly within an area of undulating terrain This has led to formulating charge rate structures that vary according to the benefits anticipated—delineated in perhaps three to five zones of benefits within a service area Benefits can be rationalized and assessed fairly applying established methodologies used by many countries that have instituted cost recovery for these services Second, flood control WSEs will require advice from higher levels of the government or consultants on major maintenance and for operations during floods Outside advice will be essential where levees are involved Charges for both types of services are best derived through property taxes set for the various zones of benefit

Wherever possible, the government should stipulate transfer conditions calling for beneficiary contribution to rehabilitation or modernization Mechanisms for transfers including the basis for assessing such cost to the WSE and its beneficiaries, should be built into all new irrigation, drainage, and flood control programs

The cost of providing the service is the most common basis used worldwide for determining service charges in the water sector—indeed, in most public utility services—although incentive pricing may be incorporated into the rate structure An incentive-based tariff structure within a cost-recovery-based charge system is usually most effective when irrigation and agricultural drainage are linked—as may be the case where conjunctive surface water and groundwater management is applied

The cost of a service can be readily determined and when several services are rendered by a single WSE, can be easily allocated among each type of service and each class of beneficiary This holds true for all WSEs whether customer-owned or a government service unit that can and should be formed as a utility' and function as a WSE Using the cost of service as the basis for charges allows the customer to judge the validity of the total charges and assess whether the provider is cost-effective It is the logical basis for the WSE and its customers/beneficiaries to decide if they wish to upgrade their services

The assessment for irrigation services may take a variety of forms Most common is the application of a flat charge plus a volumetric charge The flat charge reflects the willingness to serve by the WSE (and the associated facilities costs and overhead costs) and provides some revenue in times of drought or when there are low sales Often a property tax may be used for this same purpose and for additional purposes Ideally, the volumetric charge should be based on measured deliveries However, often a proxy such as the relative area served and approximate unit quantity may be most practical It is usually too costly to measure deliveries to each farm plot or even each farm in areas where farms are less than 5 or 10 hectares in total area

WSEs of any substantial size will require financing capability to fund new construction, major rehabilitation, and emergency repairs After a period of time WSEs may meet some of these needs with reserve funds For greater amounts, governments may provide the loans or they provide a guarantee for loans This will likely be necessary until a new WSE has established a financial and operational record and unless or until the WSE has the taxation powers essential for underpinning commercial bank loans and bond financing

As has been mentioned, it has proven essential that all WSEs of even moderate size have the power to assess property taxes This allows augmenting revenues in times of shortfalls but more important, issuers of general obligation bonds require an assured basis for payment and property taxes are the preferred means Many WSEs assess property taxes to all property in the WSE service area, including villages This has been justified by direct benefits that the businesses and merchants derive from the improved economy

There have been suggestions that WSEs should enter commercial activities as a means to augment their income and reduce service charges This may seem an effective means, however, experience policy, and logic suggest otherwise The nature of the function and the skills required for O&M of water sector services are quite straightforward and quite different from those commercial activities that could earn funds of any consequence More important, the commercial activities inevitably conflict with the service activities—whether in terms of de mands on management, staff time funds or scheduling

As an example one irrigation project entity in Vietnam entered into private ventures encouraged by the promotion of "privatization The extent of the nonrelated activities and the conflicts with rendering irrigation services were evident when the condition of the project facilities quality of services, and the current project O&M budget were reviewed A major portion of the facilities was in disrepair and the tail end of the distributaries was not receiv ing water because O&M funds were allegedly inadequate At the same time, the entity s heavy equipment was in use constructing roads elsewhere in the province under a highway contract that the WSE secured by bid The entity also had built five small hotels around their reser voir as a means to retain ownership of lands and allow for future commercial recreation The staff stated that they could obtain more revenue from these actions than spending the effort on O&M and providing irrigation services

In Morocco, poor maintenance was obvious in one irrigation scheme The elaborate network of overhead channels was leaking extensively and some works were in serious condition though the scheme was of recent construction The WSE indicated that only patch-sealing was provided The majority of the staff was fully occupied in custom land preparation, crop cultivation and harvesting services from which the staff received a portion of their sal ary In addition, the WSE staff had a conflict of interests in rendering the two services to in dividual farmers some of whom did their own cultivation And, of course in most countries these activities would be in direct competition with outside private enterprise staffed to specialize in these activities

One does not find long-established successful WSEs engaged in activities unrelated to their water sector services Hydroelectric generation incidental to operating the WSE s stor age and major conveyance facilities is common However even these are often operated by outside firms under a concession to the WSE The concession arrangement also may be found where the recreational opportunities at a reservoir are retained by the WSE and not assigned to a local governmental parks and recreation' unit The successful WSEs typically have a small staff of experienced personnel augmented when necessary by private contractors and technical services under government programs or from the employment of private consultants

Regardless of how service charges are determined and how they are collected it is essential that the WSEs have rigorous accounting methods fully transparent to all WSE mem bers And it is essential to have annual audits of the WSE books and government audits at

intervals of every few years Only in this manner can corruption and embezzlement be avoided And only with such measures can private lenders and the bond market assess the strength of the WSEs and fairly assess financing charges

THE FOUNDATION FOR CONSIDERING A TRANSFER PROGRAM

A realistic assessment should be made, before launching a transfer program of the institutional support system already in place and the government's support for the handover of existing government responsibilities Because fundamental changes in government responsibilities are more than just a routine adjustment for a single agency, they mean a change in power functions, and work The questions that should be answered include

1 What are the content and effectiveness of the government's planning and regulatory functions, and cost recovery and transfer policies?

2 Does the country have a strong, clear water rights law for surface water and groundwater applicable to governmental and nongovernmental users alike, and is it enforcing the law in an effective and timely manner?

3 To what extent is water resources management decentralized to the river basin and lower levels of the government?

4 How are the services currently provided and how are the involved government entities organized directed and funded?

5 What role, if any, does the customer now play and are the contemplated transfer concepts compatible with local customs and the form and role of the local government?

6 Has the government clearly articulated the objective of the transfer in a formal, detailed written statement?

7 Will the customers and the government realize obvious and substantial gains from a transfer?

8 Is there a firm political will and commitment by the government to effect the transfer with active support by officials to adopt the essential policies legislation and budget?

9 If answers to all the above are positive do the customers understand the broad conditions, the basic need for and the concept of the transfer?

One cannot overemphasize the importance of this preliminary assessment If any of these questions cannot be answered positively, then it may be well to reconsider the proposed approach and even the undertaking until conditions are proper

FRAMEWORK FOR TRANSFER PROGRAMS

A detailed list of tasks may help clarify what must be done the complexity of the program and the general sequence of the tasks The following list is derived from a number of sources including discussions at IWMI workshops and conferences (e g , Johnson Vermillion, and Sagardoy 1995 Frederiksen 1994 Kloezen and Samad 1995 Geijer Svendsen and Vermillion 1996) The tasks are grouped into three phases (a) verifying/creating government capacity (b) assessing and defining the proposed project-specific transfer and (c) implementing the program including the essential government framework They are presented in the general order of execution although some tasks can be conducted in parallel and some may already have been completed

All tasks must be executed since any omission places the program at risk of, if not en suring failure Indeed actions may be required on the same matters at every stage Policies do not equate to laws or laws to actions Clearly, policies on regulation without legislation are useless and legislation on regulation without its execution is worthless The most com mon cause of failed support systems is enacting laws and regulations without establishing units to carry them out without providing the equipment and a full complement of trained staff to do the tasks and without ensuring the ongoing budget to match the work

Phase I Verify/Create Essential Government Policies and the Means for Transfer

1 1 Define the government s water resources sector-wide policies and responsibilities

a national/state policies on scope of its services service responsibilities to be transferred cost recovery basis of charges facilities ownership, financing for all services

b regulatory framework including content and enforcement of a system of surface water and groundwater rights/licensing scheme water rights and the rights of the individual,

c regulatory framework including content and enforcement for a system of water quality management at all levels,

d operational oversight of service performance financial prudence, facilities maintenance by government service units and WSEs

e financing related support for start-up and ongoing capital needs of government entities and WSEs and

f advisory support

1 2 Enact legislation, rules, and regulations to provide adequate

a modernization of the existing government water management functions including the involved service entities,

b legal basis for the creation and functioning of self-sufficient WSEs,

c legal and policy bases for determining costs charges and cost-recovery mechanisms for ongoing government services,

d national, state scheme and individual water rights systems and water quality management systems,

e oversight of WSEs' financial and service performance,

f facilities ownership and maintenance of transferred facilities and

g financing mechanisms for WSEs to fund major and minor expenditures for all categories of services

1 3 Budget establish and staff the government units for

a administration of the transfer program public awareness training and technical support,

b administration and enforcement of water rights and water quality management systems

c oversight of government service units' and WSEs' services, administration financial performance, and condition of facilities,

d O&M of government retained facilities (functioning as utilities)

e rehabilitation of facilities to be transferred according to policy, and

f financing of WSE activities, also according to policy

Phase II Formulate Transfer Program

2 1 Describe with the supporting demographic economic, and environmental analysis the future (10 , 25-, and 50-year time horizon) objectives of the project-specific service(s) to be provided

a bulk supply

b irrigation distribution

c agricultural drainage and

d storm drainage and flood control

2 2 Evaluate in detail the project-specific present and future

a land use (agricultural and municipal)

b availability and reliability of water supply

c pollution and water quality conditions,

d drainage and flood control damage potential,

e condition of the existing physical works and

f future rehabilitation and expansion of facilities to meet objectives

2 3 Articulate the government's project-specific policies pertaining to

a ownership of facilities

b rehabilitation of facilities prior to transfer,

c beneficiary contribution to transfer program costs,

d cost recovery for each level and category of services

e financing of WSE start-up new investment emergency repair and

f government/public oversight

2 4 Assess the degree of complexity and combination of services a WSE can manage under existing and future conditions

2 5 Define project-specific responsibilities of the national/provincial/local government

a the government s portion of the services

b facilities O&M,

c basis and means for cost recovery for government services including additional increment if any aspect of maintenance in the service area remains government responsibility

d pre-transfer rehabilitation of facilities and

e geographical boundary role and form of any local government involved

2 6 Define responsibilities of the proposed WSE

a geographical service area

b services

c maintenance of facilities,

d ownership of facilities,

e pre-transfer rehabilitation of facilities,

f routine O&M improvement and investment financing

g administrative function and

h fee payment for government-provided services

2 7 Outline the possible role of the private sector

a maintenance/rehabilitation work, and

b technical assistance

2 8 Describe appropriate form of WSE to be adopted

a quasi-government district

b local government subunit,

c nonprofit mutual company and

d federation of WSEs

2 9 Prepare a detailed schedule for execution

Phase III Implement and Provide Ongoing Assistance to Transfers

3 1 Establish WSE

a conduct public education/orientation on transfer program

b structure the tentative WSE

c vote to establish WSE

d legalize the WSE

e conduct formal organizational meeting

f identify management and support staff

g formulate WSE s operational rules regulations and procedures

h prepare detailed Plan for Operation and Maintenance

i prepare annual 5-year and 15-year budgets,

j confirm initial financing

k establish initial service charge mechanisms and rates

l conduct staff training and

m conduct membership training

3 2 Complete facilities rehabilitation as appropriate

a planning and design, and

b construction

3 3 Provide ongoing active regulatory and oversight

a water rights,

b water quality

c service quality

d safety of facilities,

e financial prudence, and

f administration

3 4 Provide ongoing assistance

a financial, in accordance with policy and

b general advice and counsel

Part II

The Adequacy of Country Transfer Programs

BACKGROUND INFORMATION

Based on the discussion in Part I, eight key factors for success in management transfer are identified The eight key factors and their associated tasks are given in table 1

Table 1 Key factors for management transfer

Factors	Tasks
1 Scope of transfer	Define objectives Define facilities and services to be transferred Define responsibilities of parties
2 Condition of facilities	Ensure functionality of facilities to be transferred Develop a rehabilitation plan if necessary
3 Ownership of facilities	Place title of facilities with the entity that will achieve proper O&M • sustain the transfer program reduce political interference
4 Water rights	Stipulate legal right to supplies for WSEs Protect supplies of WSEs from more powerful users Control over appropriation Allow conjunctive use of surface water and groundwater Decrease political pressure on water resources agencies
5 Service charges funding and financing	Obtain payment from beneficiaries for all services Ensure WSEs have authority to collect fees • levee taxes if necessary borrow money or issue bonds Ensure the availability of loan programs for WSEs
6 Form of water service entity	Develop the appropriate type of WSE Provide the WSE with appropriate authority Ensure the WSE has all the critical characteristics
7 Preparation for and execution of transfers	Assess the present situation and forecast the future Address the need for • legislation budgets • changing government roles and organizations • financial plans Develop an execution program
8 Follow up support and oversight	Provide government support to sustain the program regulatory • water resources management audit and oversight • O&M of major facilities Construction and financing of major new projects

Management transfer programs were reviewed in six countries (Indonesia Sri Lanka the United States of America Turkey Mexico and Nepal) using the eight key factors as a basis These six countries were selected by IWMI The authors visited all the countries except Nepal They obtained information through interviews with various individuals involved in management transfer activities and collected a considerable amount of printed information IWMI staff located in Nepal collected the information concerning that country Detailed reports of these reviews are listed in the Literature Cited section and are available in the IWMI library The appendix to this paper summarizes the data in the six detailed reports Table 2 presents background information for the transfer programs in the six countries

Table 2 Background information on the six countries reviewed

	Indonesia	Sri Lanka	Turkey	USA	Mexico	Nepal
Location	Progo River Basin	Mahaweli Project	Gediz River Basin	Colorado Big Thompson Project	Several irrigation districts	Three irrigation systems
Type of government	Two body legislature President elected by the parliament	President elected by people elected parliament provinces with limited authority	Parliament President elected by parliament President appointed Prime Minister	Federation Two body legislature and President and State	Federal with states and municipios	Monarchy with legislative bodies
Key agency	DG Water Resources Development	Mahaweli Authority	Dir State Hydraulic Works	US Bureau of Reclamation	National Water Council	Department of Irrigation
Program objective	Eliminate government O&M costs of transferred schemes	Sustain irrigation network share decision making	Reduce government O&M costs	Beneficiary pays costs and manages facilities	Reduce government O&M costs	Reduce government workload and O&M costs
Facilities transferred	Distribution facilities	Distribution facilities	Distribution facilities	Storage distribution and joint use power/ irrigation facilities	Irrigation canals drainage systems and roads	Distribution facilities
WSE	Village and multi village type water user association	Distributary channel farmer organization	Villages towns and water user association	Water conservancy district	Water user association	Water user association

The following three sections 'Analysis of Individual Countries 'Rating of the Transfer Programs and Findings and Conclusions Concerning Key Factors provide the findings of the examination of transfer programs rate the transfer programs discuss the adequa-

cies and deficiencies of these programs, and provide some general conclusions concerning the programs

ANALYSIS OF INDIVIDUAL COUNTRIES

A summary is offered of the findings of the examination of transfer programs in the six countries

Indonesia

Irrigation services have evolved in various manners among the irrigated areas found within the scattered islands of Indonesia Local entities have long existed in Bali, Java and other islands The Dutch constructed facilities throughout the country and passed the tertiary service responsibilities for many on to local farmers Typically the government retained responsibilities for bulk deliveries and distribution down to the secondary canals In recent decades, the government greatly expanded the area of irrigated agriculture and assumed responsibilities for managing the new facilities, as well as some systems previously operated by local farmers

The transfer program in the Progo Basin described in the Appendix was initiated to transfer government O&M responsibilities to the local farmers This was introduced under a transfer program that has been applied to areas in several islands as part of a series of World Bank and Asian Development Bank lending projects (World Bank 1988) The overall transfer program results are mixed

At the same time the decentralization of water resources management at the central and provincial levels has modernized institutional arrangements to increase efficiency and control at the basin and local levels Most bulk services will be structured on basin boundaries and assigned to provincial and district level governments (World Bank 1994) As will be discussed, this is a major step forward in strengthening the fundamental institutional arrangements for rendering successful effective services

Scope of transfer The scope of the responsibilities transferred to local Water Service Entities (WSEs), composed of farmers, included the responsibility for O&M, and payment of the associated costs on small irrigation distribution schemes and some payment for the bulk delivery service to the area No other local services such as drainage or flood control are addressed Drainage is not an issue on many small schemes since it is provided by dual purpose channels or by incorporating drainage water into the supply system in the predominately rice-growing areas The responsibility for major and emergency maintenance on the transferred distribution schemes and for all investment and O&M on the bulk service system rests with the government

Condition of facilities at transfer The condition of facilities varies, but typically gates structures and canals have needed rehabilitation and removal of excessive silt deposits The government has correctly included a facilities rehabilitation component in the preparatory activi-

ties preliminary to transfer This action has improved service substantially on most schemes But systems, which divert from local streams accumulate large amounts of sediment that will continue to be a significant burden on the WSE

Farmers were to contribute 10 to 20 percent—primarily by labor—to the cost of upgrading facilities to minimum standards It appeared that a larger contribution, including payment in money would make farmers more cognizant of containing costs though even the low contributions have led to improved construction quality The administration of labor contributions and trying to fit contributed labor into the work of the private contractors can be very inefficient indeed costly

Ownership of facilities The ownership of distribution and bulks facilities remains with the government This provision coupled with the government's responsibility for major maintenance may encourage the WSE to slight the needs for routine maintenance

Water rights The government has legislated a framework for licensing the use of surface water but it has not been implemented No project or scheme much less the customers has any recorded rights or licenses and hence there is no protection of the customer s water supply (An increasing number of basins are over-committed) A more effective groundwater licensing system is in place that calls for administration by the provincial governor after technical approval by the Ministry of Industry and Mines

The water conditions throughout the basin studied are greatly influenced by the basin s geology highly porous volcanic deposits within which the streams' water elevation and flow and the groundwater elevation are closely interdependent Transfer canals link the Opak Oyo and Progo rivers, facilitating the management of surface waters However, heavy pumping by industries and the growing urban areas in the upper basins in Central Java Province and around the city of Yogyakarta is reducing surface flows to the lower basin within the prov ince of Yogyakarta (World Bank 1988) This is where most of the basin's irrigated land lies

The incomplete surface water rights system the administration of groundwater rights by a different level of the government and the absence of interprovincial water sharing agreements on the principal rivers and connecting canals have placed the supply of current water users in the lower Progo at risk Urban discharge of sewerage worsens the condition particularly in the low-flow season The economic impacts of diminishing supply caused by the unregulated extractions in the absence of administered rights heighten the uncertainties for WSEs and their customers

Service charges funding and financing The WSE has one source of revenue—water charges The tariff rate for service is set by the government based in part on the estimated budget needs Payments are collected by the WSE, which then pays a portion to the government for the bulk service Fees paid for bulk water service from the government-managed facilities do not fully cover the cost of O&M of those facilities However payments are reduced if the service is judged inferior during regular inspections by the WSE, customers and government officials This feature has introduced another area of uncertainty and makes the program vulnerable to political intervention The WSEs cannot levy taxes to fund investments or even fund minimum O&M costs during periods of drought when revenue from water sales drops It will take several years and wise management and membership to build up a reserve through excess water charges Such arrangements are an obstacle to creating a financially healthy WSE

Form of WSE The small area, the simplicity of operation of the schemes and the nature of the responsibilities being transferred allow the government to adopt a quite basic organizational structure for the WSE The Indonesian WSEs are governed by three officers elected directly by the member customers The WSE chairman has powers of contracting banking, and staff employment and directs a manager and other staff whose number depends on its size There is no board of directors, the three officers functioning in their stead On larger schemes representatives of 'blocks' within the scheme may meet with the officers concerning management decisions and serve as a communications link with the farmers This form is fully adequate for the very small schemes transferred however a more formal structure with a board composed of member representatives from the various subareas would be better for the larger schemes

Preparation for and execution of the transfers Indonesia has outlined a program for preparing national and basin water resources plans that, when completed, would indicate the services needed in the future However, at present the river basin program does not provide any guide for the transfer program

The government has taken the important action to establish provincial and basin water resources committees to oversee basin planning allocate water among schemes and oversee government basin service units that will provide bulk services to both agricultural and village WSEs flood control and channel maintenance in the basins (World Bank 1994) The separation of the allocation function from the government s O&M services unit isolates the regulatory from the service function an essential arrangement

Coupled with these changes has been the decentralization of prime water resources management responsibilities to the district level, below the provincial This action, over the longer term will force the local community to improve water management and modify the local institutional means to provide all water-related services efficiently—a very definite plus compared to the situation in most countries

The formulation of the Indonesia transfer procedures themselves however has a mixed history considering the high level of effort compared to other programs Externally funded projects tested an array of approaches to transfers and are still searching for basic improvements Most entailed quite elaborate evaluations of schemes stakeholder involvement mechanisms for determining services assessments and the training of farmers, potential WSE officials and laborers Substantial sums were spent on preparing teaching modules and texts monitoring training results and preparing elaborate displays This extensive effort is of particular concern when considering the limited responsibilities and small size of the units that were initially transferred Results indicate a deterioration in customer support on many systems that have been transferred for a period of years (Project Mission Report 1996) Though the upgrading of facilities was an important plus essential to any transfer program (Bruns and Helmi 1996) the management and mechanisms for assessing charges have not proven to be durable

Follow-up support and oversight There is inadequate follow up on project transfers The government units have minimal budgets and only a small staff assigned to this effort It remains to be seen whether the WSEs will succeed in securing the start-up technical managerial and financial advice without more assistance from government staff Monitoring of results is limited and data are of varying reliability

It should be pointed out again however that the government's decentralization of many bulk water management functions to the district level should have a positive and significant impact on the transfer process and the viability of the WSEs The local officials will be in continuous contact with the customers of these schemes and the larger transfers that will be subsequently launched They and the customers will soon come to realize that there is no other means to provide the local services critical to their well-being And the local people are fully capable of addressing these matters once they realize that there is no alternative

Sri Lanka

The principal transfers evaluated in Sri Lanka are situated within the Mahaweli Project Having a strong Mahaweli Authority in charge of most government functions in the project area should ensure that a sound program could be readily defined and efficiently executed in a timely manner That has not been the experience This central government agency is not well-suited by history and politics to transfer powers to local WSEs Indeed the results can hardly qualify actions to date as a transfer program A recently approved World Bank project now under discussion contains some provisions that may be effective These provisions include a 10 percent contribution of rehabilitation costs in the form of labor payment of all O&M costs of transferred works farmer participation in design and construction activities of rehabilitation training of farmers and officials in problem identification and solution, and a 40 percent reduction of the staffing level of the Mahaweli Authority But it would appear that the new program will have to overcome much skepticism among the local residents given the experiences of the project s farmers with prior programs This time, the government must formulate a clear set of components and execute the plan in a firm businesslike manner And there are many policies and government programs that must be resolved first

It is important to note here that not all irrigation in Sri Lanka comes under the Mahaweli Authority s management About one third of the irrigated area is under major and 'medium schemes managed by the Irrigation Department currently in the Ministry of Irrigation and Power the Irrigation Management Division of the Ministry of Irrigation and Power also plays a major role in system management in 35 major schemes Many of the remaining schemes (about 270) which are entirely located within one province come under the supervision of the provincial governments or the Irrigation Department The balance irrigated area is under 'minor schemes those with command areas of less than 80 hectares These systems come under the broad supervision of the Department of Agrarian Services in the Ministry of Agriculture and Lands and under the supervision of the provincial governments

In all the schemes managed by the Irrigation Department a program of "participatory irrigation management' is being implemented There are about 160 schemes under the Irrigation Department s *waphaula* program (promoting participatory management in medium-sized schemes) in addition to the 35 major schemes under the Irrigation Management Division s 'INMAS program (IIMI and HKARTI 1997) The latter are characterized by more intensive efforts to organize farmers than under the waphaula program some in the past with donor support The joint management institutional model is basically the same as the model being implemented by the Mahaweli Authority—in fact it is the source of the Mahaweli s approach A recent study found no substantial differences in overall success and performance of the Mahaweli and Irrigation Department-Irrigation Management Division approaches both share many of the same weaknesses

Scope of transfer The objective of the past transfer program was to increase production and reduce the government's O&M budget The early program entailed the transfer of responsibilities from the government to the immediate farmers (organized as a field channel WSE) for channel O&M below the distributary and the transfer of responsibilities for O&M of the distributary channels to an umbrella WSE composed of representatives from the WSEs served This has been the general objective of all prior attempts

Condition of the facilities at transfer The facilities were thought to be in good condition and in general, no rehabilitation was to be provided However, the actual conditions varied and some did not meet standards for efficient O&M

Ownership of facilities The ownership of facilities remains with the government However in 1988 the government issued a policy statement embracing turnover of O&M of minor irrigation works and parts of major irrigation works to farmer organizations The policy statement of the Cabinet of Ministers includes the following statement "To enact legislation to transfer, over a period of time the ownership of the irrigation network below the distributary level to farmer organizations, when they are found to be ready to take on that responsibility This is a sound approach if pursued and monitored in a businesslike manner To date ownership of the tertiary facilities has not been transferred to WSEs The government does have the power to carry out maintenance if it judges that the WSE is neglecting needed work The associated costs are to be assessed against the WSE as an additional increment to its water service charges or as a direct assessment Presently, this factor is immaterial, since a cost-recovery program is not currently enforced in Sri Lanka

Water rights Sri Lanka has a modified riparian law under which lands adjacent to a water body can use the water Non-riparian lands may secure a license for diverting water, separate licenses are required for hydropower generation and aquaculture Water uses for irrigation are exempted from the permit provisions according to Section 77 of the State Lands Ordinance However, few private irrigation systems exist Likewise the National Water Supply and Drainage Board and the Central Electricity Board are also exempt from the permit system although they divert water for domestic use and the generation of electricity The 1979 Mahaweli Authority Act of Sri Lanka grants the Mahaweli Authority the power to issue water use permits however the nature and reliability of any rights transferred to the WSEs within the Mahaweli are unknown since no formal rights have been recorded Aggravating the situation is the uncertainty of the land rights of many farmers because water rights are to be linked to the land [1]

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[1]With donor support Sri Lanka recently established an informal but high level Water Resources Council and a Secretariat which is in the final stages of presenting major proposals for a new national water law and new institutional arrangements for integrated water management This law will include provision for registering water rights but at an aggregate level (i e for specific irrigation or water supply schemes or flows for generating hydropower) it will not specifically address the question of individual water rights There is also an ongoing pilot commercialization of a small farmer agriculture project that is intended to specify water rights and privatize land as much of the land cultivated in major irrigation schemes remains officially government owned with farmers having use rights but no legal right to sell mortgage or lease it

Service charges funding and financing A water service fee program to cover O&M costs was initiated in 1984 but was abandoned in 1988 The government no longer collects water charges and the cost-recovery policies are unmet Those fees collected by the government were returned to the treasury not the O&M units confirming in the view of the farmers and local officials that payments served as a central tax Subsequently WSEs received government subsidies for O&M or the farmers could carry out the work under contract with payment from the government Provisions of a draft World Bank loan call for the farmers to pay full costs of their O&M responsibilities But the matter remains unresolved

Form of WSE—The form of WSE applied in Sri Lanka has evolved through pilot programs over a period of time, and has been confirmed by recent legislation Currently, farmers are encouraged to form 'farmer organizations' at the distributary level, and to register them under the provisions of recent amendments to the Agrarian Services Act Here there are two options, Section 56a which gives them government recognition but not a clear legal existence to enable them to take bank loans except with government approval and Section 56b which does give them this legal existence In both options the basic organizational structure is the same there are an elected president, secretary and treasurer to run the organization These officers are usually not paid for their work

Different organizational structures have been tried on the Mahaweli including the forms described above Now the Authority is going to experiment with the management of a few blocks by forming a company in each block A board of directors elected from the farmers in the block, would direct the company The company is to be self-financing and would hire its own staff The Authority would however supply bulk water services to the block free of charge

Preparation for and execution of the transfers The history of Mahaweli s preparatory efforts shows it has been plagued with problems, shortcomings, and perhaps less than a fully enthusiastic execution Attempts have been made under a range of externally funded efforts Project organizers training programs and other vehicles were used to institute the proposed concepts The conflicts among Mahaweli officials program lenders and consultant field staff helped doom one of the recent attempts

The situation on the Mahaweli as on other projects suggests that failure is assured if the government does not devise a simple practical program tailored to the situation in advance of commencing the program Government officials consultants, and farmers were engaged without a clear plan or tasks, though the responsibilities to be transferred were exceedingly simple Pilot studies may be helpful but the vagueness of the details of those attempted in this case did not make them valid pilot programs And the results were of little use Remarks by farmer leaders interviewed showed common sense They urged that the government should clearly define the responsibilities to be transferred, structure the WSE as a customer organization define its powers and authority legalize the entity and remove government interference in the WSE This is supported by the existence of farmer-created WSEs in Sri Lanka for hundreds of years

Follow up support and oversight The extent of oversight and monitoring of performance has been insufficient for ensuring sustainability and there is little ongoing assistance for the WSEs Hopefully this will be remedied in the program financed by a recent World Bank loan

Turkey

Turkey has adopted a program of rapid transfer of limited government responsibilities for irrigation services to WSEs Fundamental to the approach is the use of the existing local governments capability as the foundation for the WSE in the majority of transfers Umbrella associations of local WSEs formed under the same framework allow transfer of responsibilities for larger areas This review was carried out in the Gediz river basin in the Aegean region of Turkey

Scope of transfer The scope of transfer comprises the responsibilities for the O&M and payment of the associated costs of distributing irrigation water in the local area This is positive from the standpoint of including both O&M and full costs of those functions for irrigation It is negative from the standpoint that responsibilities for other water-associated services in the rural area are not addressed And there was no assessment of future needs indeed for some of the current needs to help devise the services to be met by the WSE and its structure

Condition of the facilities at transfer Most facilities were in sound condition at the time of management transfer Where rehabilitation was needed, the government completed the work after management of facilities had been transferred to the WSE The DSI (a long-established strong and capable central agency) staff worked together with the WSE staff to formulate the rehabilitation program and supervise its execution Costs of rehabilitation were shared equally by the DSI and the WSE This approach was very businesslike The level of cost sharing ensured close attention by the WSE to the scope of work they elected to carry out and to the quality of construction

Ownership of facilities The government retains ownership of the facilities The consequences of retaining ownership will be greatly influenced by the fairness, independence, and overall effectiveness of the government's efforts in the management of facilities The transfer agreement does call for government inspection to ensure proper maintenance by the WSE, an arrangement that elsewhere has functioned as intended, but only in a limited number of countries Inspection and enforced maintenance will require a permanent competent staff and resources if it is to be sustainable

Water rights The government retains power to allocate water, but issues no water rights This is potentially a serious deficiency for long-term sustainability of the service and the viability of the WSE It removes the pressure for the government to rigidly prevent excessive developments of new uses and overcommitment of the resources The statement by DSI officials that a rights system is unnecessary because the DSI will act to hold the supply firm only lends further concern for this situation, because political pressures often override bureaucracies

Service charges funding and finance All WSE routine O&M are to be funded through the assessment of service charges for the irrigation water The concept of full cost recovery is proper An additional increment is to be charged to pay for bulk deliveries by DSI to the WSE There is no information on the tariff setting relative to the degree of reliability of deliveries provided to the different categories of use within a given WSE—farm, domestic, village, and M&I It is important to resolve this at the outset since municipal officials will manage the

WSE of larger schemes serving all categories Charges based on the quantity delivered or its proxy are proper though the rates should reflect the different reliabilities Further it is unclear if all forms of WSEs have the needed powers to levy taxes for purposes of stabilizing WSE income and financing new works

Form of WSE The four forms for structuring the WSEs are valid and proven suitable in other countries The described village and the municipal and umbrella association (also organized as a municipal form) are common for drainage and flood control WSEs However the WSE irrigators may battle the villages and municipalities over allocation of services and charges as the latter two attain greater political influence in the WSE This is inevitable as villages and municipalities grow The seriousness will depend on the representation provisions of the WSE charter Conflicts over representation will be magnified if there are no WSE water rights and no agreed internal distribution of those rights backed by a law and an enforced water rights system

The proposed legislation has been drafted and is in the review stage to clarify uncertainties of managing irrigation services under the municipal law This should also define the financing and taxation powers of the entities, though other uncertainties may remain

Preparation for and execution of the transfers The DSI has devised through refinement of earlier efforts, a transfer process that obviously fits with the country s institutions and scope of the transfers The nation's culture and customs have contributed to its success The centralized role in water resources management by a long-established, strong, and capable central agency, DSI, with deconcentrated offices throughout the country has provided an effective means to carry out the program The use of the village or municipal administration as the foundation for the WSE ensures a functioning organization and staff from the onset This reduces the need for extensive training formulating operational procedures and the staffing delays of creating a new organization New management staff was secured for the umbrella WSEs

Follow up support and oversight The DSI has wisely budgeted and staffed to provide direct and close assistance to the WSE with the preparation of the O&M plan and the associated budgets This is something that has not been introduced effectively under most transfer programs The DSI has also formulated oversight and audit procedures aimed mostly at monitoring WSE performance and ensuring maintenance of the government s facilities These measures are key ingredients for successful transfers But the limited transfer of government responsibilities characteristic of this program and omission of important water rights and operating details leave the transfers vulnerable to future problems and instability Hopefully, the DSI follow-up staff will be able to resolve these and other issues such as the level of service charges and water allocations for the various levels of service reliability

United States

The transfers of irrigation service responsibilities in the USA have been limited to arrangements between Center s U S Bureau of Reclamation (USBR) and local service districts created for the purpose of contracting with the USBR for the water services In limited cases

the U S Corps of Engineers (USCE) has developed water for irrigation as part of its multi purpose undertakings However, the USBR has usually handled the irrigation component under its established policies and procedures as it constructed the works The states of California and Washington have constructed bulk water supply systems that serve irrigation and other WSEs, but no state governments have constructed irrigation distribution facilities in the USA

Consistent with the legislation early in the century O&M responsibilities for some or all facilities on USBR-constructed schemes are transferred shortly after completion The time lapse depended on when the service area was fully developed Most schemes were to serve water to lands previously in rain-fed agriculture or wild rangeland In several instances, the USBR constructed the works to deliver water to augment the supply of existing districts and cities The scheme investigated Northern Colorado Water Conservancy District (NCWCD), typifies this type of service The NCWCD was created and superimposed on an area already served by several local WSEs from their own sources Bulk delivery of water is made to the member service entities that in turn deliver it to their customers

The question arises as to the basis for defining the services and reflecting them in the transfers In the case of USBR project transfers the means to meet future services were already incorporated in the planning of the original USBR project This holds true of the other water-related service needs in the NCWCD area Indeed, the flexibility to shift water rights as demands changed in the future was accommodated by the structure and nature of water rights assigned to the water transferred from an outside basin to the service area

Overall, the institutional features framing the transfer and its resulting execution are judged fully appropriate, complete, and effective This is based on the simple fact that the district has functioned as a self-sufficient WSE providing the desired service in its area for over 45 years It typifies the many hundreds of WSEs with the same responsibilities under similar conditions and USBR policies that likewise have proven self-sufficient and effective in providing services to their customers for several decades

Scope of transfer As with all USBR-constructed projects, the responsibilities originally transferred included (a) all facilities O&M, (b) payment of all capital costs of the constructed distribution facilities without interest (c) payment of the O&M replacement and future construction, and all associated costs of the transferred facilities and (d) payment of USBR costs of delivering the bulk supply to the district

For an initial period, the USBR retained all responsibilities for the bulk services facilities—storage and conveyance—utilized to serve the NCWCD However, more recently the district successfully negotiated O&M responsibilities for the primary facilities too This was sought to reduce service costs to the district The scope of transfer was appropriate since all other water services in the area were already provided by the existing entities Thus drainage flood control roads and urban supply are met without further action

Condition of facilities at transfer The facilities were in excellent condition at the time of transfer having recently been constructed The joint use facilities transferred later were also in good condition

Ownership of facilities The USBR policy is to retain ownership of distribution facilities that it constructs though it requires the capital costs to be repaid by the WSE Rigorous annual

inspections by the USBR ensure adequate maintenance backed by its power to remedy any shortcomings and assess the full costs to the WSE

The transfer of ownership upon full payment of construction costs would be wise as it would signal the WSE that it will inherit the works and should maintain it accordingly The USBR is reconsidering its policy of retaining ownership of distribution systems beyond the time of full repayment

Water rights Water rights of the project and of the customers are fully defined and administered under Colorado law by the State Engineer's Office in a manner to ensure reliability and confidence in the supply This is critical for economic development and rational investments by the farmers and surrounding villages, municipalities, and industry The NCWCD right has one peculiar characteristic Since the water is introduced to the area by the NCWCD from another basin the return flows remain the property of the NCWCD

Service charges funding and financing The NCWCD has full powers to issue bonds to finance improvements and levy property taxes to underpin the bond financing and any revenue shortfalls in times of drought Its taxation powers apply to all lands and property within its boundary whether or not they receive district water Government policy in recent years is to remove some of the most obvious subsidies from its water services to the irrigation districts and cities This has been a long and emotional debate (The change in policy has followed the increase in cost recovery from beneficiaries of flood control and related federal water resources services)

Form of WSE The form of WSEs available in the US is established under the respective state s district formation laws satisfying USBR requirements in this case the laws of Colorado The WSE has powers of taxation, condemnation of property needed to render the services and other characteristics of a public entity Under Colorado law, the entity is governed by a board of directors appointed by the courts to equitably represent customers in all subareas of the district Candidates resident in the subareas may file with the court to be considered for appointment All 'districts are quasi-government entities, necessary in order to be granted taxation powers certain options for securing financing and other features

This form adopted for the NCWCD is typical for drainage and flood control WSEs in most states Such governing arrangements help secure bond financing and better ensure attention to maintenance of a rather inactive service such as these However most states use a form of WSE for water supply and irrigation where members directly elect the board of directors that administers the WSE

Preparation for and execution of the transfers The USBR transfer policies and specific program features were developed during the evolution of the USBR water development program early in the century As in USBR-built projects for new services the NCWCD was formed prior to project authorization by the Congress This was in accordance with stipulated policy that there must be a legal entity created with appropriate powers and that it enter into a binding contract for the water services as a condition for Congressional appropriation of funds and for USBR to proceed with final design and construction

The local public of course, was fully engaged in defining the scheme in its long effort to secure government action to construct the project This was true in all projects undertaken

by the USBR Besides aggressive promotion by the local interests, the state legislature and administration and the members of the Congress, representing the state in which the project was located had to demonstrate full support before the project was evaluated for feasibility and before it could be submitted for authorization by the Congress

Follow-up support and oversight The NCWCD is a large, efficiently managed WSE With a substantial professional staff and access to outside consultants it has the means to deal with all questions and actions that it may encounter The USBR stands ready to provide assistance on technical and other matters, however it has not been engaged by the district to any extent The USBR has had a program of limited financial support for rehabilitation work for small WSEs in the US If a WSE avails itself of this help, it does receive technical review of the work contemplated by the WSE, but the WSE is responsible for completion of the engineering and construction—both are usually executed by private firms

State governments administer very effective surface water rights systems, though in some the groundwater rights are not as specific Both the state and the federal government rather aggressively administer water quality standards The USBR does monitor the condition of the facilities that it owns to ensure adequate maintenance Financial audits are performed in accordance with state laws to verify accountability of internal operations and to meet standards of the financial community, necessary for outside financing

Mexico

The Mexico program was devised and is being executed by the National Water Commission (CNA) supported by a World Bank loan Unfortunately the mix of powers and responsibilities assigned to the CNA creates a conflict of interests in the program CNA functions as the national bulk water services provider and the regulator for issuing and monitoring water rights, including those that govern its own services Indeed as now assigned it will manage the auction of water rights when water use licenses of the WSEs come up for renewal

As with the other examples, all aspects of the performance of the WSEs cannot be evaluated Insufficient time has elapsed and several areas received above-average water supply during the period studied The handicap of not having taxing powers came to the fore with the recent drought in a few areas Most indications are that the service has been equitable with only limited distortions This review is based on a review of the Lagunera irrigation district but applies generally to the Mexico program

Scope of transfer The primary scope of responsibilities transferred encompasses the routine O&M of irrigation distribution systems, associated drainage facilities and interior roads and all related costs In about 25 percent of the area responsibilities for the larger bulk facilities were transferred to umbrella organizations composed of several WSEs

Mexico is one of the three examples among the six that has formally transferred responsibilities for services in addition to the water supply to a local WSE Farm to market roads are essential for agriculture and their maintenance must be ensured A World Bank report indicates that 30 percent of the irrigated lands suffer from drainage problems This has O&M implications for the affected areas, for the adjacent lands where surface water application is the primary source of raising groundwater levels and for both villages and farms that

may be affected by storm water and waste discharge The combined responsibilities permit coordinated O&M staged for maximum efficiency and present and future works can be shaped to meet the needs judged by the local people

Condition of the facilities at transfer Facilities were in reasonably good condition Some rehabilitation was necessary and the cost was shared equally by the government and the WSEs

Ownership of facilities The government retains ownership of all facilities—those transferred to the WSEs and those whose O&M will remain government responsibility The government does have the power to carry out maintenance if it judges that the WSE is neglecting needed work The associated costs are to be assessed against the WSE as an additional increment to their water service charges or as a direct assessment

Water rights The law provides for issuing surface water "use licenses to projects for a duration of 5 to 50 years Most irrigation modules managed by a WSE have a 20-year license under their concession A critical flaw in the law in addition to the very short period of validity, is that a concession is defined loosely as having quantities sufficient to meet needs with the caveat " it has firm rights except in times of drought and in basins where concessions issued exceed water available The government will determine annual water availability and its allocation among projects and sub projects With all concessions of equal force regardless of when issued the increasing overcommitment of basins will directly affect the viability of WSEs

Groundwater concessions are issued to individuals and local entities that depend on wells for their supply Unfortunately, this precludes the WSE, or other management bodies from instituting conjunctive management of surface water and groundwater This runs counter to principles of sound resources management

There are plans to establish some form of Basin Councils to oversee water resources management at the basin level However, the principal officers and members are now slated to come from central government agencies The role, if any, of WSEs and the community at large is not resolved

The uncertain reliability of WSE water rights is aggravated by the law s provision to auction licenses when they expire Few irrigation WSEs will be able to outbid industry and urban users—or more prosperous farmers It remains to be seen how Mexico will deal with the associated social and economic issues The fundamental deficiencies of the water rights and the over-allocation of available water resources are perhaps the most serious threats to the viability of many WSEs in Mexico

Service charges funding and financing The farmers are to pay service charges based on the quantity of water delivered by the WSE to cover WSE costs and the bulk service cost of CNA However at the same time it is stated that the rates will be determined in collaboration between the WSE and CNA A significant portion of CNA staff salaries and overhead is covered by the national budget as a subsidy to the WSEs As now set forth, the WSE charge on surface water deliveries is also to cover drainage and road O&M But some WSE farmers will not contribute to the drainage and road costs to the extent they obtain their irrigation water from private wells Indeed WSE customers pay for surface water brought into the area

a portion of which becomes well supply to others However the WSEs cannot recover these costs from the well operator—farmer, village, or industry

The only sources of funds for WSE activities are through levying water charges to surface water customers The WSE has no power to levy property taxes to cover costs during low delivery years, to cover drainage and road costs or to finance new construction The WSE charge mechanism is inequitable and conflicts with means for comprehensive water management Changes are necessary to better ensure the financial viability of the WSEs

Form of WSE Each of the local WSEs is governed by a board elected by the members to serve a 3-year term The board has the usual administrative powers The umbrella WSEs are limited liability societies with similar powers and responsibilities The forms are sound but unfortunately as mentioned both lack essential powers

Preparation for and execution of the transfers The government formulated an effective transfer program and had a competent staff to carry it out The governing policies laws, and WSE regulations were in place The speed of the transfers and many of the positive reactions by customers can be attributed directly to this preparation By November 1996, 86 percent of the government-built facilities had been transferred Delays on the remaining stem largely from farmers' desire to retain subsidies and seemingly from some reluctance by unit staffs to loose what remains of the government systems

Follow-up support and oversight CNA is to oversee the quality of service, O&M and financial performance of the WSEs, all very essential The WSEs are to conduct regular internal audits But these are not to standards of the financial community since that mechanism for financing works will not be used The CNA budget and staff appear adequate to provide assistance to the WSEs during transfer and afterwards, however it is too early to judge the matter at this stage

The present institutional arrangements for other regulatory functions are not supportive of sound management As mentioned earlier, the CNA serves both as the national bulk service provider and the issuer of water rights Water quality and discharge permits are involved The service and regulatory functions should always be separated The complications of having an inadequate rights system uncertainty of future rights to a supply insufficient financing powers and assessment for other services of the WSEs have yet to arise to the extent they will in the coming years The sustainability of many WSEs is at serious risk under present provisions of the concessions and field conditions

Nepal

The Government of Nepal has initiated the transfer of management to WSEs at different levels on projects of the Department of Irrigation The irrigation systems in the process of management transfer reviewed in Nepal include the West Gandak Irrigation System (WGIS-10 200 hectares) the Khageri Irrigation System (KIS-4 100 hectares) and the Panchakanya Irrigation System (PIS-600 hectares) These three systems are part of the Irrigation Management Transfer Program—Phase 1 financed by the Asian Development Bank (ADB) All three are simple gravity flow systems and the average farm size is about one hectare

The concept of management transfer is relatively recent in Nepal the strategy having been drafted in the early 1990s The implementation of the concept began in 1993 with the establishment of WSEs in five projects The Irrigation Management Transfer Program under the ADB began in 1995 The transfer of the physical systems started early in 1996 Final agreement for transfer on the largest system is complete and final agreement for the other two systems was expected late in 1997

Scope of transfer The responsibility for O&M on all irrigation and drainage facilities except for the main headworks is being transferred to WSEs on the WGIS The government will continue to operate and maintain the headworks of the WGIS WSEs on the two smaller systems are given management responsibility for all the irrigation and drainage facilities including the main headworks For the two smaller systems, maintenance is the sole responsibility of the WSEs, but operation of the headworks and the main canal is being done jointly (WSE and the government) Operation of the distribution facilities below the main canal is the responsibility of the WSEs This is one of the most comprehensive transfers encountered in this study and in others The government's objective of the transfer of management is to reduce government O&M costs and increase productivity of the systems leading to increased agricultural performance

Condition of facilities at transfer Rehabilitation work was carried out prior to transfer This included flow structure repairs desilting canal reshaping, embankment improvement, source protection canal road improvement, and headwork improvement, for the PIS, main and branch canal improvement tertiary system improvement drainage improvement farm to market road improvement for the KIS and WGIS, and construction equipment repairs in all three systems Rehabilitation work was done by contract with the WSEs wherever possible The WSEs are responsible for 15 percent of the costs either in cash or labor This is an appropriate preparatory activity of the transfer program

Ownership of facilities The government retains ownership of the facilities but vests the rights to use the facilities to the WSEs as part of the Memorandum of Understanding on transfer

Water rights The ownership of surface water and groundwater is vested with the central government Individual use of the water is granted by a license from the government or by purchasing water from an entity which has a license for the use of water To obtain a license, a report describing the development and use of the water must be filed and a fee must be paid The water rights system is managed by the District Water Resource Committee (DWRC) in each District Licenses are given for set periods of time and must be renewed before expiration if the holder of the license plans to continue using the water The license to use water is both salable and transferable but the holder of the license must submit an application to the DWRC to obtain permission to sell or transfer the license The amount of water for a water permit is determined by the DWRC by examination of the data submitted in the water right application technical review of the water situation in the area, and consideration of information gathered from the public review process

The Irrigation Management Transfer Program document and the Memorandum of Understanding between the government and the WSEs are silent on water rights licenses, hence there appears in fact, to be no protection of the customers

Service charges funding and financing The Water Resources Act requires payment of an irrigation service fee to the government for government-operated projects In the past, this fee was collected by the District Land Revenue Office but collections amounted to less than 7 percent of the government's O&M costs

The 1996 Irrigation Policy provides detailed guidelines for irrigation service fees and authorizes WSEs registered with the government, to collect fees to cover the cost of O&M of facilities for which they are responsible There is no repayment of capital costs of government developed projects As mentioned, water users are to repay 15 percent of the initial rehabilitation costs The 1996 policy includes the sharing of income from fees by the government and the WSEs with fees divided according to the proportion of facilities in the irrigation system managed by them

For the three systems reviewed irrigation service fees to cover O&M costs are based on projected farm income Thus in fact, charges are not based on cost recovery for services provided The amount calculated represents only 1 2 percent of the "with project" income at full development This fee rate meets about 70 percent of the O&M costs of the facilities Collection of fees by WSEs is relatively new and on the three projects reviewed only 25 percent of the collection target was met It may take some time for farmers to adjust to the new system and for the WSEs to set in place the procedures needed to guarantee payment of fees by their members The problem is illustrated by the actions of WSEs to obtain money through other sources such as charging foi vehicular use of canal roads, selling of limbs cut from trees planted for bank protection, imposing fines and penalties, and charging a periodic market tax in the local area

The WSE has no means for taxation to fund road and drainage system maintenance There is no policy concerning recovery of capital costs for municipal and industrial water supplies The Water Supply Corporation of the government collects tariffs for household water supplies to cover its O&M costs Though much is sound in the Nepal program the fundamental deficiencies in financing policies procedures, and enforcement will jeopardize the sustainability of the WSEs The consequences are already visible and if not promptly rectified, will place the WSE at risk of failure

Form of WSE The Water Resources Act provides the legal framework for establishing WSEs To form a WSE at least seven persons must be selected from the group of consumers to serve as a board An application must be tendered to the DWRC including a copy of the WSE's bylaws Once the DWRC approves the application the WSE is registered with the government WSEs have the authority to manage irrigation systems, collect irrigation service fees raise funds through other means, and resolve conflicts among its members

The Department of Irrigation has identified the need for four tiers of irrigation organization depending upon the size and structural complexity of the system Generally, a main committee of WSEs is mandatory in canals of all sizes The WSEs can be established with appropriate levels of representation for main, secondary, and tertiary canals as well as the head-end, middle, and tail-end sections of the sub-projects Thus, there may be one or more WSEs for sub-projects This process may be more complicated than necessary, since most of the systems are relatively simple direct diversion systems

The water users in the WSE area elect the WSE's seven member executive board The users are encouraged to elect at least one woman to the board The board elects its officers

and organizes subcommittees of members to carry out various functions for the WSE such as fee collection and liaison with the Department of Irrigation

Preparation for and execution of transfers Preparation activities for the transfer program for the three systems included defining program objectives establishing criteria for system selection collecting hydrologic and socioeconomic information, assessing the capability of WSEs defining responsibilities of the government and the WSEs and developing the implementation procedures and guidelines

A new unit within the Department of Irrigation (the Irrigation Management and Water Utilization Division) was established for managing the transfer program Unfortunately, the department did not coordinate the transfer program with other agencies associated with the work, consequently, the other agencies have shown no enthusiasm for the program Training programs and workshops were conducted for both agency and WSE personnel

The WSEs in the three systems have established offices and hired some administrative personnel Board members have been trained in budget preparation and audit procedures O&M are carried out by committees of the WSE

Follow-up support and oversight Audits are done by local, registered, and licensed auditors From the government s side the department has overall responsibility for financial and physical oversight of the system and WSEs A monitoring and evaluation program has been set up and WSE personnel have been trained to assist government personnel with data gathering (crop surveys irrigation performance etc)

For the large system (WGIS) the department furnished 19 staff in the first year after transfer to assist the WSE in taking over the O&M responsibility for the system This staff is being reduced to seven by the third year after transfer The government is also providing cash support to this system s WSE for the first three years after transfer

Long-term support to be furnished by the government consists of training and engineering services as required by the WSEs and emergency repair of structures damaged by natural disaster There is, however no definition of what constitutes an emergency or a definition of the extent of the support to be rendered This may lead to different interpretations by the government and the WSEs a potential source of conflict Apparently there is no system for periodic government inspection of maintenance for the facilities turned over If this is the case this weakness in the transfer program should be corrected Appropriately heavy equipment for maintenance was transferred from the government to the WSEs

RATING OF THE TRANSFER PROGRAMS

Table 3 rates each of the six countries on the eight key factors for transfer of management

Ratings of management transfer in Mexico Turkey and the USA were higher than in the less-developed countries Sri Lanka, Indonesia and Nepal Some might conclude that the more developed the country, the better the chance for successful management transfer However the poorest of the three less developed countries Nepal is closest to Mexico while the other two are at zero Successful farmer management of systems if the key principles for

Table 3 Rating of the transfer programs

	Sri Lanka	Indonesia	Nepal	Mexico	Turkey	USA
Scope of transfer	Inadequate	Inadequate	Adequate	Adequate	Adequate	Adequate
Condition of facilities	Inadequate (1)	Inadequate (1)	Adequate	Adequate	Adequate	Adequate
Facility ownership	Inadequate	Inadequate	Inadequate	Inadequate	Inadequate (2)	Inadequate (2)
Water rights	Inadequate	Inadequate	Inadequate	Inadequate	None	Adequate
Service Charge						
Funding & Finance						
Repayment						
O&M Cost						
Transport facilities	None (3)	Inadequate	Inadequate	Adequate (4)	Adequate	Adequate
Major facilities	None	Inadequate	Inadequate	Adequate	Adequate	Adequate
Capital cost						
Rehabilitation (T F)	None (3)	Inadequate	Inadequate	None	Adequate	Adequate
Major Facilities	None	None	None	None	Inadequate	Adequate
Finance availability	Inadequate	Inadequate	Inadequate	Inadequate	Inadequate	Adequate
WSE legality	Inadequate	Inadequate	Inadequate	Inadequate	Inadequate	Adequate
Preparation for and execution of transfer	Inadequate	Inadequate	Adequate	Adequate	Adequate	Adequate
Follow up and support	Inadequate	Inadequate	Adequate	Inadequate	Adequate	Adequate
Number of adequate ratings	0	0	4	5	7	11

Notes

1 Rehabilitation of facilities was incorporated into the management transfer program

2 Although the ownership of facilities remains with the government the contract between the government and the WSE contains provisions for periodic inspections of facilities and if the WSE does not maintain the facilities the government has the right to do the work and charge the WSE for the cost

3 By mid-1998 the government and the World Bank were in negotiations for a loan to rehabilitate the distributary systems of parts of the Mahaweli Project Under conditions of the loan the WSEs will be required to pay 100 percent of the O&M costs of transferred facilities and 10 percent of the capital costs of rehabilitation

4 Groundwater users do not pay any water service fees even though their supply is directly attributable to recharge from the surface water that is delivered through the transferred facilities If these beneficiaries were required to pay for the service they receive the repayment of O&M costs would improve (presently fees cover about 85 percent of O&M costs)

successful transfer are followed can succeed in developing countries There are several de veloping countries that have successful farmer-managed schemes A few examples are listed below

Colombia

In the Coello and Saldaña systems, the farmers initiated management transfer themselves in 1975 Operation and maintenance of the systems have not deteriorated Subsidies to the districts stopped on transfer of the system Since the transfer, the districts have had positive budget balances The cost of irrigation has risen nearly fivefold in real terms on a per hectare basis since turnover but the gross value of output per unit of water has risen even faster Although there is some evidence of water distribution problems, the overall impact of management transfer in these projects has been positive (Vermillion and Garces-Restrepo 1996)

Nepal

Although the government s management transfer program in Nepal is rated inadequate on some factors, there are successful farmer-managed schemes in Nepal About 66 percent of the cultivated land in Nepal is under farmer management, and most can be classified as successful The Chhattis Mauja Irrigation System is an example It is financially independent and the organization managing the system has a high level of support from the irrigators It is very effective in system management, enforcing rules and communication A basic characteristic of the management system is the use of the *kulara* unit This unit expresses a certain share assigned to a member village of the system, and simultaneously integrates the village s water rights and voting rights and its obligations for providing labor and cash for system upkeep The total number of kulara is not fixed but is controlled by the executive committee based on certain rules Although there are some deficiencies in record keeping and differences in water allocation between the formal rules and actual rules, overall the system is successfully managed Yoder (1994 86-87) calculates the "effective rate of taxation," defined as the ratio of resources paid for irrigation to the marginal income from irrigated agriculture, and finds this cost averages 1 73 percent for the whole system with a range of 1 79 percent to 2 13 percent between the middle and head branches respectively Therefore in spite of the high level of expenditures on O&M, Yoder concludes irrigation is a "highly profitable enterprise "

Pakistan

The mountainous Chitral District consists of many successful farmer-managed schemes Three systems were appraised by IWMI (IIMI 1994) All three are several centuries old and have stable well-established management systems Users have clear water rights, with such rights being defined most clearly in the relatively water-scarce system All three systems support two crops per year and the crop yields are higher than the national averages

Others

The many "tanks" and associated works in southern India are managed by farmers In the island of Bali in Indonesia, farmers have constructed and operate and maintain their own systems In the Kunduz-Khanabad area of Afghanistan farmers have managed a 20,000-hectare scheme for close to 2 000 years

FINDINGS AND CONCLUSIONS CONCERNING KEY FACTORS

The experience with transfer programs in the six countries examined parallel, to varying degrees, the experience in other countries The program features and results were judged in reference to a set of institutional, physical, and management conditions found in situations where local WSEs have been successfully functioning for several decades or more

Five of the six countries lack one or more institutional, procedural, or financing features judged to be essential for sustainability Only one had all features sufficient for ensuring reliable services on into the future as evident in the service and strength of the WSE examined 45 years after the transfer commenced

Scope of Transfer

The one overriding program objective of all transfers examined was to attain an early reduction in the government's budget and staff And this is important But the level of services in the broader water sector to meet the area's needs was not set out as a basic objective of the transfer programs in three cases Improvement in irrigation deliveries and reduction in costs to the customer were implied as an objective in some—also important for successful transfers

The absence of a long-term plan for all water services to the area contributes to program deficiencies The water resources situation within project areas, the anticipated future land use at various time horizons—particularly urban, the water-related services demands of all sectors and the underlying services policies are unknown and unappreciated by the government agencies, the WSEs, and the public Yet as was evident in several, changes in service needs are already underway

- An explicit statement of objectives helps focus the provisions of a transfer program
- A long-term plan helps define the services and responsibilities to be transferred

Condition of Facilities

The condition of facilities varied in the six countries but where facilities needed rehabilitation, the government developed plans for rehabilitation The implementation of these plans varied In three countries the management of these plans was weak

- Facilities to be transferred should be in good operating condition to meet the primary objective of transfer—provision of services that helps customers meet their objectives reliably and cost-effectively

- When facilities are not in good condition, the government and the customers should work out a plan to rehabilitate them before or during the transfer process

Ownership of Facilities

In four cases, the conditions of the transfer resemble, in part, a facilities rental agreement Ownership of facilities remains with the government, it has responsibility for major rehabilitation and all new construction

More often, government ownership has allowed the WSE to neglect routine maintenance until conditions dictate major actions or even rehabilitation, which the owner, the government, has to correct These arrangements also lead to questions of what is judged routine what is judged major, and what is judged emergency repairs This is where politicians—particularly local powers when managed by municipal officials, as in the Turkey program, may dictate government actions that otherwise should have been WSE responsibilities Another example is the watercourse lining program in the State of Haryana in India, which was initiated late in the 1980s The State government set up a government corporation to line watercourses for farmer groups with the understanding that they would operate and maintain the courses at their own expense in addition to paying the cost of lining The program was operating successfully, when politicians, in order to get votes, removed all repayment requirements The farmers interpreted this move to mean that the government was now responsible for the facilities, so they refused to carry out even routine maintenance The government had to step in and perform and finance this activity

In almost all countries there are nongovernmental systems operated by private organizations that are successful and have been sustained over long periods of time In California, 80 percent of the distribution systems are privately owned and operated successfully In Nepal and Indonesia many systems were developed by nongovernmental groups and successfully operated for long periods of time The sense of ownership results in more responsible operation and maintenance of facilities

- Government retention of title to transferred facilities robs the WSEs of a sense of ownership and can lead to less than satisfactory maintenance

- WSE ownership of facilities is the most effective means to minimize vandalism and improper actions adjacent to the facilities

- When ownership is not transferred to a WSE a contract with the WSE requiring regular firm inspections with enforcement of maintenance standards and full cost recovery of any remedial work should be part of the transfer process

Water Rights

In all but two countries reviewed, the underlying water rights are retained by the government have not been resolved, or are a proportionate allocation of whatever water is available annually New demands on supply have rights to the water equal to the long-established users In one country even such WSE rights lapse after a limited-term license expires and are subject to government auction in which the WSE must compete In all but Nepal, the basin water sources are fully committed and some are overcommitted For this reason alone, the WSEs in four countries and their customer farmers face an uncertain future regarding the service on which to base their investments

- Water rights should be reliable and clearly spelled out for the transfer to succeed—and done so before the transfer so that farmers know what they will receive
- Water rights programs should be administered by one agency separate from water resources development agencies
- Effective water rights programs are necessary for sound management of water resources to keep basin water supplies from being over-appropriated, to eliminate the vulnerability of WSEs from increased demands of more powerful users, and to allow conjunctive management of surface water and groundwater resources
- Effective water rights programs reduce the opportunity for political pressures to override bureaucracies
- Effective water rights programs provide WSEs reliable water supplies and thus the confidence to make the investments to maintain their systems

Service Charges, Funding, and Financing

Water service charges are levied in five of the six countries reviewed In two countries, WSEs had taxation authority and in three countries WSEs were conducting commercial enterprises to try to raise additional funds In some countries not all water resources services are paid for directly by the direct beneficiaries

Sri Lanka, Indonesia, and Nepal had very weak cost recovery for transferred facilities (one had no cost recovery and two collected less than 25% of the cost of O&M of transferred works) Turkey and the USA had good cost recovery (100% of O&M of transferred works and bulk supply facilities) and Mexico has an 80 percent cost recovery record for transferred facilities

The availability of financing for WSEs and their authority to borrow were weak in four of the countries reviewed

- Those benefiting from water services including irrigation supplies, domestic supplies drainage and flood control should pay for the costs of those services
- Costs are the most common basis for determining water resources service charges

- WSEs should have the power of taxation to augment income during shortfalls
- Commercial enterprises conflict with the primary function of WSEs by competing for management and staff time, funds and scheduling
- Loan programs should be available to WSEs and they should have the authority to borrow funds

Form of Water Service Entity

Every country studied had numerous schemes that were built and have long been managed by a local customer-based WSE The USBR utilized the local form of WSE in each state where it operates, all of which followed the structure developed by farmers and legislators and enacted into law by the individual states in the 1800s (Barnes 1987) Sri Lanka is another example with local informal farmer WSEs, most over one thousand years old But, neither Sri Lanka nor others that have experienced difficulty with their transfer program appeared to have conducted a formal examination of their indigenous entities

As indicated previously, most countries do not have a long-range plan and have not examined carefully the trend in service needs The individual services to meet these needs should logically be provided by a single WSE, certainly at the lower two levels of service Indeed this was reflected in the scope of transfers in several countries The similar nature of the maintenance, equipment and access coupled with the differing seasonality of supply and drainage work allows substantial savings The joint operations and rate setting allow sound management of surface water and groundwater supply and the reuse of drain waters

Such a picture of the area's water-related service needs however limited in detail, also would awaken governments to better tailor the legal authority and powers of the proposed WSEs The government could inform the WSE and its customers of future conditions and devise more appropriate transfer steps and government assistance As noted, three of the five had wisely included drainage and road maintenance, but no related mechanism to set out the customer water rights, to equitably charge customers or to conjunctively manage the resource

- Long-term plans and studies of present and future service needs are necessary to determine the form of WSE to best meet customer needs
- Reviewing existing indigenous entities and adapting the form of WSE to what is already successful facilitate implementation of transfer programs
- A successful WSE has the following features
  - a clear statement of services to be provided,
  - a legal entity with elected officials,
  - a stated policy to cover all costs of WSE services,
  - a firm water right,
  - the legal power to obtain loans from private banks or government sources,
  - a sound, reliable infrastructure, and
  - a capable efficient management and staff

Preparation for and Execution of the Transfers

Three out of the six countries did a reasonably good job of preparing for and implementing their transfer programs They considered the issues of legislation, changing roles of government, public information budget requirements training and adapting forms of WSEs to existing capabilities Stakeholder participation programs differed considerably among the six countries

Stakeholder participation a prominent objective today may occur in the transfer process through discussions within the area prior to initiating the transfer program Obviously, it will occur in the subsequent WSE management matters after the responsibilities are transferred It may have occurred prior to constructing the project At the initial planning phase of a new project, the government should have public debate and secure the stakeholders full views when shaping a proposed new water-related development

It is quite something else however, to engage customers in setting policies when the government proposes that the customers take greater responsibility for the service and pay full cost of services previously provided without charge The stakeholders will rarely be enthused This is particularly true when only one service, such as irrigation is singled out for transferring responsibilities and the associated costs, while beneficiaries of other services do not pay

Public education programs and exchanges with farmers to explain the transfers are necessary In Turkey, the local people and community leaders were informed of the program content and steps to be taken But the transfer program was executed rapidly at minimum cost with no stakeholder input, utilizing established institutional arrangements Yet, Turkey had some of the most satisfied stakeholders after the transfer had been completed The same result was found in Mexico, except in those areas where smallholders sought to retain government subsidies In the successful example in the US the government set policies and procedures that were uniformly applied throughout the country—without local debate on content These three countries attained the best results

Ironically, the elaborate and costly stakeholder participation program pursued in Indonesia and Sri Lanka did not result in successful transfers in many areas Several WSEs in Indonesia never became active and others are ineffective Service payment has dropped dramatically The costly pilot efforts in Sri Lanka seem to have increased uncertainty among the stakeholders Some of the failed programs in other countries can be traced to what may be excessive efforts for stakeholder participation Complicated, loosely managed efforts with costly support and lengthy delays confuse farmers and make for skeptical partners Indeed in many instances it is evident that the government did not think through the action and formulate a truly comprehensive proposal before launching 'pilot studies '

- Preparation for transfer programs should include consideration of legislation, the future role of the government, budget requirements, public information programs, training, form of WSE, and public participation

- Stakeholder participation programs must clearly spell out what issues are negotiable and what are not Issues that are negotiable must clearly state what limits there are to the negotiations

Follow-Up Support and Oversight

The regulatory and oversight functions of governments were inadequate to varying degrees in the five examples The inadequacies of water rights have been noted These are serious Even those that have sound legal provisions remain unenforced The basic resources cannot be managed without monitoring diversions and groundwater extractions—and providing for conjunctive management of water resources

The level of water quality management is equally inadequate All countries have laws and detailed rules for managing quality, however, five have no effective monitoring or enforcement The quality of natural streams has deteriorated seriously, even in rural areas of the densely populated countries of Mexico, Indonesia, and Sri Lanka and to a lesser extent in Nepal and Turkey The same is evident in their groundwater The WSEs will not be sustainable without comprehensive and enforced regulatory laws and rules to manage water quality

The level of government oversight, supported by prompt remedial action, of WSE performance—service and financial—varies from little to adequate Four countries state their intentions to monitor maintenance quality by WSEs None state they will monitor the financial performance, though provisions of some agreements call for internal audits It is difficult to determine what ongoing effort will be applied to this because it receives little note in the programs However, timely and competent oversight supported by thorough audits, is essential to the sustainability of transfers particularly their financial viability One can only judge that this weakness is not recognized sufficiently

- Government regulation and oversight of water resources are a necessity
- Financial audits of WSEs are a necessity to maintain transparency of transactions and ensure legal financial management
- Governments must manage major complicated water service facilities to ensure reliable and equitable primary services to WSEs
- Governments must finance, but not subsidize, and construct major water resources facilities
- Governments can assist WSEs to finance major maintenance and rehabilitation by arranging loan programs and ensuring the WSEs have the authority to borrow money

Question

The question that remains is Will the countries remedy deficiencies in their programs in time to allow the WSEs to become strong self-sufficient entities that can render efficient services to meet the areas' needs in a cost-effective manner?

Closing

The analysis suggests that several countries such as some of the six examined are neglecting a number of key factors and this may threaten the long-term sustainability of the WSEs and the success of management transfer programs

Transfer programs must be founded on fully adequate physical resources, management capability, financing mechanisms and a comprehensive government support system of institutions and actions that have proven successful in practice There must be a firm political will and commitment for management transfer to be successful

All the items in the framework and all the key factors and their associated tasks although not equal in importance are necessary for successful management transfer Management transfer has been successful in both developed and developing countries where the key factors have been employed If all the elements of the framework and key factors are not in place or cannot be employed, it may not be wise to undertake a management transfer program Although one of the goals for management transfer is reducing government budgets, governments should be aware that in the short term there may be added costs for rehabilitation of systems prior to turnover, training, reorganization, and preparation of WSEs

Full cost recovery of water service costs as described herein, is not practiced in many countries, but where it is, it considerably enhances the success of management transfer

Informative materials and documents can be obtained from many old and successful WSEs, providing every type of service, that describe the WSEs' evolution and ongoing operations Much can be learned by examining existing programs for the transfer of service responsibilities, the successful and unsuccessful and by observing long-established WSEs Numerous investigators have written about government programs IWMI has developed a library of materials compiled under their programs But in all of these one should examine what evolved—not just what was envisioned

Appendix

Summary of Field Data Concerning Management Transfer Programs, Collected in Six Countries

Institutional elements water management tasks and management transfer programs were reviewed in six countries (Indonesia, Sri Lanka, Turkey, the United States of America, Mexico, and Nepal) The detailed field data collected in the review of the six countries are contained in six reports, one for each country These six reports are available in the library of the International Water Management Institute (IWMI) This appendix summarizes the data collected

Even though a specific project or river basin was reviewed within a country, much of the institutional and management transfer information applies to all irrigation developments in the country of review

Information collected from the review in the six countries is summarized under the following categories

- project/area description
- water resources
- water resources policies and legislation
- government water resources entities
- audit/oversight
- financial/cost recovery
- management transfer program

PROJECT/AREA DESCRIPTION

Specific projects or areas were selected for review in each of the six countries Following is a brief description of the project or area reviewed in each country

Indonesia

The Progo-Opak-Oyo river basin was selected for review in Indonesia It is located in the south central part of the island of Java, the most populous island of the country The basin has about 190,000 hectares of irrigated land, and a high concentration of small-scale irriga-

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tion systems most of which were developed by farmers Each scheme of the more than 85 percent of the schemes is less than 500 hectares in size The primary crop is rice Population densities vary from 800 persons/square kilometer to 48 500 persons/square kilometer (250 acres) depending on the district within the basin

Sri Lanka

In Sri Lanka the Mahaweli project was reviewed It is a large project developed by the government in the Mahaweli and adjacent basins The project consists of storage reservoirs, hydropower plants canals, distributaries and drain systems The area irrigated is about 88,000 hectares Domestic water is also furnished by the project in some areas The project was laid out with farm sizes of 1 25 hectares (one hectare of irrigated land and 0 25 hectare of dry land) Rice is the predominate crop (80%) The review focused largely on the System H area in the North Central Province

Turkey

In Turkey the Gediz river basin in the Aegean Region was reviewed This basin drains to the Bay of Izmir The basin contains storage reservoirs and canal and drain systems developed by the government About 128,000 hectares are irrigated in the basin The main crops grown are tobacco, raisin, olive, cotton, and horticultural crops The average farm size is 5 8 hectares with each farm of the 68 percent of the farms below 5 hectares in size

USA

In the USA the Colorado Big Thompson Project located on the east slope of the Rocky Mountains in the State of Colorado was reviewed The project was constructed by the federal government, it is a trans-basin diversion project that consists of storage reservoirs, diversion tunnels hydropower plants, pumping plants, canals distributaries and drainage systems It generates electric power, serves 310,000 acre-feet ($3\ 824 \times 10^8 m^3$) of supplemental water to irrigated lands and delivers municipal and industrial water to communities in the area

Mexico

The area reviewed in Mexico is the Lagunera Region However, the review examined the entire national program Most schemes are supplied by gravity diversions but groundwater supplies a significant portion in some areas Crops vary with horticultural crops dominating exports and grains dominating the domestic market Farm sizes vary with an average of 3 hectares

West Gandak system to 0 7 hectare in the other two systems The project areas for these systems are located in the low-lying flat areas in the Terai, a part of the Gangetic plains The source of water is the Narayani river All three systems are simple gravity flow systems constructed in the 1960s and rehabilitated in the 1980s

WATER RESOURCES

A summary of the physical water resources situation in each of the areas reviewed in the six countries is given in table A1

WATER RESOURCES POLICIES AND LEGISLATION

Sector-wide water policies and legislation for the six countries reviewed are summarized in the following paragraphs

Indonesia

Legislation in Indonesia is usually general in nature, and the details and processes for implementation are provided in ministerial regulations

Water and landownership According to the constitution, land and water and the natural resources contained therein shall be controlled by the State and shall be exploited for the greatest benefit of the people Some land is owned by the government but it can lease land to private parties usually for periods of 25 years Village lands are usually controlled by the Village Head who can allot lands to village residents Private landownership requires legal title Facilities and lands on which facilities exist in government-developed water resources projects remain in government ownership

Water rights Government regulation divides surface water use into two categories the use of water without license and the use of water with license The use of water without license is for social (household) purposes but such use should not damage the water resources and the environment All other uses should be licensed Groundwater use must also be licensed except for water used for household purposes and cattle watering Although a legal framework exists for water use licensing it is not applied to irrigation use Farmers are said to have first rights based upon historical use but no government-issued license exists for this historical use

Water quality Laws require that entities discharging wastes to water bodies must obtain a license from the government The entity must file an environmental impact statement concerning its discharge as part of the licensing process Water quality standards exist for 14 types of industries and 4 classes of water use (treated and untreated water for drinking fisheries

Table A1 Water resources

	Indonesia	Sri Lanka	Turkey	USA	Mexico	Nepal
Surface water	Is fully utilized in most areas Ample except in 1 of 5 districts in the basin Further reductions caused by upper basin growth	The Mahaweli project has enough water for the lands in the project area in most years but faces infrastructure constraints at times	Presently developed surface waters in the basin are fully used	The trans basin diversions supplied are sufficient to serve the agreed supplemental supply to the area	Many surface water supplies are fully exploited	Adequate for the West Gandak system but dry season flows are low for the other two systems
Ground water	Supplies are in excess of present demand except in the dry season	Exists in flat alluvial plains and is scarcely used	Totally utilized in most areas of the basin	Fully developed	Groundwater tables are in overdraft	Not fully utilized
Drainage	The basin is well drained and drainage works are generally not required	Generally no problems exist	No serious problems drainage facilities exist	Drainage return flows used to the maximum extent to minimize trans basin diversions	30% of the area suffers from drainage problems	Drainage is poor drainage facilities exist and drain reuse occurs in some areas
Water quality	Water quality in the mid and lower parts of the basin is deteriorating	High siltation is occurring in project reservoirs nitrate levels in surface water and groundwater are increasing	Salt concentrations vary between high and medium. Some areas in the lower part of the basin are badly polluted	Surface water and ground water is generally of good quality in the project area	Some surface water and groundwater is polluted in rural areas and most is near urbanizing areas	Siltation problems exist in river fed canals
Flood control	Flooding is not generally a problem	Flooding is not a problem in the Mahaweli area	Reservoirs in the basin provide flood control but the lower basin has occasional floods	Flood control is provided by reservoirs and levee systems along some streams	Flood control is provided by levees and natural channels	Flooding occurs in almost every rainy season due to inadequate drainage systems
Water service needs	Municipal and industrial uses are increasing irrigation demand is not expected to increase significantly	Domestic water demand is increasing potential exists for additional irrigation	Municipal and industrial uses are increasing rapidly and only half the irrigable land is presently irrigated	Water use is changing from irrigation to municipal and industrial uses	Water use is changing from irrigation to municipal and industrial uses	Municipal and industrial uses are increasing and demands for irrigation water are also increasing
Potential water supply development	A little additional ground water can be developed no potential exists for further surface water development	Potential exists for further development of both surface water and groundwater	Some potential exists for developing additional surface water	Additional water can be obtained through conjunctive use of surface water and groundwater and conservation and treatment of waste water	There are no means to secure significant amounts of additional water in the majority of areas now irrigated	Potential additional supplies are from more river diversions use of water from drainage ponds and groundwater exploitation

and cattle breeding, and agricultural use) Water quality standards for municipal and domes tic uses do not include parameters for BOD and COD (biological and chemical oxygen demand respectively) Water quality regulations are inadequate and existing laws remain unenforced in both rural and urban areas

Water resources development Legislation exists authorizing the national government to develop water resources projects Urban water supplies can be furnished by self-financing utilities set up by municipalities

Monitoring and regulation Government regulations require monitoring of surface water, but not groundwater or marine waters Water quantity and quality are to be monitored Surface water is generally monitored weekly, but at widely spaced stations

Well depth and spacing regulations exist for development of groundwater, but enforcement of regulations is weak

Priority of use is set by law (domestic national defense, religious purposes, municipal, agriculture, fishery energy industry mining navigation, and recreation)

River basin management Indonesia, by government regulation is divided into 90 basins for water management, however, river basin management activities are just beginning in two basins under a World Bank program Government decrees call for the provinces to manage all but those basins of national importance Basin committees were created in five basins, including the Progo Opak-Oyo river basin

Sri Lanka

Water and landownership Generally, water and landownership are divided between the private sector and the government however the government has the general authority to control the use of all land and water Private ownership of water occurs only where a lake or stream is entirely within the boundaries of private property All other water bodies are considered public water resources Facilities and lands on which facilities exist in government-developed water resources projects, remain in government ownership

Water rights The Crown Lands Ordinance provides for issuing permits for water use Domestic use, stock watering, and minor agricultural uses do not require permits if the water is taken by bucket or other receptacle and not diverted by canal pipes or pumps There is no selling or trading of water under the water rights system Use of water for irrigation is exempt from the law but most irrigation use takes place on government projects Separate legislation exists for granting licenses for electric power generation commercial fishing and aquaculture Groundwater use is not covered under the water rights law The only law concerning groundwater addresses fencing of wells and the establishment of waste disposal areas in relationship to pollution of groundwater basins

There appears to be no record of court settlement of water disputes The court system is generally considered too slow and bureaucratic for settling water disputes

Water quality The law prescribes general standards for discharge of effluent into water bodies or on to the land The law also requires a license to discharge effluent The permits have a duration of 12 months and are renewable Enforcement of water quality legislation is weak

Water resources development Legislation exits for government construction and management of water resources projects including works for stabilizing areas subject to erosion Government construction of water works must be publicized so that anyone with objections can raise them to the appropriate ministry No private person may construct any water works in or on the bank of any public stream or lake, unless he obtains a permit from a government agent

Monitoring and regulation Hydrologic, meteorologic water quality waste water discharge and groundwater data are collected Each type of data is collected by a different agency No mechanism exists for coordination of the data and no system exists for the registration of water uses and waste water discharges

River basin management No general legislation exists for the management of water resources on a basin-wide concept Legislation authorizing the Mahaweli Project is the closest thing to river basin management existing in Sri Lanka A Water Resources Council was formed in 1995 for the coordination of government activities in the field of water resources By late 1998 it is anticipated the government will endorse proposals to create a new water authority and a new water resources law, perhaps in 1999

Turkey

Water and landownership Water and land are considered public goods Most land except for government reservations is privately owned Facilities and lands on which the facilities exist in government-constructed water resources projects remain in government ownership

Water rights Surface water is a public good which everyone is entitled to use subject to the rights of prior users Authorization prior to use is not required and registration of water use does not exist Conflicts over water use are governed by local customary rules

Groundwater is subject to regulation by the government through a water extraction permit process Permission is required from the government to drill a well The government grants a permit based upon the condition of the basin and the information supplied by the applicant Wells with discharges below 500 liters/second and shallow wells are not subject to licensing but the government must be informed when such a well is developed Enforcement of the groundwater regulation law is weak

Water quality Legislation exists for the control of water pollution and methods for sampling and analysis The national government monitors and evaluates water quality, but has no authority to enforce meeting water quality standards The federal agency reports violators to the local provincial or municipal government Local governments are empowered to enforce water quality law New industries must include water treatment facilities in their construction plans

Water resources development Legislation exists for government development of water resources Private entities may also develop water works with the appropriate permits from the government There are 13 large cities in Turkey designated greater metropolitan areas which have the authority to develop their own water and sewerage facilities

River basin management River basin plans have been developed for all major basins in the country In the 1970s, following completion of river basin plans, the government prepared feasibility studies for the development of specific water resources projects No river basin management authorities exist In the Gediz river basin some entities involved in water development and use are beginning to meet informally as a basin management council

USA

Water and landownership Water is generally owned and controlled by State governments and land is in private ownership except for lands used or preserved by federal, state and local governments Facilities and lands on which facilities are located for government-constructed water resources projects generally remain under government ownership

Water rights Use of water in the State of Colorado in which the Northern Colorado Water Conservancy District is located, is controlled by the State government The water rights system is known as the prior appropriation system This system is referred to as the 'first in time first in right' system It controls who uses water, the quantity of use the type of use and when water is used An appropriation is made when an entity takes water from a stream (or underground aquifer) and places the water to some type of beneficial use Licenses from the State government are required for water use The first person to appropriate water from a water source has the first right to use the water within the water source system Each succeeding user has a lower priority based upon the date of appropriation Water users with late water rights can use direct stream flows only for a short time each year These water users are largely dependent upon storage water from reservoir companies or the District Rights to store water in reservoirs are separate from rights to divert water for direct use They are effective only during the nonirrigation season from late fall through early spring and during flood flows (these rights are recorded in acre-feet) Storage rights are based on priority of appropriation and are fixed by court decrees in the same manner as direct flow rights

All water rights are adjudicated in water law courts The State has developed special courts for the adjudication of water rights A State Engineer manages the water rights system Management consists of reviewing applications for water rights recommending licensing of use to the water courts and determining in water-short years which water users may take water A water right is a property right and can be bought or sold moved and put to different uses without limitation so long as the change does not injure the vested rights of others The water rights law is strictly enforced

Water quality Federal water quality standards are legislated States may set their own standards but they must be equal to or more stringent than the federal standards Generally the State government enforces water quality legislation

Water resources development Federal legislation exists for the development of water resources under specific conditions Local governments may also have legislation concerning development of water resources In most instances government entities do not construct water projects unless requested to do so by citizens groups that are willing to meet certain repayment and management conditions Usually, a process of project study review, legislative authorization and consummation of agreements and contracts between the government and nongovernmental entities must occur prior to commencement of project construction Private entities may also develop water resources projects with the proper permits from the government

Monitoring and regulation Both the state and federal government have water resources monitoring programs Data collection systems for surface water and groundwater exist They are quite extensive and well-managed

River basin management River basin management authorities do not exist in Colorado, but legislation exists for the development of the State s allotted portion of the Colorado river water, interstate stream operations flood plain management and water project planning and construction Compacts between States for the sharing of interstate waters are usually set by federal courts

Mexico

Water and landownership Citizens of the country own the water resources and the central government administers these resources on their behalf The government retains ownership of facilities transferred to WUAs for management

Water rights Permission to use water for any purpose is issued as a 'concession' of limited duration (5 years minimum to 50 years maximum) Most concessions are for 20 years All concessionaires have equal rights to the water actually available regardless of the chronology of the issuance of the concessions Surface water concessions are issued to districts or other comparable entities but groundwater rights are issued to individuals The law qualifies equal use as follows firm rights to quantity except in times of drought and in basins where concessions issued by the government exceed the water available Domestic and livestock use has first priority in case of droughts

In several basins, concessions issued already exceed supply by a factor of two There is no criterion or procedures for reissuing concessions for water held by concessionaires when the existing concession reaches the end of the licensed period

Water quality Water quality standards and pollution control legislation exist but enforcement is weak

Monitoring and regulation Monitoring and enforcement of water use licenses and waste discharges are lax or ignored

River basin management The law provides for "Basin Committees" to assume loosely defined responsibilities in basin management It appears that this level of entity is still under

debate including composition powers and their creation There are no basin plans to guide water and land resources management or to protect existing investments

Nepal

Water and landownership The Water Resources Act of 1992 provides that all water resources are vested in the government The public may use the water if they obtain a license for its use from the government, or they may purchase water from someone who has a water use license Ownership of land is similar Cultivation of the land must be within the regulations set by the government Those who own a certificate of entitlement of land issued by the government are required to pay applicable taxes to the government

Water rights Entities that wish to use water must obtain a license for such use from the government (District Water Resources Committee - DWRC) A description of the use, the area of use and other information must be submitted along with the application for a license For large projects, a feasibility report must be submitted along with the license application A license fee is assessed and procedures allow protests to granting of the license from anyone who believes he will be harmed by the water diversion In this case the government makes the final decision after considering all the evidence submitted Licenses are granted for fixed periods of time and must be renewed when the time expires The license to use water is both salable and transferable, but the licensee must submit an application to the DWRC and obtain permission to do so

Water quality Legally the use of water is controlled by a code of conduct and any form of contamination to the water body is regarded as a breach of the conduct that limits the access of others to use water The DWRC has been given the authority to control water pollution through the water rights process

Water resources development Water resources development projects may be implemented by the government and by the private sector upon receipt of a water rights license from the government

Monitoring and regulation The DWRC is responsible for monitoring the water resources in each district A joint meeting of DWRCs occurs when water resources must be monitored across district lines The government is responsible for creating detailed geographical and management information systems that will be updated and institutionalized based upon the requirement

River basin management The Environmental Action Plan of 1994 contains policy for integrated basin management No plans for implementing the policy have been developed

GOVERNMENT WATER RESOURCES ENTITIES

The following paragraphs summarize the form of government in each country and the key agencies involved in water resources development and management

Indonesia

The Government of Indonesia consists of a two-body legislature a Council for which members are appointed and a House of Representatives for which members are elected except for certain nonvoting members appointed from the military The President is elected by the majority party in the House of Representatives Local government consists of Provinces and Districts

National agencies The primary agency of the national government for development and management of water resources is the Directorate General of Water Resources Development within the Ministry of Public Works Its functions include the planning, construction, and management of water resources projects, water use and waste disposal licensing enforcement of water quality legislation river basin plans, water quality monitoring flood control, drainage works development and management, and provision of guidance to provincial irrigation activities

The Directorate of Environmental Geology within the Ministry of Mining and Energy is responsible for technical oversight of the groundwater extraction and the provincial governors are responsible for the licensing program

Two other agencies, in addition to the Directorate General of Water Resources Development that have some responsibility for water quality standards and control of pollution are the Ministry of Population and Living Environment and the Ministry of Industry However the Ministry of Population and Living Environment has no budget for monitoring and enforcement of water quality legislation

The Ministry of Home Affairs has two functions related to water resources general responsibility for administration of programs related to public utilities and collection of irrigation service fees for the government's irrigation service fee program

The Bureau of Water Resources and Irrigation in the National Development Planning Agency is the entity that generates the national water resources program and budget, based upon input from other ministries

Local government Legislation concerning decentralization was enacted in 1974, and was amplified by later legislation Since that time many functions managed at the national level have been delegated to the provinces and districts Decentralization includes two forms of local governance direct delegation from the national level and coadministration of functions in which the higher level of government provides technical guidance, but administration is provided by the lower level of government For example the groundwater abstraction and licensing program is administered at the provincial level based upon technical guidance from the Ministry of Mining and Energy The Provincial Water Resource Service is responsible for managing and regulating surface water resources and the operation and maintenance of pub

lic irrigation facilities up to the tertiary level headgate The Governor's Irrigation Committees are responsible for setting annual allocations

Sri Lanka

The Government of Sri Lanka combines a powerful elected president and an elected parliament In 1987, the 13th amendment to the constitution was enacted forming eight provinces with elected assemblies and specific, but limited powers

National agencies There are ten entities at the national level with some functions related to water resources

The Ministry of Irrigation, Power and Energy is responsible for planning design operation and maintenance of major irrigation and drainage infrastructure and flood control outside of the Mahaweli Authority s area The Ministry is responsible for administration of the Irrigation Ordinance and water rights legislation and the organization and development of farmer organizations for taking over operation and maintenance of tertiary and distributary channels on Ministry projects The Ministry is also responsible for administering electricity licenses, development of electricity policy generating or acquiring and selling bulk and retail electricity supplies, and construction, operation, and maintenance of generation and transmission facilities

The Mahaweli Authority of the Ministry of Mahaweli Development has essentially the same functions as the Ministry of Irrigation, Power and Energy for the Mahaweli Project area (88 000 hectares) Additionally, it has the responsibility for the economic development of the project area

The Department of Agrarian Services of the Ministry of Agriculture and Lands has the responsibility for management functions for minor irrigation systems (under 80 hectares in size) such as technical advice and assistance on irrigation efficiency adequate drainage and maintenance of irrigation infrastructure Since decentralization of the government, most of these activities are now accomplished at the provincial level

The Ministry of Housing, Construction and Public Utilities is responsible for development, operation and maintenance of water supply and sewage systems for public, domestic and industrial purposes

The Ministry of Industrial Development issues water quality and effluent standards for industry

The Water Resources Council was established in 1995 on a temporary basis for 3 years with the functions of water policy analysis and recommendation legislation review water rights administration water resources planning water resources data management and coordination of sub-sector activities

Local government Provincial governments may legislate in matters of planning design and construction, and operation and maintenance of irrigation works that are not interprovincial The provinces share legislative powers with the central government with respect to water storage and management drainage and bank protection and soil conservation Municipal coun-

cils provide domestic water, sewerage services, and storm drainage Industrial water supplies are furnished by the industries or municipalities

Turkey

The Government of Turkey is parliamentary Its parliament members are elected by general ballot and the President is elected by the parliament The President appoints the Prime Minister, usually from the majority party in parliament to form a government Local government consists of 78 provinces and 900 districts

National agencies Turkey has two primary agencies involved in water resources The General Directorate of State Hydraulic Works (DSI) within the Ministry of Public Works and Settlement is responsible for implementing flood control projects reclaiming wetlands building irrigation and drainage systems, constructing hydroelectric power facilities, improving navigable rivers, and developing water supplies and sewerage treatment facilities for cities with populations over 100 000 The DSI also monitors surface water and groundwater resources (quantity and quality) and does river basin planning

The General Directorate of Rural Services within the Prime Ministry is responsible for developing small-scale (less than 500 liters/second) groundwater and surface water projects for irrigation on-farm irrigation development and construction of village roads and water supplies This agency may also develop irrigation projects with delivery capacities above 500 liters/second with the approval of the DSI

Small municipalities may develop their own water supplies and sewage treatment systems Those that do may obtain technical assistance and financing from the Bank of Provinces

Local government Turkey has 78 provinces and 900 districts The 13 largest cities are designated metropolitan areas Local government entities are primarily involved in domestic and industrial water supplies, sewerage facilities, and management of small irrigation systems that have been transferred to them from the General Directorate of Rural Services

USA

The Government of the United States is a federal system composed of a federation of 50 states Certain governmental powers are restricted to the national government Each state has governmental subunits called counties or townships and within these entities are towns and cities All levels of government are involved in water resources in some way

National agencies The major water resources development agencies are the U S Corps of Engineers in the Department of Defense and the Bureau of Reclamation in the Department of Interior

The Corps of Engineers develops multipurpose water projects but its main emphasis is on flood control and navigation works The Bureau of Reclamation has jurisdiction in only the 17 western states of the continental US, the more arid portion of the US It also develops multipurpose projects, but its emphasis is on water services (irrigation and bulk water sup

plies for municipal and industrial uses) It operates and maintains only the major storage water conveyance and hydropower generating facilities of large projects All other facilities are transferred to water user entities for management

The Tennessee Valley Authority is similar to the Mahaweli Authority in Sri Lanka in that it was organized to develop the water resources and the economy of the Tennessee Valley It has developed and presently operates and maintains major storage, major water conveyance and hydro nuclear, and fossil fuel electric-generating facilities in the Valley

The Soil Conservation Service within the Department of Agriculture has the responsibility for developing small watershed management projects for conserving moisture and providing livestock watering reservoirs

The Geological Survey within the Department of Interior is responsible for monitoring surface water and groundwater resources, surveying and mapping the country's physical features, and monitoring volcanic activity and earthquakes

The Environmental Protection Agency has the authority to set and enforce pollution control standards and assist the states and other local governments in the enforcement of pollution control legislation

Local government The two primary agencies in the State of Colorado concerned with water resources are the Department of Natural Resources (DNS) and the Department of Public Health and Environment The DNS has various Divisions but the two most involved in water resources are the State Engineer/Division of Water Resources and the Water Conservation Board The State Engineer/Division of Water Resources issues well permits administers water rights monitors stream flow and water use inspects dams for safety maintains databases of Colorado water information and represents the State in interstate water compact proceedings The State Engineer is assisted in the administration of the water rights system by seven water courts located in each major drainage basin of the State These courts consider applications for water rights, issue permits and settle water rights disputes

The mission of the Colorado Water Conservation Board is to promote the protection, conservation, and development of the State s water resources Its principle programs consist of the development of Colorado's compact apportioned water interstate stream operations flood plain management, water project planning and construction management of Colorado s in-stream flow program and water conservation assistance

The Water Quality Control Division of the State Department of Public Health and Environment is the agency responsible for setting State water quality standards, monitoring water quality, and enforcing compliance with water quality laws

Counties often develop storm drainage facilities and in some cases develop and manage municipal and industrial water supply systems Cities and towns often develop and manage water supply and sewerage facilities Private companies may also be involved in providing municipal and industrial water supplies and sewerage services

Mexico

Mexico has a federal form of government with states and municipios at the lower level However the overwhelming concentration of power at the Center has the effect of functioning more as a unitary government than a federal system

National agencies The National Water Council (CNA) is the predominant water resources agency It is responsible for water resources planning, project development allocation of water among projects and users enforcement of water allocations, and operation and maintenance of the primary and some secondary works The CNA service roles include bulk water supply for irrigation, village and urban use and storm drainage/flood control except where municipios or metropolitan governments have the capacity to carry out these tasks CNA is also in charge of the irrigation management transfer program

Each CNA district has a "Hydraulic Committee These committees set the annual allocation of water to the concessionaires and water storage carryover within the system for the following year and determine the number of irrigations

Local government Cities and larger villages are responsible for providing water and sewerage services These are arranged in a manner similar to utilities, but with limited independence from the city agencies

Nepal

The Government of Nepal is a constitutional monarchy with legislative bodies at the central and local levels of government Various ministries departments and corporations are created under the broad administrative framework of His Majesty's Government of Nepal (HMG/N) to administer the affairs of the government

National agencies The National Planing Commission is responsible for national plans based upon recommendations from agencies in each sector of the government consequently, it controls what water resources plans are recommended for approval at the central level The Ministry of Water Resources (MOWR) is responsible for overseeing the water resources of the country Operating under MOWR is the Water and Energy Commission Secretariat (WECS), which is responsible for development of policy for water resources and energy development and management The Department of Irrigation (DOI) within MOWR is the agency responsible for planning, development and O&M of national water resources projects for irrigation It has constructed about 220 irrigation systems It is also responsible for flood control projects and administration of the water rights system through District Water Resources Committees The Ministry of Agriculture is responsible for providing technical support and training to farmers

The National Agriculture Coordination Committee oversees the planning implementation, monitoring and evaluation of agricultural development activities in the country The recently formed Ministry of Population and Environment is responsible for environmental policy and has proposed water quality maintenance legislation

Local government The DOI maintains offices in all 75 governmental districts in the country These are grouped under five regional offices Each district, by Water Resources Regulation also has a District Water Resources Committee (DWRC) These committees have 9 members representing the various government agencies in the district They are responsible for issuing licenses to use water and other water resources management tasks A Water Resources Utilization Inquiry Committee exists in each district for the purpose of resolving disputes that arise

in the use of the water resources of the district The lowest political level of government is the municipality or village The recent decentralization policy of the government is resulting in more autonomy for this level of government

AUDIT/OVERSIGHT

An important function of the government in assuring proper administrative and financial management of its water resources projects is audit and oversight of its own activities and those of WUAs

Indonesia

Oversight and audit of government activities are accomplished by the Inspectors General in each governmental agency and by the Ministry of Finance

Except on World Bank-funded projects, there is no arrangement for financial technical or administrative oversight of water user association (WUA) management of facilities except on an ad hoc basis

Sri Lanka

The Auditor General of the central government audits activities of government agencies The Mahaweli Authority audits the administrative and financial affairs of WUAs Audits are not regular because of lack of funds and trained personnel Some WUAs hire their own financial auditors

Turkey

The water resources agency in Turkey has an internal board for technical and administrative oversight The Head of the Finance Department in the agency is from the Ministry of Finance, thus providing a form of financial oversight All activities of water service entities (WSEs) are reviewed by the Ministry of the Interior The water resources agency also reviews WSE activities and makes annual maintenance inspections Both of these government oversight activities have occurred regularly since the initiation of the turnover program

USA

Federal agencies have their own internal Inspectors General and their programs are also subject to review by the General Accounting Office of the legislative branch Local governments have similar audit arrangements

The activities of WUAs under contract with the Bureau of Reclamation are diligently audited by the Bureau of Reclamation Most State governments also audit the activities of

WUAs although increasingly private bond rating agencies review financial performance of districts seeking external bond financing

Mexico

Financial audits of WUAs are commonly done by private certified accountants or government regulatory bodies Annual audits are made

Nepal

The DOI is responsible for both financial and physical oversight of the affairs of the WUAs The Financial Administration Section of the DOI oversees financial activities and the Irrigation Management and Water Utilization Division of the DOI oversees operation and maintenance activities Local registered and licensed auditors audit the WUA accounts

Finance/Cost Recovery

All six countries finance water resources projects and have cost recovery programs Governmental budget procedures in all six countries are very much alike Budgets are developed at lower governmental levels and forwarded to agency headquarters for finalization and submission to a national planning or management agency that formulates the national budget in turn for submission to the legislative body of the country Once budgets are approved the planning/management agency allocates money to the operating agencies

The cost recovery programs vary by country in both their operation and effectiveness In most cases money collected is submitted to the national treasury rather than back to the systems management entity

Indonesia

Early in the country s history farmers developed small irrigation systems with their own re sources Since then most water resources developments have been financed by the national government and recently, in some instances by local governments Water resources development budgets have increased slightly since the 1980s (about 5%) The cost of the manage ment transfer program is presently US$172 per hectare This amount includes the cost of re habilitation required to permit reliable service The government s goals of reducing O&M budgets and staff levels is not being achieved Income from the cost recovery program equals only 1 percent of the O&M budget

The Irrigation Service Fee (ISF) program was initiated in 1989 with the goal of user payment of O&M costs for project facilities collection of fees by water user associations, and channeling money collected back to the areas in which the fees were collected The ISF program has been deteriorating in recent years and present collections are about 30 percent of targeted amounts

Cost-recovery policy for other water resources functions vary Flood control service is non-reimbursable Urban water supply capital and O&M costs are paid from water rates charged to users Rural water supply systems are supposed to be managed and paid for by the users through local government but in many cases the central government manages and finances these systems Laws call for customers to pay fees to the government according to a rate structure, for groundwater extractions Entities discharging wastes must pay the government a fee under the law

Irrigation water user associations have few choices for financing their activities Additional legal authority is needed for them to obtain loans and sign contracts

Sri Lanka

As in Indonesia, early water supply systems were developed by the beneficiaries but in recent history the government has developed and financed water resources projects The share of the national budget for O&M of water projects has remained at 4 percent of the total investment in irrigation in the country O&M budgets have recently been decreased and agency officials complain that the amounts are insufficient to cover O&M costs

In 1984 the government initiated a cost-recovery program to pay for O&M of the irrigation systems In the first few years, only 50 percent of the targeted collections were paid and response decreased thereafter In 1988 the cost recovery program was abandoned The Mahaweli Authority has completed negotiations with the World Bank for a major rehabilitation loan Under this program, the World Bank requires that water users pay all O&M costs and 10 percent of the capital costs for rehabilitation

Most distributaries in major irrigation schemes are now maintained and often operated by WUAs having contracts with the management agency The agency in many cases pays the WUAs, but since the amount paid is inadequate additional labor and other resources are mobilized from the users

Bulk domestic water supply systems are financed by the government but not the pipe distribution portion of the system Users are charged rates for payment of O&M costs and 50 percent of the capital costs of the pipe delivery systems Legislation exists for charging flood control taxes, but the law is not enforced Entities discharging wastes are presently charged licensing fees, and additional pollution charges are part of a new National Environmental Protection Act being considered

WUAs registered under Section 56b of the Agrarian Services Act have authority to borrow money and charge their members fees for repayment of loans

Turkey

Most water resources projects are constructed by the government The present budget for water resources is still heavily oriented toward construction (92% in 1996) It appears that the objective of reducing government O&M budgets will be achieved The budget and staff levels have started to decline 4 years after the initiation of the accelerated management transfer pro gram

Recovery of capital costs of national projects is required by legislation, but is not enforced for projects constructed since 1985 Repayment of capital costs for projects constructed prior to 1985 is occurring but payments are not adjusted for inflation so amounts collected are small O&M costs are required to be repaid by users Since the initiation of the management transfer program, WSEs have been collecting fees to cover the O&M costs of transferred works Since turnover the collection rates have increased from 38 percent (under government collection) to 80 percent by WUAs Starting in 1998 WSEs are required to pay O&M costs of the major project facilities retained for management by the government (25% the first year increasing to 100% by year four)

Cost recovery for municipal and industrial water projects includes repayment of capital costs over 30 years without interest and payment of O&M costs Flood control services are non reimbursable and hydroelectric power generated by government projects is sold to private utilities

Since the turnover program in Turkey is only a few years old there is uncertainty as to whether WUAs can borrow money None have yet attempted to borrow funds They have no collateral and their legal status concerning borrowing money is unclear

USA

Water resources projects including the function of irrigation are developed and financed by the private sector and the government (national and local levels) Government funds for project construction and management are not budgeted until a contract between the government and a water user group has been consummated The contract lays out the terms of repayment and management of the project Over the last 15 years government water resources construction budgets have decreased considerably as most lands are developed to the extent water is available

Costs allocated to the irrigation function of federal government projects are reimbursable (capital costs at 100%, but interest free and O&M costs at 100%) In some projects capital costs for the irrigation function are subsidized from hydroelectric power or municipal and industrial revenues generated by the project Flood control services are non-reimbursable Municipal and industrial water services and electrical power facility capital costs are totally reimbursable with interest O&M costs for municipal and industrial water services and electrical energy service are 100 percent reimbursable through service charges to the respective customers Partial cost recovery is required from beneficiaries for recreation and for fish and wildlife benefits provided by government projects

Pollution control costs for waste discharges are the responsibility of the discharger

The WUAs prepare their own budgets, collect fees and taxes for repayment of costs, and generally have the authority to borrow or raise money through bond issues

Mexico

Farmers pay for water delivery service based on volume of water delivered These payments are to cover the costs of routine O&M of the facilities transferred to the WUA plus a portion of the cost of O&M of the government (CNA)-retained facilities Rates are determined by

the WUAs in collaboration with CNA with the appropriate portion of the funds, collected by the WUA, passed directly to the CNA for O&M of the facilities under direct CNA jurisdiction However, significant salary and overhead costs of CNA incurred directly in routine O&M of the irrigation works are covered by the government's general budget and not passed on to the WUAs

The water delivery service charge is linked solely to a farmer s water deliveries—no other services There are no other mechanisms for assessing charges and neither CNA nor WUAs have powers of taxation Funds to pay for drainage and road O&M are extracted from the water delivery charges

The government funds all capital expenditures rehabilitation, replacement and expansion Farmers are not paying for past or future capital investment nor do they pay into a reserve fund to cover rehabilitation or replacement of CNA facilities The introduction of betterment charges is being considered In only limited cases have the WUAs attempted to create a reserve fund of their own

Under a proposed World Bank loan for rehabilitation and modernization the Bank intends to require farmers to pay 50 percent for all capital costs over a period of 40 years

The availability of financing varies greatly among farmers within the modules Larger farmers have more assets, greater access to lending sources, and can contract production with US entities Small farmers can only get production credit from private sources at high rates There is no government source of money

Nepal

Most water resources projects are constructed by the government Budgets for water resources development are prepared at the district level and approved at the central governmental level

The Government of Nepal has no policy for recovery of capital costs of irrigation projects Rehabilitation projects funded by international lending institutions usually have a requirement for water user payment of 10 percent of the capital costs in currency or in kind Legislation exists regarding irrigation service fees The legislation requires that a licensed user of water pay an annual service fee The regulation sets up a Service Charge Fixation Committee consisting of two members from the government and one member from the consum ers Various factors are taken into consideration by the committee in setting rates and the rates may vary between projects Prior to the initiation of the management transfer program in 1993 water service fees on government-operated projects were collected by the District Land Revenue Offices Full O&M costs were not collected from irrigation service fees Income from fees ranged from 2 percent to 10 percent of O&M costs

After initiation of the management transfer program in 1993 a new irrigation policy was adopted (1996) This policy provides new guidelines for irrigation service fees The WUAs are to collect fees from water users on projects managed solely by the water users On jointly managed projects fees are to be collected by the WUAs licensed with the government The income from the service fees on jointly managed projects is to be shared by DOI and the WUAs proportionately according to the amount of facilities managed by them The cost recovery goal of the irrigation policy is payment of 100 percent of the O&M costs of all projects whether jointly managed or not For the three projects examined in this study, irrigation service fees

have not covered the full cost of O&M in the first 3 years of turnover It is too early to tell if the repayment goal will be met in the long term Initially the WUA for the larger system hired a staff member to collect fees This has not worked satisfactorily so the WUA has now entrusted the task to the branch committee of the WUA After the government subsidy for O&M assistance runs out, the WUAs are looking at other means to raise money to pay O&M expenses Means being considered are selling of branches cut from trees during maintenance internal tax collection from vehicles using the canal bank roads, and fines and penalties for infractions in taking water or not paying water service fees

There is no policy for repayment of capital costs for water developments for municipal and industrial use The Water Supply Corporation of the central government collects tariffs from households that receive water from a water supply system There are no records concerning how the rates are fixed, but it is assumed that they are fixed to cover O&M costs

MANAGEMENT TRANSFER PROGRAM

The programs for transferring management of government-constructed water resources irrigation facilities to water user entities vary considerably in the six countries reviewed The following sections summarize the planning and implementation of these programs and the current statuses of the management transfer activity

Indonesia

The primary programs for turnover were enunciated in the 1987 Irrigation Operation and Maintenance Policy Statement " The objectives of the program are to eliminate government expenditures for O&M of small irrigation systems and achieve financial and physical sustainability of small irrigation systems through more effective mobilization of local resources and skills without sacrificing the productivity of irrigated agriculture

The turnover program is aimed at transferring management of schemes smaller than 500 hectares to WUAs There are about 813 000 hectares in these small schemes Small schemes totaling 200 000 hectares have been transferred as of 1996 The World Bank program (Java Irrigation and Water Resources Management Program-JIWMP) initiated in 1995 in four provinces has a turnover target of 357 000 hectares Pilot turnover programs are also being formulated for schemes between 500 and 1 000 hectares

Several programs with different approaches have been tried Planning for the turnover program included a qualitative assessment of water supply constraints irrigation distribution problems flood and drainage problems and the physical condition of facilities Planning also included defining the responsibilities of WUAs, a decision to repair facilities prior to turnover government retention of title to all project facilities to be turned over and providing training to WUA members and some government staff The JIWMP expanded this plan of turnover by including more farmer involvement in the planning process defining post-turnover support and detailing the steps and tasks for turnover

Implementation of the program included the initiation of Ordinance 42/PRT/1989 defining the procedures to be followed in turnover The government determined which systems would be turned over and the priority of turnover Implementation was managed by the provincial government under the guidance of the national Director General of Water Resources Development

Some of the initial problems encountered in implementing turnover were shortage of suitable staff, the need to train and retrain personnel delays in funding lack of coordination between interrelated activities, and adaptation of the national program to local conditions Implementation activities seem to focus more on the engineering aspects such as rehabilitation than on formation and training of WUAs

In those areas where turnover has occurred three types of WUAs have developed

- A single organization whose members and jurisdiction fall entirely within a single village area
- A federated entity responsible for an irrigation scheme, which consists of subunits with service areas located in more than one village
- Water service entities in irrigation schemes, which consist of service areas located in multiple villages, but where no federated entity exists Representatives from each village coordinate with each other to manage operation and maintenance

Although registration and training of WUAs have received considerable attention, it appears that in many cases, once a project is completed, irrigation management reverts to local customary patterns used prior to turnover Management transfer has, however, resulted in better and more equitable water distribution, even in areas where formal WUAs have been abandoned Current levels of maintenance, however, are inadequate, threatening to reduce performance in the medium term and increasing needs for major repairs and rehabilitation in the longer term There is also a lack of adequate support for WUAs after turnover

Cost recovery is not meeting governmental goals and, in fact, is deteriorating, providing less than 1 percent of the total national funding for O&M

Concurrent with the turnover program, decentralization of the provincial "Irrigation Service" to the district level took place with the goal of reducing overhead costs and other inefficiencies and to make services on irrigation schemes more responsive to farmers

The government s goal of reducing O&M costs is not being realized and the government is still retaining the function of assisting WUAs with major repair and rehabilitation

Sri Lanka

When the Mahaweli Project was planned, turnover of facilities to WUAs for management was not considered In the early 1980s, attempts to organize farmers into WUAs for managing water distribution channels at and below the distributary channel level were initiated A few different approaches were tried without much success

In 1992, the Mahaweli Authority adopted a new policy for the development of farmer organizations and turnover The main features of the program were

- All features related to water management and O&M were to be managed by committees whose members include agency personnel and farmer representatives
- The irrigation network at the distributary channel level and below were to be managed by farmer organizations
- The agency would operate and maintain the main and branch canals and storage facilities

Planning for this program included organizing farmer organizations at the distributary channel level, committees at the project's block level with agency and farmer representatives, and an operating committee at the project's system level with agency and farmer representatives

Implementation of the 1992 program was facilitated by an amendment to the Irrigation Ordinance of 1946 providing farmer organizations with the right to impose and collect charges to recover O&M costs, and giving them the necessary authority to enforce WUA rules The amendment also provided a legal basis for the Project Management Committees which had been operating informally in non-Mahaweli major schemes The Mahaweli Authority established a special unit to organize farmers and train them to manage facilities transferred to them They also had the task of training agency employees for the turnover program A special cadre of "institutional organizer volunteers' was also organized (1 500 volunteers) to work with farmer groups, but this effort failed due to lack of funds

Implementation included drafting of memoranda of understanding for turnover of facility management and ratification of these memoranda at 3-day workshops with WUAs By-laws for WUAs were also developed

Implementation of the program called for payment of O&M costs of the systems transferred to WUAs by the associations

Prior to implementation of the 1992 turnover program, 83 WUAs were registered out of a target of 212 Each WUA covers about 250 to 500 hectares The early policies adopted for turnover created a high level of dependency of farmer organizations on the government The agency contracted with WUAs to do channel maintenance, paying them for this task

Under the program adopted in 1992, about 730 WUAs had been registered as of 1997, however, only 154 WUAs had actually taken over management of distributary channel facilities

Water delivery has improved somewhat in the channels turned over to WUAs, but tail-end users are still less happy with operational performance than head-end users Farmers believe that maintenance is satisfactory However, agency personnel have mixed feelings about the quality of maintenance About 20 percent of the WUAs are involved in business activities such as selling farm inputs and marketing farm produce

Cost recovery does not exist Government efforts to collect money to defray O&M costs have ceased O&M costs for turned over facilities are now paid by the government rather than by the WUAs Money collected by WUAs is used for their business activities

Even though more WUAs have been organized under the 1992 program turnover is behind target and the WUAs are still highly dependent on the government and many do not function according to the criteria outlined by the program

Little or no change has occurred in the Mahaweli Authority's staff level as a result of turnover Staff reduction has been due to overall budget cuts, rather than due to turnover

In 1997, a pilot program was initiated to set up farmer organization companies All WUAs would be shareholders in a company formed at the block level in the project This company would operate and maintain all channels in the block and become involved in various business activities A board of directors would be elected from the WUAs in the block The government would provide initial seed money and second staff to the companies for a period of time to help the board of directors get started This program is currently being pilot-tested

Another activity which will affect the turnover program is the implementation of a World Bank-funded rehabilitation program in System H of the Mahaweli Project in which the Bank will assist the agency with improved turnover procedures, initiation of a cost recovery program, and a reduction in agency staff levels

Turkey

Two agencies in Turkey are involved in water resources development for irrigation and turnover of facilities to WSEs The General Directorate of Rural Services develops small groundwater and surface water projects and turnover is automatic after completion of the project The entity, usually a cooperative or village, to which the development is turned over, operates and maintains the facilities and pays the costs

Large projects are developed by the General Directorate of State Hydraulic Works (DSI) This agency has recently initiated a program to turn over parts of large projects for O&M to WSEs The following discussion concerns this agency s turnover program in the Gediz river basin The policies and program elements discussed also apply throughout the country

The DSI started transferring facilities to WSEs in the 1950s, primarily smaller and remote projects In 1993, the DSI developed a program for accelerated turnover of O&M of secondary and tertiary distribution facilities to WSEs In the Gediz river basin turnover has been completed for 110 000 hectares involving 13 WSEs The DSI continues to operate dams, pumping plants, and main canals The nationwide goal for turnover was set at 120,000 hectares per year However by May 1997 facilities serving 1 2 million hectares from surface water sources and facilities serving 500,000 hectares from groundwater sources were transferred to WSEs

The objective of the program is to reduce governmental O&M costs In preparation for the accelerated turnover program several DSI employees traveled to other countries which had been involved in turnover programs to learn about different approaches problems encountered and successes Planning for the program was accomplished by the O&M staff of the agency A special 3-man team was set up to plan and implement the program The heads of branch offices and operations engineers were involved in planning the turnover program Specific criteria, providing the best opportunity for success were developed for selection of the first areas in which to implement the program

Details of the turnover program were developed by the government and then presented to village leaders and town mayors in orientation seminars held over a 2-year period

Implementation of the program was done under the authority of an existing law (Municipality Law No 1580) Entities which assumed management of facilities include villages

municipalities and WUAs In the case of villages and municipalities the village leader or mayor serves as the executive officer, and village and municipality staff manage the facilities WUAs have elected boards of directors, passed bylaws and hired professional staff to operate and maintain the facilities Transfer agreements developed by DSI were consummated with each management entity WSEs pay all O&M costs of the transferred facilities and will be required to pay O&M costs of the major facilities managed by DSI These payments are to commence in 1998 with 25 percent payment in the first year increasing to 100 percent by the fourth year Implementation of the management transfer program consisted of five steps

- motivation and legalization of water users
- consummation of the turnover agreement
- transfer protocol (description of facilities, O&M manuals and maps)
- joint (DSI and WSE) preparation of O&M plans and budgets
- commencement of facility operation and maintenance by the WSE

Since turnover the WSEs have participated with DSI in irrigation planning for the season DSI officials report that operations of turned over facilities by WSE have been excellent Maintenance has also been done well but heavy equipment work has been somewhat of a problem because DSI is unable to sell or give excess equipment to the WSEs consequently, DSI either loans equipment to WSEs or does the heavy equipment work for them DSI and the WSEs are working on means for resolving this problem Cost recovery has improved considerably under WSE management, but rates will need to be raised in the future to build up emergency/reserve funds and to pay the O&M costs of the major facilities managed by DSI

Implementation of the turnover program under an existing municipal law has created some problems for the WSEs Uncertainty exists on what rights and legal authorities exist for WSEs As of 1997 DSI was drafting proposed legislation to correct this problem

The goal of the program was reduction in government O&M costs much of which consists of staff costs Initially, staff reductions were small and related to overall government staffing policies rather than to turnover but in 1996 and 1997 staff reductions have increased and are the result of turnover DSI offices in the Gediz basin have reduced staff by 25 percent in the last 2 years The DSI non-personnel costs for O&M for the Gediz basin facilities have been reduced by 70 percent since turnover Resolution of water service conflicts has also shifted from DSI to the WSEs, reducing this workload for DSI To date there has been no problem with political interference in the turnover program

USA

The policy of the federal government is to turn over management of irrigation facilities to WSEs after the construction of the project is complete For small projects in which the primary function is irrigation, all facilities including reservoirs are transferred to WUAs for management On large multipurpose projects major storage reservoirs other multipurpose facilities and hydropower plants are managed by the government but all irrigation facilities

are transferred to WUAs Water rights for the project are obtained by the federal government and guaranteed through contract to the WUAs Title to transferred facilities is retained by the government but conditions of use and maintenance are clearly spelled out in the contract with the WUAs The government is now developing some criteria for facility title transfer to WUAs but the program has not yet been implemented

The Colorado Big Thompson Project in the State of Colorado from which the Northern Colorado Water Conservancy District (NCWCD) gets its supplemental water supply was authorized for construction as a result of strong support from water users on the eastern slope of the Rocky Mountains and after reaching compromises with residents in western Colorado the source of the water supply Construction of the project was contingent upon consummation of a contract between a legal WSE and the government, to define terms for project cost repayment and the responsibilities of the WSE and the government

To prepare for construction and turnover, the Colorado legislature enacted the Water Conservancy Act which provided the legal basis for the formation of the NCWCD

Construction of the project commenced in 1938 but was delayed by World War II It was essentially completed in 1956

Transfer of single purpose water service facilities to the NCWCD occurred in 1957 The government retained management of hydropower facilities and multipurpose facilities In 1986, the government turned over the management of the joint use facilities to the district The O&M costs for the joint use facilities are shared 50-50 between the government and the WSE All O&M costs of the single purpose facilities are paid by the WSE By contract the NCWCD was required to pay US$25 million of the project s capital costs (interest free) over a period of 40 years

The district has maintained a high standard of maintenance and water service is consistent and well-managed In the first year of operation the NCWCD delivered supplemental water to 300,000 hectares but water use has changed over the last 40 years Now 32 percent of the water deliveries are for municipal and industrial uses Agricultural uses have declined

The NCWCD is meeting its obligations under its contract with the government Capital costs will be paid off in the year 2002

The government s O&M staff was reduced as a result of the transfer of joint use facilities to the district This has not however reduced O&M costs of government-operated facilities, charges that are passed on to the NCWCD Reasons adduced for this situation are increasing government activities and costs to comply with environmental, and fish and wildlife issues and a decrease in construction budgets, which were not accompanied by a proportional decrease in overhead costs

Mexico

The management transfer program entails delegating responsibility for limited aspects of the O&M of infrastructure on irrigation projects previously managed by the government The facilities include the irrigation channels, associated drainage systems and interior roads

As of November 1996 approximately 86 percent of government-built irrigation projects (3 3 million hectares) have been transferred Most WUAs receiving the transferred facilities have jurisdiction for modules of 8 000 to 20 000 hectares Transfer activity in the remaining areas and transfer of the primary conveyance works have diminished dramatically in the last

2 years for various reasons Some small farmers appear reluctant to assume responsibilities for fear of losing present subsidized services while some in CNA wish to retain a direct O&M role rather than risk additional loss of positions in the organization

The transfer of facilities in Mexico is similar to a rental agreement It has many of the characteristics of the associated maintenance and long-term sustainability of rented property and the services provided thereby

The WUAs have been created to assume responsibility for O&M of the individual modules when transferred The entity's board of directors elected every 3 years from the membership has the power to set policy, approve annual operations hire and fire staff assess service charges, and disburse revenues from the service charges

Limited Responsibility Societies comprising several WUAs may be created to assume O&M responsibility for portions of the primary conveyance facilities They function as a federation of WUAs with powers at the level comparable to an individual WUA and have been established on slightly more than 25 percent of the government s area

Ownership of facilities remains with the government and may result in little sense of responsibility in WUAs for prudent O&M sufficient to sustain the works on into the future unless the government maintains close oversight and enforces sound maintenance standards

Based on limited field data collected for a 2-year period, it appears that water delivery within the modules is fair and reasonable but the referenced data indicate an above-average water availability in the 2 years evaluated after transfer as compared to the annual precipitation in the years immediately preceding the transfer

It is too early to ascertain the adequacy of maintenance after transfer of management to WUAs for sustained use into the future

Nepal

The strategy of joint management and turnover of irrigation projects was drafted in the early 1990s Actual implementation of the policy began in 1993 by forming WUAs in five irrigation projects Currently implementation of turnover is reaching the final stage in three irrigation sub-projects The irrigation policy of 1996 contains the following elements concerning management transfer

1 Hill schemes up to 500 hectares and systems in the Terai up to 2 000 hectares that are developed by the government are to be turned over to WUAs Larger schemes may be turned over if WUAs are capable of managing the schemes

2 In systems currently managed by the government WUAs will be formed and a rehabilitation plan will be prepared upon consent by the water users WUAs will be responsible for O&M of the facilities

3 In schemes turned over irrigation service fees will not be collected by the government, but the WUAs may collect fees to pay for O&M costs

4 In systems identified by the government for turnover where WUAs are unwilling to participate in program implementation the government will stop any future works for system O&M

5 After turnover, WUAs recognized by the government will be responsible for O&M of the project Technical support beyond the capability of the WUAs may be furnished by the government

6 Before turnover, the government will consummate an agreement with the WUAs for the irrigation support and related structure development

In 1995, the Department of Irrigation (DOI) entered into an agreement with the Asian Development Bank to expedite, refine, and institutionalize the turnover process Eleven irrigation schemes are included in this program The project has been planned in two phases over a period of 7 years Criteria were devised for selection of the schemes The contractor employed to assist the government in implementing the program assessed the water resources, socioeconomic, economic, land use and agricultural situations in the eleven systems The capability of the farmers to organize WUAs and manage the systems was also assessed

The DOI hired a sociologist to introduce the management transfer process to the water users assess their capability, assist in organizing WUAs and assist them in development of bylaws and operating rules Training courses, workshops, and orientation sessions are part of the turnover program Fourteen training programs and workshops were conducted in 1997 System walk-throughs by DOI and WUA personnel for identifying rehabilitation requirements are also part of the management transfer program DOI is responsible for the rehabilitation program WUAs are to contribute up to 10 percent of the capital costs in cash or labor

In all three sub-projects reviewed, WUAs have been formed, registered and fully involved in joint management affairs All have offices and one system's WUA has hired office administrative staff Part of the facilities has been turned over to the WUAs, and action is currently under way to turn over the remaining facilities in the two smaller systems In the largest system, the government will retain O&M responsibility of the headworks DOI is also transferring certain pieces of heavy equipment for maintenance to the WUAs The WUAs organize branch committees to operate branch canals and supervise the workforce A district level federation of about 35 WUAs has been formed in the Chitwan District in which two of the three systems reviewed are located The federation is to coordinate district-wide management transfer activities with DOI

The DOI is providing post-turnover support for 3 years On the largest system reviewed, DOI support staff will be reduced from 19 to zero over this time frame DOI is also providing a cash subsidy to the WUAs in the three post-turnover years Long-term support will consist of training research and engineering services as required and emergency rehabilitation of works damaged by natural disaster DOI and the WUAs will carry out annual maintenance inspections

Presently DOI staff do not seem to have much difficulty in internalizing the turnover program into the agency s functions However, other line agencies directly associated with the program s implementation have not shown a marked enthusiasm toward the program DOI has not been diligent in coordinating the program with these agencies Farmers seem to be positive about the program and are cooperating fully in the management of the systems Membership in WUAs and irrigation service fee collections are increasing

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