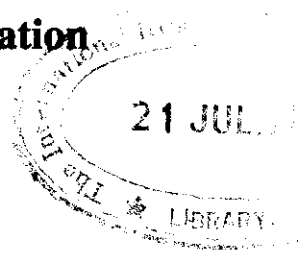
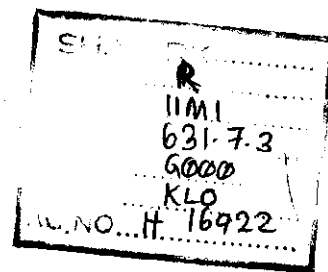


Short Report Series
on
Locally Managed Irrigation

Report No. 12



**SYNTHESIS OF ISSUES DISCUSSED AT THE
INTERNATIONAL CONFERENCE ON
IRRIGATION MANAGEMENT TRANSFER**

Wuhan, China, 20-24 September 1994

Wim H. Kloezen and M. Samad

April 1995

H 16922 C2

Program on Local Management

INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE

Kloezen, W.H. and Samad, M. 1995. Synthesis of issues discussed at the International Conference on Irrigation Management Transfer, Wuhan, China, 20-24 September 1994. Colombo, Sri Lanka: IIMI. v, 20p. (Short report series on locally managed irrigation, no. 12)

irrigation management / irrigation systems / maintenance / irrigation design / farmer participation / local management / operation / privatization / legal aspects / policy / rehabilitation / financing

© IIMI, 1995

All rights reserved

Production of this paper was financed by IIMI's Privatization and Self-Management of Irrigation Project funded by the German Government (BMZ/GTZ)

IIMI International Irrigation Management Institute

P.O. Box 2075, Colombo, Sri Lanka.

Telephone: 94-1-867404 Telex: 22318 IIMIHQ CE

Facsimile: 94-1-866854 E-Mail: IIMI (CGNET), IIMI@CGNET.COM (INTERNET)

Purpose of the Series

The *Short Report Series on Locally Managed Irrigation* is designed to disseminate concise information on the role of local management in irrigation and irrigation management transfer or turnover experiences and policies. The *Series* is distributed worldwide to a broad range of people—policymakers, planners, researchers, donors and officials in both public and nongovernmental organizations—who are concerned with the irrigated agriculture sector. IIMI's goal is not to promote policies such as irrigation management transfer, but to enhance the knowledge base available to decision makers and advisors as they face questions of policy adoption and strategies for implementation.

Locally managed irrigation can be of many types, such as traditional farmer-constructed diversion or tank schemes, indigenous and often new lift irrigation, government-constructed but farmer-managed irrigation systems and systems where management is or has been transferred from an outside agency to a local user organization.

By "irrigation management transfer" we mean some degree of transfer of responsibility and authority for irrigation management from the government to farmer groups or other nongovernmental entities. This generally involves contraction of the role of the state and expansion of the role of the private sector and water users in irrigation management. In other words, there is a shifting upstream of the point where management responsibility and control of the water supply are transferred from the irrigation authority to local management. This may involve changes in policies, procedures, practices and the performance of irrigated agriculture. It may or may not involve "privatization" of ownership of the assets of the irrigation system. The *Short Report Series* addresses questions such as the following:

What are the necessary conditions which support viable locally managed irrigation?

What socio-technical conditions, institutional arrangements and change processes lead to sustainable locally managed irrigation?

What is the range of different models that are being applied worldwide for turnover or transfer of responsibility for local management for recently developed irrigation?

What are the effects of management transfer on the productivity, profitability, financial viability, equity, efficiency and sustainability of irrigated agriculture?

What are the perspectives of farmers, managers, policymakers, urban consumers and other stakeholders in irrigated agriculture about irrigation management transfer?

What adjustments in government may be needed as a result of turnover to provide support to locally managed irrigation systems and to improve productivity in the public sector?

The Short Report Series is produced by the **Program on Local Management** of the **International Irrigation Management Institute (IIMI)**. Support for the Series is provided by Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH through the Privatization and Self-Management of Irrigation Project (No. 91.7860.9-01.288). Individuals wishing to contribute to the Series or otherwise correspond about the Series, are invited to direct communications to the editors of the Series:

Dr. Douglas Vermillion or Dr. Sam H. Johnson III,
Program on Local Management, IIMI,
P.O. Box 2075, Colombo, Sri Lanka.
Fax: 94-1-866854; Telex: 22318 IIMIHQ CE;
E-Mail: IIMI (CGNET), IIMI@CGNET.COM (INTERNET)
Telephone: 94-1-867404

Editors' Note

The International Conference on Irrigation Management Transfer, held in Wuhan, China during 20–24 September 1994 brought together 220 participants from 28 countries around the world. These included policymakers, planners, academics, irrigation system managers, technical assistance experts, farmers and donors. The transfer of management of irrigation systems from governmental to nongovernmental organizations is a global movement with many causes, variations and results. It can mean transfer of responsibility for any or all of the roles of financing irrigation, diverting and/or distributing water through irrigation canals, maintaining infrastructure, rehabilitating systems, managing water-related disputes, allocating water rights or planning crop calendars. It can include transfer of management authority over an entire irrigation system or only over tertiary or distributary canals of a medium- or large-scale system. Management can be transferred from government agencies to farmer organizations, third-party contracting firms, NGOs or irrigation companies. The role of farmers can be direct management, representational supervision of direct-hire workers, or establishing governance and leadership arrangements to oversee a professional, management organization. Management transfer is often initiated by governments because: (a) they lack funds to manage irrigation systems, (b) they are unable to collect water charges from farmers, or (c) they have a poor record of management performance. But sometimes, farmers seek to take over management of irrigation systems from the government, assuming that they can manage the systems more cost effectively.

Discussions at the Conference reflected the great variety of approaches to irrigation management transfer (IMT) and contexts within which IMT is occurring. Participants at the Conference discussed the policies and preconditions (physical, technical, socioeconomic, institutional and agricultural) that are believed to be either supportive or detrimental to the realization of successful transfer programs. The various kinds of policy, institutional and managerial arrangements and planning tasks which could be used in transfer programs were discussed, and the different implementation processes being used—approaches toward legislation, organizing farmers, training, and rehabilitation—were compared. The participants discussed the results and impacts of transfer programs which are emerging, including the effects on government budgets, cost burdens on farmers, quality of operation and maintenance (O&M), productivity and profitability of irrigated agriculture, incomes of farmers, environmental consequences and gender relations. Another topic frequently raised was the kinds of support services locally managed irrigation systems would need after management transfer to ensure their sustainability.

This short synthesis cannot capture the full richness of the discussions. It is rather an inventory of the most important and commonly mentioned issues and recommendations put forward by Conference participants. A complete list of Conference papers is included at the end of this Short Report for reference. We wish to thank the participants of this Conference for sharing their experiences and insights. We also welcome comments and reactions to this short report and other reports in the Series.

SYNTHESIS OF ISSUES DISCUSSED AT THE INTERNATIONAL CONFERENCE ON IRRIGATION MANAGEMENT TRANSFER

Wuhan, China, 20–24 September 1994

*Wim H. Kloezen*¹
*M. Samad*²

INTRODUCTION

The International Conference on Irrigation Management Transfer held in Wuhan, China during 20–24 September 1994 was organized jointly by the International Irrigation Management Institute (under its Local Management Program), Wuhan University of Hydraulic and Electrical Engineering, Hubei Association of Science and Technology, Hubei Association of Hydraulic Engineering, Hubei Province Ministry of Water Resources and the National Ministry of Water Resources.³ Over 220 participants from 28 countries attended the Conference.

The overall objective of the Conference was to enhance policymaking, planning and implementation of irrigation management transfer (IMT) programs worldwide through the exchange of information and experiences among a large number of professionals from many countries. The large number of participants and the animated discussions at the Conference demonstrated the strong interest many countries have in IMT. During the discussions, many issues and findings emerged regarding: the necessary preconditions for enabling management transfer, transfer strategies, different models of locally managed irrigation, agency reorientation, changing state-farmer relationships, financing O&M and structural system improvements, and how to make locally managed irrigation sustainable after transfer.

More than 100 papers were presented at the Conference (IIMI 1994), in plenary and parallel sessions. This review attempts to synthesize the discussions that followed the presentations in parallel sessions. Lists of chairpersons and all papers presented at the Conference are included after this report. A review and synthesis of the papers, as well as a selection of 32 papers are to be published soon by FAO and IIMI. Papers were presented and discussed in six parallel sessions. Chairpersons were invited to steer the discussion to the following broad issues:

-
- 1 Associate Expert, Irrigation Management, IIMI (Headquarters), Colombo, Sri Lanka.
 - 2 Research Associate, IIMI (Headquarters), Colombo, Sri Lanka.
 - 3 Main donors for the Conference were the Ford Foundation, Canadian International Development Association (CIDA), Food and Agricultural Organization of the United Nations (FAO), German Federal Ministry for Technical Corporation (BMZ), International Development Research Center (IDRC), OXFAM, Australian Catholic Relief Services, United States Agency for International Development (USAID), Overseas Development Agency and the Mekong Secretariat.

1. In a given country, what conditions effect the success or failure of an IMT policy? These may include legal, socioeconomic, institutional, environmental, physical and technical conditions.
2. How should the process of irrigation management be implemented? Implementation may involve strategic planning and policymaking, organizing water users associations, reorientation of public irrigation agencies and improvement of irrigation infrastructure and management.
3. What supporting conditions are needed to ensure the long-term viability of locally managed irrigation? These may include the financial viability of irrigation, long-term physical sustainability of irrigation systems and water supply, and the strength of management organizations.

This report is mainly based on the notes and minutes submitted by the chairpersons of the sessions. Not all topics of potential relevance to IMT were discussed during the sessions and, therefore, this report does not give a complete review of all relevant topics. This synthesis gives the essence of the issues raised by the participants under the following sections: (1) Rationale and Motivation for Irrigation Management Transfer, (2) Experiences of Implementing IMT Programs, and (3) Supporting Viable Locally Managed Irrigation after Turnover.

RATIONALE AND MOTIVATION FOR IRRIGATION MANAGEMENT TRANSFER

Irrigation Management Transfer refers to a range of strategies adopted by governments to transfer the management of irrigation systems from the state to water users or other nongovernmental entities. What is being transferred may include management of an entire irrigation system (as has occurred for example, in Australia, Japan, USA and Spain); management of sub-sections such as a distributary canal (as in Sri Lanka and the Philippines); financial responsibility for operation and depreciation costs (as in China); or responsibility for the provision of support services for irrigated agriculture (as in Colombia and Sudan). IMT is now a major component of national agrarian policy in more than 25 countries worldwide and is being implemented under a variety of labels.

Conference participants indicated that the reasons why IMT programs are being implemented vary by country. In a majority of countries, the primary motive for IMT is to curb public expenditure on recurring costs of irrigation in light of mounting fiscal difficulties of governments. In addition, there seems to be a consensus that IMT programs should involve at least three contingent strategies: improvement of the delivery of support services, empowerment of farmers and the long-term financial viability of irrigation systems. The driving forces behind these objectives include:

1. The perception that public irrigation agencies lack the incentives and responsiveness to optimize management performance.
2. The claim that farmers have a direct interest in the cost-efficiency of irrigation and in preventing the deterioration of irrigation systems so as to better ensure financial sustainability of irrigation.

3. The assumption that a management system which is more accountable to farmers will be more equitable and responsive.
4. The view that the cost of service provision should be borne by the beneficiaries.

The motivation for IMT initiatives often emerges from finance and planning departments rather than irrigation agencies. Case studies indicate that pressure from external agencies has induced some governments to curtail their role in irrigation management and devolve some of the functions to irrigators. In other cases, the pressure has come from within the government. For example, the transfer program in Mexico was greatly influenced by broader national economic liberalization and Mexico's new membership in the North American Free Trade Agreement (NAFTA). In contrast, the management turnover program in Mexico was being implemented at the initiative of USAID, the US development agency. International institutions such as the World Bank, the Inter-American Development Bank, the Asian Development Bank and the African Development Bank have promoted IMT in several countries in Latin America, Asia and Africa, including Mexico, Colombia, Chile, Ecuador, Indonesia, the Philippines, Bangladesh, Nepal, Sri Lanka, Turkey, Madagascar and Senegal.

Although interest in IMT is widespread, most governments neither have a clear policy on IMT and its relation to other policies and reforms, nor are the objectives of the programs clearly defined. The multiple goals that IMT reportedly serves makes it difficult for any simple characterization of turnover policy. In many instances, there is only a partial commitment to transfer. Common patterns seem to be emerging internationally. Many governments see IMT as a means to relieve budgetary pressures and often ignore essential preconditions for success. Transfer programs have most often been "top down" and one-sided with the primary focus on achieving state objectives. Experiences in Australia, the USA and in the Coello and Saldaña systems in Columbia are exceptions: farmers wanted and demanded IMT, and even hired lawyers to negotiate with the government on issues relating to IMT.

Discrepancies between official statements and ground-level reality show that there is no common understanding of how far the process should go and how the different interests and objectives of concerned actors can be integrated. Such diverse interests include the government's goal of food security, water sector policies, social welfare, financial austerity and agency fears about job security. Farmers' main priorities tend to be achieving higher incomes and improving the quality of irrigation service. Conference discussants suggested that if governments decide to adopt a "top down" approach, they should at least make their policies clear to farmers, preferably giving a time frame for the transfer process, a clear strategy and definitions of roles of farmers and agencies.

In this context, it is important to take into account the perception of farmers regarding IMT. This would require participatory planning dialogues before initiating the transfer process. Literacy of farmers, their economic position, political affiliations, caste, gender and religious characteristics all shape the ability and ways in which farmers can participate with governments in IMT programs. In addition, governments should be in a position to demonstrate the benefits of IMT to farmers; otherwise IMT can be easily thwarted by the resistance of farmers (as well as agencies).

EXPERIENCES WITH IMPLEMENTING IMT PROGRAMS

The Conference provided an excellent forum to review the experiences of implementing IMT programs in various countries. This review included implementation strategies, forms of

management transfer, the need for reorienting public irrigation agencies, and the need for irrigation system rehabilitation.

IMT Implementation Strategies

Although some form of IMT is being implemented in more than 25 countries, it was clear from the discussions that implementation strategies are very diverse. However, certain aspects of IMT were recognized as necessary, no matter what type of institutional setting is dominant within a country.

Policy Match and Clarity

Conference participants noted that one of the major preconditions of any irrigation management program is that it should be absolutely clear to both implementors and beneficiaries what the program is about, who has what responsibilities and what the likely benefits will be. IMT programs are generally associated with a wider range of economic and institutional reforms, such as liberalization; privatization; structural adjustment; legal reforms such as changing water laws; and irrigation rehabilitation programs. These often complicate the strategies that have to be followed to implement IMT programs. For instance, there should be a match between food security policies and policies that are geared toward individual welfare and equitable sharing of land and water resources. The objectives of these policies often contradict each other. In the case of IMT policies, this has often resulted in lack of **clarity** about government policies and of rights and responsibilities of farmers and agencies. This can weaken both the **credibility** of government policy and the **legitimacy** of farmer organizations. Lack of clarity, credibility and legitimacy can jeopardize the success of any IMT program. IMT for the wrong reasons and by default can be counter-productive and misleading.

Intervention Strategies

Although many governments have, to some extent, implemented IMT programs, the strategies that are followed in these programs are poorly documented. Often, the only documentation available describes the official process and formal procedures that should have been followed. As programs differ in their context, scale, time frame, objectives and actors involved, no blueprint model can work everywhere. However, Conference participants noted several basic guiding principles which should have relevance in most contexts:

1. A gradual, participatory IMT strategy is necessary to ensure proper institutional development.
2. Key issues in the IMT process are to define clearly the intended transfer of rights, to whom the rights are being transferred, and what level of continued state support and services will exist after turnover, as appropriate to specific sectors or regions.
3. Agencies do not always sufficiently realize that considerable costs are involved in transfer processes.
4. In many cases, irrigation agencies can only implement IMT programs with help from external agencies. This has the danger of a certain degree of "projectionization."

IMT programs can easily become (or induce) new bureaucracies within existing irrigation bureaucracies.

5. Often, it is probably not very effective to have the primary agency, which sometimes feels threatened by IMT, as the agency charged with the responsibility of implementing it.
6. Continuous monitoring and performance evaluation must be built into the process to determine the quantity and quality of turnover, using limited but effective indicators.
7. To the extent possible, farmers should have responsibilities for implementing the program.

Legal Reforms

Financial and institutional reforms like IMT dramatically change the ways in which both natural and financial resources are allocated, distributed and used. Hence, legislative reform is often a prerequisite to giving user rights (especially water rights) to newly established management entities regulating over-exploitation of scarce resources. Only in a few countries, new water laws have preceded irrigation transfer programs (such as Mexico and Chile). In other countries (such as Sri Lanka and Indonesia), new legislation has given greater authority to farmer organizations without giving them explicit water rights. In general, participants agreed that legal reforms should precede irrigation management programs, although some argued that it is **not** necessary to define water rights of farmers in the initial stages of IMT. According to some discussants, water rights can be defined over time, as the IMT process gains experience.

Representation

IMT should have strong high-level political support and should mobilize or encourage full support from both farmers and agency staff. Imposition of organizational structures during the process of IMT, without regard to the existing institutional setting, social habits and traditional values of rural communities, will very likely lead to failure. Sufficient time and preparation are needed for negotiating with all concerned actors at each stage of the transfer process, before management responsibilities are transferred to farmers. This necessarily implies that strategies and processes should be open-ended, leaving sufficient flexibility for change. Cases in Rajasthan, Indonesia and Nepal, where IMT was reported to be of a "top down" sort and donor driven, show that the irrigation bureaucracies tried to retain their position because farmers did not follow a "proper" process (i.e., the one that was suggested by planners and policymakers). A third party may be required to serve as a catalyst to overcome farmer apathy and the paternalistic relationships that often exist between irrigation agencies and farmers.

Conference participants emphasized that implementation of IMT needs to be carried out in a carefully staged way, which allows adequate time and effort in training and motivation, making use of existing farmer organizational skills and experience. The recognition by government agencies of capacities and skills of existing farmer groups is very important for the success of IMT. However, this does not necessarily mean that farmers themselves are

aware of these capacities and skills. In some cases, farmers themselves underestimate their ability to manage irrigation schemes. But persistent efforts by government agencies and organizers of farmer associations have shown (in the Philippines, Indonesia, and Mexico) that farmers are able to both organize themselves and effectively manage the systems. Some discussants also pointed out that planners and policymakers rarely recognize the roles and rights of women in the IMT process. In general, women are not involved and not considered as important stakeholders in locally managed irrigation. As a consequence, in most IMT programs, water users associations are mainly established by and for the participation of men, excluding women explicitly or implicitly.

Forms of Management Transfer

At the Conference, it was repeatedly emphasized that transfer programs vary according to the following aspects:

1. Type and size of the system and technologies included.
2. Specific responsibility to be turned over (operation, maintenance, financing, support services).
3. Charter of authority (internal with the users or external with the state).
4. Kind and size of management entities involved (agencies, farmer organizations, board of governors of irrigation districts and irrigation companies, individuals, banks).
5. How both capital and operational costs are to be recovered (such as through subsidies, irrigation service fees, cross-subsidization).
6. Kind of legislation that supports local management of resources (such as water rights, laws that vest ownership and authority with farmer organizations and individuals).
7. Socioeconomic and political environments in which IMT programs are implemented.

These variables put each form of locally managed irrigation somewhere along the spectrum between full state-managed irrigation and farmer-managed irrigation. Countries such as the USA (Columbia River Basin) and Australia (Coleambally irrigation area) have transferred complete ownership and management of irrigation systems to water users associations. In other countries, IMT has involved a shift to jointly managed systems. The variables given above characterize each case in terms of level of accountability of management to farmers, level of separation between management and ownership, level of financial and organizational autonomy and the level of specialization of management tasks to be executed by the different actors involved. Although no attempt was made at the Conference to produce a common typology of different management forms, different management models were discussed extensively and these are important issues in the transfer process.

Sharing O&M Responsibilities

In many cases, IMT merely involves "sharing" the labor and resources that are necessary for O&M between different levels of irrigation systems. This so called joint management model is the most common model followed in transferring irrigation management responsibilities to farmers, especially for medium- and large-scale irrigation systems. This model is dominant in most Asian countries where full transfer is not common (with exceptions such as Taiwan, Korea and Japan). However, full transfer for small-scale systems is done in the Philippines, Indonesia and Sri Lanka. Many participants argued that the major drawbacks of joint management are the lack of a clear separation between ownership and management, the lack of clarity about financial responsibility, the lack of full rights of self-governance and self-management (including water pricing and distribution of revenue) vested in the user organization, and the lack of accountability of agencies (which manage the intake and main canals) to farmer organizations. Another problem reported is the frequent lack of accountability of farmer leaders to their own organizations.

Some doubts were raised whether models other than joint management could be introduced in South and Southeast Asia, given the small size of farm holdings and the difficulties of establishing federations of water user organizations that could deal with larger parts of systems or even multiple systems. However, other participants saw no necessary correlation between the size of farm and mode of authority. Experience of IMT in Nepal and the Dominican Republic demonstrates that small farms are not necessarily an obstacle to the full transfer of management to farmers. Weak political commitment to institutional and financial reforms that give clear rights and authority to users is seen as the main obstacle to introducing alternatives to joint management.

To a degree, some of the above drawbacks of joint management seem to have been overcome by more recent and innovative management models that were introduced in China. Two examples of innovative management models are indicated below:

Contract Responsibility System. The Chinese experience with irrigation management devolution shows the need for and benefits of strong incentive arrangements for management. The Production Responsibility System and the Contract Responsibility System introduced in the 1980s in the water resources sector have dramatically changed the farmer-state relationship, as system management became separated from government sponsorship. Irrigation system management is now fully financed by farmers. Management is done by irrigation districts and contracting organizations. The contract organization can be a company, a group of farmers, a joint household or even an individual. The contract system has increased competition (bidding) for the right to manage the irrigation system, which reportedly has improved management performance. Throughout China, in irrigation districts, water is generally delivered on the basis of payment of water charges by the users. Some differences in views exist over whether contract management or direct management by professional village irrigation teams has better accountability to farmers.

Collective Shareholding System. The Contract Responsibility System has its own limitations. Some contract targets, such as quality of work, are difficult to operationalize. Some contractors may pursue short-term gains which may induce rapid deterioration of physical infrastructure. To overcome these problems, collective shareholding systems have emerged in some areas in which fixed irrigation assets are converted into shares. Shareholders can be a collective, a company, a community or individuals. Shareholders have equal rights to own irrigation system assets and share profits. Preliminary indications are that this can lead to improvement of cooperation, management performance, monitoring and supervision.

Irrigation Service Fees

A common concern among participants was how financial responsibility for operational costs should be shared between the state and water users. Although some argued that IMT cannot mean complete withdrawal of support and subsidies, there was a general agreement that realistic water pricing needs to be implemented before IMT, and that farmers should be involved in setting the charges. It was reported that in Indonesia, farmers who never had to pay water fees were the least willing to assume O&M responsibilities. Participants agreed that from the onset of any turnover process, farmers need to understand that water charges are inevitable and that there will be no further subsidy. In all cases there should be a clear policy on the mode and extent of financial support for O&M after turnover.

Few countries represented at the Conference have yet been able to establish a sound system of sharing financial responsibilities for O&M between the state and the water users. This is especially true in the case of jointly managed systems. However, there seems to be enough evidence to suggest that willingness to pay for water is reasonably high, provided water delivery is ensured. Cases in Vietnam and China and groundwater irrigation in India show that when benefits of turnover are clear, users are willing to pay more for water and the services they receive. On the other hand, in systems where water was once given free or at very low cost, it becomes almost impossible to increase water charges without coercive measures. Several participants argued that greater efforts should be made to commercialize irrigation, as is commonly done with other aspects of agriculture. Commercialization could mean the financing of irrigation through buying and selling water, paying fees from agricultural profits or raising revenue from sideline enterprises.

In Colombia, IMT has involved the establishment of system-specific water fee rates which reveal the approximate actual cost of water. In China, IMT has included the development of new methods of cost recovery through the collection of irrigation water fees, maintenance labor contributions and the development of diversified enterprises to cross-subsidize the cost of operation and maintenance. Such operations are viewed as a method of helping irrigation districts to raise funds, put excess workers to productive use and relieve pressures on central government treasuries. Some participants reported that water fee rates that are standardized across systems do not ensure local financial sustainability or create incentives for cost efficiency. Fees should be based on a compromise between the actual cost of water supplied by the management, the ability of farmers to pay and the availability of sideline revenues to subsidize O&M costs. In China, standard water charges are generally considered to be too low to cover the full cost of water.

Cross-Subsidization

Few IMT programs explicitly incorporate cross-subsidization or alternative support mechanisms for funding O&M. Exceptions are found in China where expenditures for irrigation O&M by central or provincial governments are prohibited by the law. In addition to collecting irrigation service fees, irrigation districts and water management units are encouraged to develop a diversified economy of sideline enterprises to help finance O&M costs and improve the living standard of irrigation staff. These reforms are viewed as creating a favorable condition toward financial autonomy or self-support from funds to be generated by the irrigation district itself (which is no longer considered as a government agency and whose staff are not civil servants). Similar developments were observed in the case of the Colombia Basin in the USA, although farmers there receive considerable indirect operational

subsidies in the form of the very low price they pay for electricity to pump water out of the river basin.

Political Commitment to Reorienting Public Agencies

IMT should involve a strategically planned reorientation of public irrigation agencies away from a mandate for direct management gates and structures to one that is a higher-level regulatory authority and support services. However, often IMT programs are implemented without such reorientation (such as in Indonesia or Sri Lanka). This can lead to some resistance to IMT by the irrigation agency.

Political support at the highest level for institutional reforms during and after management transfer is essential for any of the management transfer models to be introduced. Involving farmers in financial and institutional changes at the local level generally requires a dramatic reorientation of the agencies involved. However in many cases, such political support for institutional change is seriously lacking. Some countries are only interested in reforming irrigation management if these reforms are limited to lower levels of systems, so that agency involvement in main canal levels of irrigation systems and at administrative levels remain unchallenged. Successful turnover means that farmers need to obtain real power over decision making, even at the higher levels. Agencies are often reluctant to share or devolve managerial authority to the farmers. This is true both in attempts to organize strong water user organizations as well as to reorient the agencies from control to support service functions.

A critical issue in IMT is redefining the role of public irrigation agencies in the post-transfer period. This is an area which has remained largely neglected. A key role such agencies could play is to create an enabling environment for local governance, provide technical and auditing services and facilitate mobilization of finances, local resources and skills. Agencies could also play more regulatory roles in the fields of disaster management and protection of water resources. Participants generally expressed the view that state agencies should not withdraw completely from the irrigation sector and that some sharing of responsibilities is unavoidable.

Reorienting agencies implies that old, direct management roles and functions cease to exist, and new regulatory and support service roles will be created. This inevitably means that changes among agency staff should take place. During the Conference, it was made clear that staff issues were a major concern in most IMT programs and they comprise one of the most serious impediments to implementation. Many countries do not have a clear policy on what will happen to agency staff after turnover has occurred. Until recently, the turned over irrigation districts in Colombia were unable to retrench staff members at will. The districts struggled for years to retrench excess staff members against powerful legal and political obstacles. In contrast, Mexico has had strong political support and as a result the irrigation districts have been able to eliminate excess staff, thus increasing their operating efficiency and reducing operating costs.

Financial Autonomy of Agencies

One of the reasons agencies resist management transfer is that it often requires them to become accountable to farmers. It is widely assumed that a powerful way to make agencies change institutionally is to make them financially autonomous and independent of state support, i.e., the charter of authority is transferred to the users or shareholders of irrigation systems. Some

participants hypothesized that fully autonomous organizations managing single irrigation systems will exhibit the highest performance, while agencies which are only partially autonomous will have only limited accountability to the users, which will impede their performance. Most Conference participants seemed to support the financial autonomy hypothesis. The clearest examples of full financial autonomy are found in China, Chile, Spain and the USA.

As discussed earlier, in China, this has stimulated the development of numerous means for cross-subsidization through sideline enterprises. The National Irrigation Administration (NIA) in the Philippines is an example of an agency that has become partially independent of state financing. Although farmers have little control over NIA itself, it is apparent that NIA has become more innovative and performance oriented as a result. On the other hand, it remains unclear as to how sustainable the "NIA model" is. Some participants claimed that NIA has succeeded in establishing a new management model that is leading to higher performance. Others noted that recent developments show that it cannot sustain itself financially, if it is solely dependent on irrigation fees. Insufficient irrigation fees collected from farmers has brought NIA into a financial crisis.

IMT and System Rehabilitation

In many cases, IMT is preceded by, or comes together with, the improvement of system infrastructure. In the initial period of an IMT process, external funding is often necessary for rehabilitation. Donors support high capital investment that is associated with rehabilitation and investment in human resource development, which is part of the IMT process. In either case considerations about infrastructure design should recognize the particular needs of irrigation management turnover, especially future maintenance and operational costs and the technical and managerial capacities of farmers and the staff they are able to hire.

Rehabilitation Before, After or Not At All?

It is often assumed by policymakers that rehabilitation prior to turnover will better motivate farmers and enable them to take over management. The argument is often made that restoring a system to full functional order will improve the productivity and profitability of the irrigation system and will lower the future costs of maintenance. However, if rehabilitation is done without farmer participation or investment, it can weaken farmer capacity to take over management and the work may not be compatible with farmer preferences. Also, rehabilitation of inherently uneconomical technological devices such as public deep tubewells in some locations cannot be expected to have sustainable results. The Grameen Bank in Bangladesh recently decided not to take over deep tubewells that are not cost effective. Due to its recent experiences with uneconomic deep tubewells, the Bank is now assessing the economies of wells very carefully before taking them over.

Involving Farmers in Design and Construction

Several participants noted that IMT will not be successful when farmers are not involved in designing water distribution structures and selecting their locations. Experiences from India, the Philippines and Indonesia show that if farmer participation in design, construction and

rehabilitation is full, and not perfunctory, designs are enhanced and more farmers will be able to receive water. In Nepal, where farmers were not involved in the planning and design stages of deep tubewell development, it was difficult to convince farmers to take over O&M responsibilities. Farmers perceived that management of the tubewells was beyond their technical and financial capacity. Farmer involvement in rehabilitation, design and construction is relatively simple for small systems, where cooperation and participation by farmers can be more readily sought and guaranteed.

SUPPORTING VIABLE LOCALLY MANAGED IRRIGATION AFTER TURNOVER

Participants at the Conference suggested that for long-term viability, the development of appropriate institutional frameworks is necessary, both at the user level and the agency level. Where there seems to be little doubt about the willingness and capacity of user organizations to sustain themselves institutionally, much doubt was expressed about agencies in this respect. For instance, in Niger, Sudan and Senegal, turnover has been followed by a near institutional vacuum as the government agencies withdrew from irrigation prior to formation of viable farmer organizations. Consequently, existing regulations for water use tend to dissolve, resulting in some chaos and a rapid increase in the use of water in some areas. This again shows the need for agencies to identify new roles which should help establish legal, institutional and environmental parameters within which locally managed irrigation can be supported. A major issue raised repeatedly at the Conference was the need for different forms of financial support for transferred irrigation systems.

Profitability

Low profitability of irrigated agriculture, such as that found in Northeast India, Sri Lanka and parts of Africa, can weaken the ability of farmers and the incentives to finance irrigation management. Therefore, turnover programs should be accompanied by programs that stimulate long-term profitability of irrigated agriculture: clear credit and marketing policies, crop diversification, and the freedom of farmers to choose which crops are to be grown. Governments may need to ensure the timely supply of other inputs as well, such as fertilizers and high-yielding seed variety. However, these preconditions to sustainable irrigated agriculture after turnover were not discussed much by participants.

Subsidies

Adequate financial resources to meet operational costs after turnover was a key issue raised by the participants. The question whether governments should continue some form of subsidization after turnover, or whether financial support from the state should cease to exist was a topic of much discussion. Some argued that turned over schemes that have not proved to be financially viable should continue to be subsidized. One example given was the Grameen Bank's program to take over the management of public sector deep tubewells in Bangladesh. Three reasons for continuing subsidies were given: (1) the Bank's main mission is to help the poor; (2) the program was about turnover of deep tubewells to the Bank, not directly to the

farmers; and (3) the Bank still believes that eventually it can turn around its poor financial record and make the deep tubewell program a viable enterprise. However, there are a few conditions that hinder this attempt. A major problem the Bank faces is a competing deep tubewell program by the Public Ground Water Development Board (with more favorable terms for farmers), which creates a negative incentive to farmers to participate (at a higher financial cost) in the Grameen Bank's deep tubewell program.

Multiple-Function Organizations

Rather than continuing government subsidies, participants suggested that alternative or sideline revenues should be raised where possible. A general opinion was that farmer groups should be encouraged to build up a reserve fund which could be utilized in emergency situations and for the improvement and expansion of systems. The question, however, is from where the funds for these reserves should come. The case of China shows the possible advantages of developing multiple income activities by water management groups. Some doubts were raised as to whether cross-subsidization would be possible and desirable under the conventional model of joint management, particularly in south Asia. It was felt by some that there is always a danger of irrigation organizations neglecting irrigation, particularly, if they take on other activities which are more remunerative. Farmers often feel the need to expand the scope of their irrigation organizations not necessarily to subsidize irrigation per se but because of the inadequate provision of required services such as the supply of seeds and fertilizers. On the other hand, irrigation organizations cannot be prevented from engaging in activities they are interested in. The key issue is how to optimize and balance sideline income earning activities and irrigation functions within the same organization.

Supporting Structural Improvement for Locally Managed O&M

The design of irrigation infrastructure should be appropriate to local management capacities. In order to meet this condition, user involvement in both design, and operation and maintenance is a prerequisite to the long-term physical viability of irrigation systems. In several discussions, it was argued that systems that are controlled by users are more likely to place higher priority on maintenance than systems that are controlled by an external public agency, because of the sense of ownership of the users. Other participants argued that farmers tend to defer maintenance in order to maximize short-term gain because they assume that eventually the government will return and rehabilitate deteriorated systems. Therefore, successful transfer requires a clear statement of policy that O&M costs (and perhaps rehabilitation costs as well) will not be subsidized in the future. Otherwise farmers are likely to let their systems deteriorate.

Some participants suggested that water user groups should create capital replacement funds. These funds can be created by a surcharge on O&M fees that farmers pay, by sideline revenues, or by both. Some participants argued that depreciation should become part of the O&M costs as irrigation assets should be regarded as an economic investment. Others, however, argued that this is not necessary as most irrigation facilities can serve for quite a long time with normal maintenance, if properly conducted.

Supporting Organizational Sustainability

Sustainable farmer organizations are usually initiated by the farmers themselves. Examples of government programs to create water users associations in Indonesia, Mexico and China were discussed. Where these are based more on external administrative needs than on local management requirements or local existing organizations, they often fail to function or survive. Often, new organizations are not needed, but existing informal ones need to be recognized.

The dynamics of non-economic factors within the community of farmers seemed to have been overlooked in transfer processes in Sudan, Senegal, the Philippines and Mexico, which may jeopardize a durable relationship between government/agencies and farmers. Social divisions among the users are thought to hinder collective efforts. Cases in the Philippines and elsewhere show that lack of organizational and financial accountability between farmers and group leaders undermine the sustainability of water user organizations. Water user groups must create a sense of financial trust among their members who also demand the right to know how, where and how much money is being spent for what purposes.

A simple and transparent accounting system is critical. This is an area where both governments and NGOs could assist farmer organizations. Creating accountability among users and leaders of farmer organizations is much more difficult in cases where there is more social differentiation among the users. For instance, in the case of the deep tubewell program of the Grameen Bank in Bangladesh, it was said that it could only continue if cooperation between landless groups and farmers can be guaranteed. Cases in the Philippines show that powerful farmer leaders are often identified with the irrigation bureaucracies to which they have easy access. A serious obstacle to IMT in countries like Pakistan is the high level of tenancy, whereas in Sri Lanka, encroachment of land in settlement projects disturbs the cooperation between farmers in water user groups.

Organizational design principles was a topic which was not discussed extensively, but some general principles were presented in at least one session. It was said that user organizations tend to succeed if they are organized according to the following four organizational principles:

1. They are designed to serve objectives of central concern to their members.
2. They evolve and enforce a suitable "operating system."
3. They evolve governance structures and processes which constantly focus on the main business interests of members.
4. They constantly strive to maximize their members' allegiance to themselves.

Some participants recognized that organizations may survive for a certain time, but are prone to disappear as soon as policies and objectives regarding irrigated agriculture change. This potential danger is also apparent in the case of newly established water users organizations that should take over O&M responsibilities. Does the duration of existence of an organization influence its effectiveness? Some asserted that older water users associations have had more learning opportunities to solve problems. Others however, pointed out that it could also be true that newer organizations often face fewer problems in their earlier stages because of subsidies and support services they receive under government development programs.

Creating Other Supporting Conditions

Other areas in which the state could play a role in supporting reforms toward locally managed irrigation were discussed only briefly during the Conference. These included the establishment of water markets, regulatory mechanisms and conflict resolution, especially at the river basin or aquifer level, where different actors compete for ever scarce water.

CONCLUSIONS

IMT is a relatively recent phenomenon. Governments find IMT an appealing strategy for a variety of reasons. Turnover programs varying in scope and content are being implemented in over 25 countries worldwide. Yet the management turnover experience is still poorly documented and a clear picture of patterns has yet to emerge. At the Conference, the consensus of opinion was that IMT, if properly executed, could benefit both the farmers and the government. However, it needs to be carried out in a carefully staged process that requires considerable time and supporting efforts. Many participants felt that IMT should be conceived more as a long-term evolutionary process than as a structural adjustment project.

From the discussions it was apparent that although most governments find IMT attractive, there is often only a partial commitment to management transfer. Governments have been somewhat lax in formulating clear policies and providing the necessary legal support. In many countries, IMT programs have not progressed beyond a few pilot areas. There was clear consensus among participants that IMT, as presently conceived and implemented, tends to be initiated by governments and is oriented toward cost reductions in servicing irrigation. Farmers' needs and aspirations have not been adequately addressed. The question whether farmers are ready to take over management of irrigation systems often does not receive thorough consideration. Another clear consensus of opinion was that for IMT to be sustainable, there should be an economic basis which makes irrigated agriculture profitable to farmers. The material presented and discussed at the Conference clearly demonstrated that the emphasis of IMT to date has been on the turnover process. Complementary policies which would ensure the sustainability of management systems after turnover often have not been integrated with IMT programs.

A major problem identified during the discussions relates to the retrenchment of public agency staff after systems are turned over, and the need for a thorough strategic reorientation of government agencies from direct management organizations to support service and regulatory organizations.

The nature of post-turnover management systems are context-specific and derivatives of a combination of factors: social, political, economic and physio-technical factors, state-farmer relations, and so on. It was not possible to make a clear characterization of management models in relation to physical attributes of irrigation systems. However, management accountability, financial autonomy, water rights and property rights were recognized as vital ingredients in the design of all turnover programs. It was agreed that there were multiple institutional forms that could potentially support these ingredients including water users associations, autonomous irrigation districts with professional staff, contracted management companies or mutual irrigation companies.

IMT is still in the policy or program formulation stage in many countries. Numerous issues need to be addressed and many problems need to be discussed and resolved. Policy options that can help resolve some of the major roadblocks to successful transfer programs should be developed. While not designed to solve these problems, the International

Conference on Irrigation Management Transfer was an opportunity for practitioners, researchers, donors and policymakers to learn from the wealth of experience and ideas presented by the 220 participants.

Chairpersons of Parallel Sessions

Dr. Shashi Kolavalli, Professor, Indian Institute of Management, India.

Prof. M.A. Sattar Mandal, Professor, Department of Agricultural Economics, Bangladesh Agricultural University, Bangladesh.

Mr. Thomas Buhl-Böhnert, Project Manager, MAINTAIN, GTZ, Germany.

Mr. Ashok Gulati, Director, National Council of Applied Economic Research, India.

Prof. Tushaar Shah, Director, Institute of Rural Management, India.

Ir. Soenarno, Director, Directorate General of Water Resources, Indonesia.

Dr. David J. Molden, Irrigation Management Advisor, Computer Assisted Development Inc., United States Agency for International Development (USAID), Nepal.

Eng. I.K. Musa, Director, Irrigation and Drainage, Federal Ministry of Water Resources and Rural Development, Nigeria.

Mr. Hugh Turrall, Coordinator, Irrigation Research Network, Overseas Development Institute, United Kingdom.

Dr. Robert Yoder, Senior Associate, Associates in Rural Development Inc., United States of America.

Dr. Herve Plusquellec, The World Bank, United States of America.

Mr. J.M. Makadho, Director of Agritex, Department of Agricultural, Technical and Extension Services, Zimbabwe.

List of Papers Presented at the International Conference on Irrigation Management Transfer

1. Management Turnover in a Major Irrigation Scheme of Sri Lanka: A Study of Consequences and Constraints, *Abhayaratna M.D.C.*
2. Proposed Strategies for Irrigation Management Transfer in Libya, *Alghariani Saad A.*
3. Irrigation Management Transfer: Development and Turnover to Private Water Users Associations in Egypt, *Aziz Yehia Abdel.*
4. Joint Management of the Libmanan-Cabusao Pump Irrigation System between Farmers and the National Irrigation Administration in the Philippines, *Bagadion Benjamin U.*
5. Irrigation System Management Turnover Program: The Philippine Experience, *Bautista Apolinario V., Galvez Jose A. and Gamboa Renato S.*
6. Are Collective Farms Water Users Associations? Land Reform and Irrigation Management in Uzbekistan, *Berkoff D.J.W.*
7. How to Turn Over Irrigation Systems to Farmers? Questions and Decisions in Indonesia, *Bruno Bryan and Atmanto Sudar Dwi.*
8. The Water Resources and the Approaches for Alleviating Irrigation Water Shortage in Hebei Plain, *Cao J.R. and Zhang G.S.*
9. An Institutional Analysis of Ganga-Kalyan Scheme IMT in South India, *Chandrakanth M.G., Shivakumaraswamy B., Vidya M.R. and Pramesha J.H.*
10. Overview of Irrigation Management Transfer in China, *Chen Xueren and Ji Renbao.*
11. Mexican Institute of Water Technology: Why the Social Dimension Is Important in the Design of Modern Technology for Hydroagricultural Projects, *Davila Sonia.*
12. Social Impact in Small Irrigation Projects Transferred to Farmers: A Case Study in Andean Semiarid Agrosystems, Peru, *Durand Fransh Medina.*
13. Management Model for Sustainable On-Farm Irrigation, *Foroud N.*
14. Considerations in the Transfer of Responsibilities for Services in the Water Resources Sector, *Frederiksen H.D.*
15. Irrigation Management Transfer in Colombia: An Assessment of Seven Transferred Districts, *Garcés-Restrepo Carlos and Vermillion Douglas.*
16. Participatory Training of Water Users' Associations, A Tool for Irrigation Management Transfer: A Case Study from Indonesia, *Geijer Joost, Porton Margot and Smith Martin.*
17. Irrigation Service Fees (ISF) in Indonesia: Towards Irrigation Co-Management with Water Users Associations through Contributions, Voice, Accountability, Discipline and Plain Hard Work, *Gerards Jan L.M.J.H.*
18. A Better Reform Form of Management System In Irrigation Districts: The System of Contracted, Managerial Responsibility, *Gong Xiaohu.*
19. The Institutional Context of Irrigation Management Transfer, *de Graaf M. and van den Toorn W.H.*
20. Toward Financial Autonomy of the Irrigation Sector: For Better Cost Recovery and Management (Lessons from Selected Countries and Selected States of India), *Gulati Ashok and Svendsen Mark.*
21. Grameen Bank Tubewell Irrigation Program: A Case of Management Transfer in Bangladesh, *Hakim M.A. and Parker D.E.*
22. Supporting Farmers' Organization for Irrigation Management, From O&M toward a Business Orientation: A View From Indonesia, *Helmi.*
23. Irrigation Management Transfer in China, *Jiang Kaipeng.*
24. Performance Impacts of Transfer, *Johnson III Sam H., Svendsen Mark and Zhang Xiyang.*

25. Irrigation Management Transfer: Experiences from Tanzania, *Kagubila Mwanitu*.
26. Participatory Action Research to Improve the Performance of Jointly Managed Irrigation Systems, *Karunasena H.A.*
27. Changing Pillows for a Headache? Financing Participatory Irrigation Management in Sri Lanka, *Kloezen Wim H.*
28. Alternative Support Systems to Strengthen Irrigators' Associations in Bicol, the Philippines after Irrigation Management Turnover, *Lauraya Fay M. and Sala Antonia Lea R.*
29. The Financial Sources for the Development of Small- and Medium-Sized Irrigation Works, *Li Lishan and Chen Xieqin.*
30. Changes in Irrigation as a Result of Policy Reforms in China: A Case Study of North China, *Liu Changming, Mou Haisheng, Ma Quijun and Johnson III Sam H.*
31. The Transfer of Irrigation Management to Farmer Organizations in Niger, *Lonsway Kurt A. and Amadou Allahoury.*
32. The Evolution and Implications of Decreased Public Involvement in Minor Irrigation Management in Bangladesh, *Mandal M.A.S. and Parker D.E.*
33. Social Aspects of the Irrigation District Transfer, *Mechaca Juan Carlos Marin and Torregrosa Maria Luisa.*
34. Institutional Design Principles for Accountability on Large Irrigation Systems, *Merrey Douglas J.*
35. Manipulating Irrigation Management Models: Institutional Requirements for Social Engineering, *Morrison Jamie and Carruthers Ian.*
36. Irrigation Management Transfer in Nigeria: A Case of Financial Sustainability for Operation, Maintenance and Management, *Musa Inuwa K.*
37. The Strategies of Irrigation Management Transfer in Nepal, *Nangju Dimyati.*
38. Critical Steps in Irrigation Management Transfer in Vietnam, *Nguyen Minh Cuong.*
39. Irrigation Management Transfer in Vietnam, *Nguyen Manh Ta.*
40. Strategy on Irrigation Management Transfer in Vietnam, *Nguyen Dinh Ninh.*
41. Improvement of Irrigation Management and Enhancement of Economic Benefits by Contract Management, *Nie Datian and Tao Shansheng.*
42. Transfer of Management to Water Users in Stages I and II of the Bhairawa-Lumbini Groundwater Irrigation Project in Nepal, *Olin Manuel.*
43. It Takes Two to Tango: A Case Study of Irrigation Management Transfer in the Philippines, *Oorthuizen Joost.*
44. Performance of Water Users Associations in the Operation and Maintenance of Irrigation Districts in Mexico, *Palacios-Vélez Enrique.*
45. The Turnover of Deep Tubewells for Irrigation, *Palmer-Jones R.W.*
46. The Turnover of Public Tubewells in Uttar Pradesh: A Case Study of a Successful Cooperative Society, *Pant Niranjana.*
47. Irrigation Management Transfer: Problems in Implementation, *Patil R.K. and Lele S.N.*
48. Irrigation Policies and Irrigation Management Transfer Programs in Chile, *Pereira N.*
49. Irrigation Management Transfer in the Murrumbidgee Region of New South Wales, Australia, *Prathapar S.A., Bramston M. and Chant J.*
50. Kedar Tank: A Case Study on the Turnover of Tanks to Farmers, *Pundarikanthan N.V. and Kallapiran S.N.*
51. Development of a Diversified Economy to Increase Financial Revenue for Irrigation Management, *Qian Xu-Lai.*
52. Irrigation Management Issues in Sustainable Irrigated Agriculture Project, Laos and Thailand, *Rajvong Nouanedeng and Toan Nguyen Hong.*
53. Irrigation Management Turnover, A User's Perspective: The Case of the Indira Gandhi Canal, Rajasthan, India, *Ramanathan S. and Ghose Sarjjoy.*
54. Irrigation Investment and Management Transfer in Colombia, *Ramirez Jorge.*

55. Experience of Management Transfer to Users in Nepal, *Rana Jitendra, Satyal Ram P., Rajbhandari Shyam P., Sharma Khem R. and Molden David J.*
56. Farmers' Groups and Their Viability in Irrigation Management Transfer: A Case Study in Sreeramsagar Project, Andhra Pradesh, India, *Rao C. Sithapathi.*
57. Lessons Learned from Irrigation Management Transfer Programs, *Sagardoy Juan A.*
58. Political and Economic Dimensions of Privatization and Turnover of Irrigation Schemes in Sudan, *Samad Madar, Dingle Mohamed A. and Shafique M.S.*
59. Turnover Program: Some Theoretical Basis, *Sengupta Nirmal.*
60. Brick by Brick: Building a System of Participatory Irrigation Design in Gujarat, India, *Shah Anil C.*
61. Turnover of State Tubewells to Farmer Co-operatives: Assessment of Gujarat's Experience, India, *Shah Tushaar, Ballabh Vishwa, Dobrial Kusum and Talati Jayesh.*
62. Issues and Options of Irrigation Management Transfer in the Nepalese Context, *Sharma Piyush Kumar.*
63. Irrigation Management in Taiwan, *Shih Charles C.C.*
64. Management Transfer of Agency-Managed Irrigation Systems in Nepal: Are There Any Lessons to be Learned from Farmer-Managed Irrigation Systems?, *Shivakoti Ganesh P.*
65. A Methodology to Assess the Organizing Process of Irrigation Management Transfer, *Wijayaratna C.M.*
66. Basarahiya Water Co-operative Society: A Case Study in Northern India, *Sinha Phanish Kumar.*
67. Implication of Agrarian Contracts for Irrigation Management Transfer: Prospects of Farmer Group Formation on the Rajasthan Canal Project, *Sinha Saurabh.*
68. Technological and Operational Changes Related to Irrigation Management Transfer (IMT): A Case Study of the Sumani Pumping Irrigation Project in West Sumatra Province, Indonesia (A Discussion Paper), *Sjoffjan Asnawi.*
69. At the Doorstep of Transfer: Paliganj Distributary of Sone Canal System, Bihar, India, *Srivastava L.P.*
70. Lessons from Management Transfer in the Columbia Basin Project, USA, *Svendsen Mark and Vermillion Douglas.*
71. An Irrigation System Fully Managed by Farmers, *Tao Shansheng, Xu Zihong and Li Yanjun.*
72. Development and Outlook of Irrigation Water Management in Taiwan, *Tung-Yueh Hung and Charles C.C. Shih.*
73. Irrigation Management Transfer: An Indian Perspective, *Vaidyanathan A.*
74. Srey Ampil Irrigation Scheme Rehabilitation Experience, Kingdom of Cambodia, *Vecco Giorgio.*
75. Institutional Reform in Two Irrigation Districts in North China: A Case Study from Hebei Province, *Vermillion Douglas, Xinyuan Wang, Xiying Zhang and Xuesen Mao.*
76. Irrigation Management Transfer in Yanguan Town of Zhejiang Province in China, *Wang Yiqiang and Xu Haigen.*
77. Research on Standard of Irrigation Service Fees, *Wang Xiugui and Qian Xulai.*
78. Developing Share Systems for Sustainable Water Users Associations in Nepal, *Wilkins-Wells John, Molden David J., Pradhan Prayog and Rajbhandari Shyam P.*
79. The Role of Rural Credit Institutions in Irrigation Management Transfer, *Wilkins-Wells John and Prasad Krishna C.*
80. Design of Water Distribution Procedures in Irrigation Management Transfer: A Crucial Step, *Willet Has.*
81. Increasing Irrigation Benefits by Irrigation Management Transfer, *Wu Jingtang.*
82. Farmers' Irrigation Management Experience in the Central Hilly Area of Hubei Province, *Yan Ge and Ou Guanhua.*
83. The Management of Village Irrigation Systems in Shandong Province, *Yan Zhenyuan and Ma Shusheng.*

84. Converging Factors in the Successful Transfer of Irrigation Management Responsibilities to Water Users Associations in the Dominican Republic, *Yap-Salinas L. Humberto*.
85. Irrigation Management Transfer in Laofangqiao Town of Yuyao City in China, *Yi Yongging*.
86. Locally Managed Irrigation Systems: Suggestions for Management Transfer, *Yoder Robert*.
87. Measures and Effects of Farmers' Participation in the Construction and Management of the Manas River Irrigation System in China, *Yuan Huaibing, Qiu Weiguo and Zhang Junmin*.
88. Institutional and Management Issues in the Development of Irrigation with Small Dais in the Potwar Area of Punjab, *Zaidi A.H.*
89. Self-Financing Irrigation Districts Under the Hubei Water Resources Project, *Zejun Huang and Houbin Liu*.
90. Yellow River Irrigation Management Organization Transfer and Results Analysis in Shouzhangji Township, *Zhou Zhenmin*.
91. Gender Aspects of Irrigation Management Transfer: Rethinking Efficiency and Equity, *Zwarteveen Margreet*.