Chapter 1
Introduction

Agriculture is by far the largest user of the world's water, soil and biodiversity. Today, it finds itself at the centre of the debate on how to conserve the world's environments. It accounts for 70 percent of the total water withdrawals of the globe, a percentage that is close to 85 percent when considering only the developing countries. As the world's welfare improves, demands from other water subsectors are increasing. Domestic water supply, industry and manufacturing, and the environment itself, are now in direct competition with the agriculture sector for increasingly scarce water resources.

Thus, competition for water resources can only lead to the agriculture sector having to review, and adjust accordingly, its share of water. The international community is increasingly scrutinizing and monitoring water consumption patterns in agriculture and its corresponding water-use allocation and efficiencies. The approximately 1 260 million ha under rainfed agriculture (corresponding to 80 percent of the world's total cultivated land) supply 60 percent of the world's food; while the 277 million ha under irrigation (the remaining 20 percent of land under cultivation) contribute the other 40 percent of the food supplies. On average, crop yields per hectare under irrigated agriculture are 2.3 times higher than those from rainfed areas. Together with the figures from the previous paragraph, these numbers demonstrate that irrigated agriculture has had, and will continue to have, an important role to play both in the provision of the world's food supply and beyond.

Parallel to the concern about natural resources management, two other major movements have been emerging across the globe and shaping policy: (i) liberalism; and (ii) a call for a more participatory development approach. The former is centred around the idea that in order for countries to move forward – to progress – they should *inter alia*:

- open their economies to competition;
- remove trade barriers;
- open markets;
- deregulate;
- eliminate subsidies;
- privatize their industries;
- diversify providers of goods and services;
- expand their commercial frontiers based on the principle of comparative advantage.

The participatory movement has advocated that the size of government should be reduced and that people should participate more in governance, management and financing resource development in order to promote sustainable and equitable development. Participation promotes the subsidiarity principle of making decisions at the lowest level possible, thereby increasing stakeholder participation. In combination, liberalization and participation have led to the concept of self-reliance coming to the forefront of the development strategy.

Moreover, in order to comply with the structural adjustments required by the international financing institutions in the last few decades, governments have devised ways to decrease public spending in most sectors. This disengagement has not spared agriculture (in particular, the irrigation sector).

Within the above context, governments across the world have responded and embarked on a process of irrigation reform meant to tackle the increasing demands on irrigated agriculture and to enhance its performance while coping with both liberalization and participatory strategies. Among reforms in irrigated agriculture, irrigation management transfer (IMT) has appeared as the most important and far-reaching reform thus far.

RATIONALE FOR AND OBJECTIVES OF THIS REPORT

Towards the end of the twentieth century, many developing countries were moving in the direction of major change in their economic policies, including reductions in the size and budgets of government. Pressure was mounting on the agriculture sector to become more efficient. Many governments made efforts to collect irrigation service fees but few were successful. The time for more basic change in the irrigation subsector was ripe. One such reform, IMT, was emerging worldwide. The philosophy behind IMT lies in the perception that increased ownership, decision-making authority, and active participation in the operation and maintenance (O&M) of irrigation systems would create or force a binding commitment from water users to be more effective and responsible towards their obligations. If farmers were to assume the costs of running the irrigation systems, the incentives to succeed in their management were bound to increase. This is the principle of subsidiarity, or that decisions are made at the lowest level possible, a pillar of what is now perceived as "good" water governance. On the other hand, governmental irrigation agencies (usually constrained by bureaucratic procedures, dwindling budgets and rigid policies) became inefficient and had unmotivated personnel and low system performance. Therefore, IMT emerged in response to the need for sector reform, the merits of self-sufficiency, and the drive for increased participation of water users in irrigation system management.

In line with the preceding paragraphs, this report has several objectives. First and foremost, it is intended to be a knowledge synthesis document that captures the global experiences emerging from a wide-reaching process targeting the reform of the irrigation sector: IMT. It is also intended to bring to closure a long-running programme (undertaken by FAO and partners) initiated in the year 2000 that was designed to assist countries with the exchange of information regarding all aspects of the reform. In this connection, this report is a natural follow-up to FAO Irrigation and Drainage Paper No. 58 *Transfer of irrigation management services – guidelines* (FAO, 1999), which is a reference tool to orient policy-makers, planners, technical experts and other agents of reform engaged in programmes to design and implement effective, comprehensive, integrated and sustainable irrigation sector reform. Finally, this report will further enrich the worldwide database on IMT that has resulted from all the studies reported herein. These have led to a specialized Web page on the subject managed by FAO (available at http://www.fao.org/nr/water/topics_isr.html).

Irrigation management transfer has been applied to fit diverse reform needs, ranging from pilot areas of a few hundred hectares to large schemes of several hundred thousand hectares and a national effort encompassing millions of hectares. Similarly, as shown in the following chapters, the reform can take place at various hydraulic levels and result in a variety of institutional arrangements. Such a far-reaching process of irrigation reform needs to be documented and analysed, and its key lessons need to be identified. These are the purposes of this report.

The report consists of five chapters. This first chapter provides a brief introduction to set the stage of why irrigation sector reform has emerged. This is followed by the rationale and historical background about how the concept of IMT developed. It then summarizes the current situation across the globe, and ends by examining the scope and breadth of activities undertaken by FAO and the International Water Management Institute (IWMI).

Chapter 2 presents the policy and legal framework for IMT. Regarding policy, it examines the requirements for supporting IMT programmes as well as for establishing water users associations (WUAs), the cornerstone of the transfer process. It also examines: policies for tackling financing irrigation; how to secure the reforms of irrigation agencies or similar government bodies; and how to assure fundamental support services that must be generated as a result of the reform. In respect of the legal framework, it discusses the scope and basis for both WUAs and the management transfer process itself. It touches briefly on other legal aspects, such as water rights, dispute resolution and support services.

Chapter 3 focuses on the elements present in the implementation of IMT programmes. It addresses IMT strategies (e.g. the scale of transfer, the scope of activities included, and the speed of implementation. It examines how to mobilize support and create public awareness to strengthen the process, how WUAs are organized, what type or extent of capacity development activities are included, and how the actual transfer takes place. It then explores aspects related to the need for rehabilitation and modernization (and their financing). The chapter closes with a discussion on accompanying support services (generated or lacking), and on how or whether the public-sector organizations involved need reform.

Chapter 4 brings together the outcomes and impacts derived or expected from IMT reform. Regarding outcomes, it focuses on: irrigation system management, WUAs, the irrigation subsector organizations, and the emerging private-sector service providers. Regarding impacts, it analyses the effect on agricultural productivity (land and water), including crop yields and cropping intensities. It then analyses aspects related to economic productivity, such as gross value output (GVO), farm income, employment and poverty. The chapter also examines the socio-economic and political relationships as well as the impacts on the environment.

Chapter 5 summarizes key conclusions and recommendations. It summarizes the emerging types of IMT models and programmes, the main constrains on IMT (and how they have been overcome), and the role of IMT in the context of integrated water management (IWM). Following a discussion on whether the current concept of IMT (rationale and objective) should be revised in the light of the lessons learned, the chapter closes with some specific recommendations for future IMT programmes.

HISTORICAL BACKGROUND OF IMT, AND DEFINITION OF CONCEPTS

The emergence of IMT as a process for subsector reform can be traced back to the early 1970s, when a general disappointment with the performance of irrigation systems (following huge investments by governments and international agencies in the 1950s and 1960s) began to take hold. More often than not, irrigation agencies established with the purpose of supplying water to those systems under a rigid, top-down approach failed in their objectives. Farmers who were meant to pay for these services in order to keep the operation sustainable began to falter in their obligations and to demand better services tailored to their needs. A vicious cycle of non-payment and infrastructure deterioration ensued. By the 1980s, the world economic downturn had forced governments to revise their policies of trying to keep the irrigation systems running from their meagre budgets after lack of payments of water charges by farmers had only increased. The need for reform was ripe. Thus, typical objectives of IMT programmes became:

- Eliminate or reduce recurring government expenditures for operation and management of irrigation systems.
- Establish financially self-reliant water service providers to replace the public agency in the management of systems.
- Reverse the increasing rate of deterioration of infrastructure.

- Provide transparency in management and accountability of the service provider to water users.
- As an end-result, the main objective of IMT was to achieve improvements in the performance of the irrigated agriculture sector, including both productivity and financial and physical sustainability.

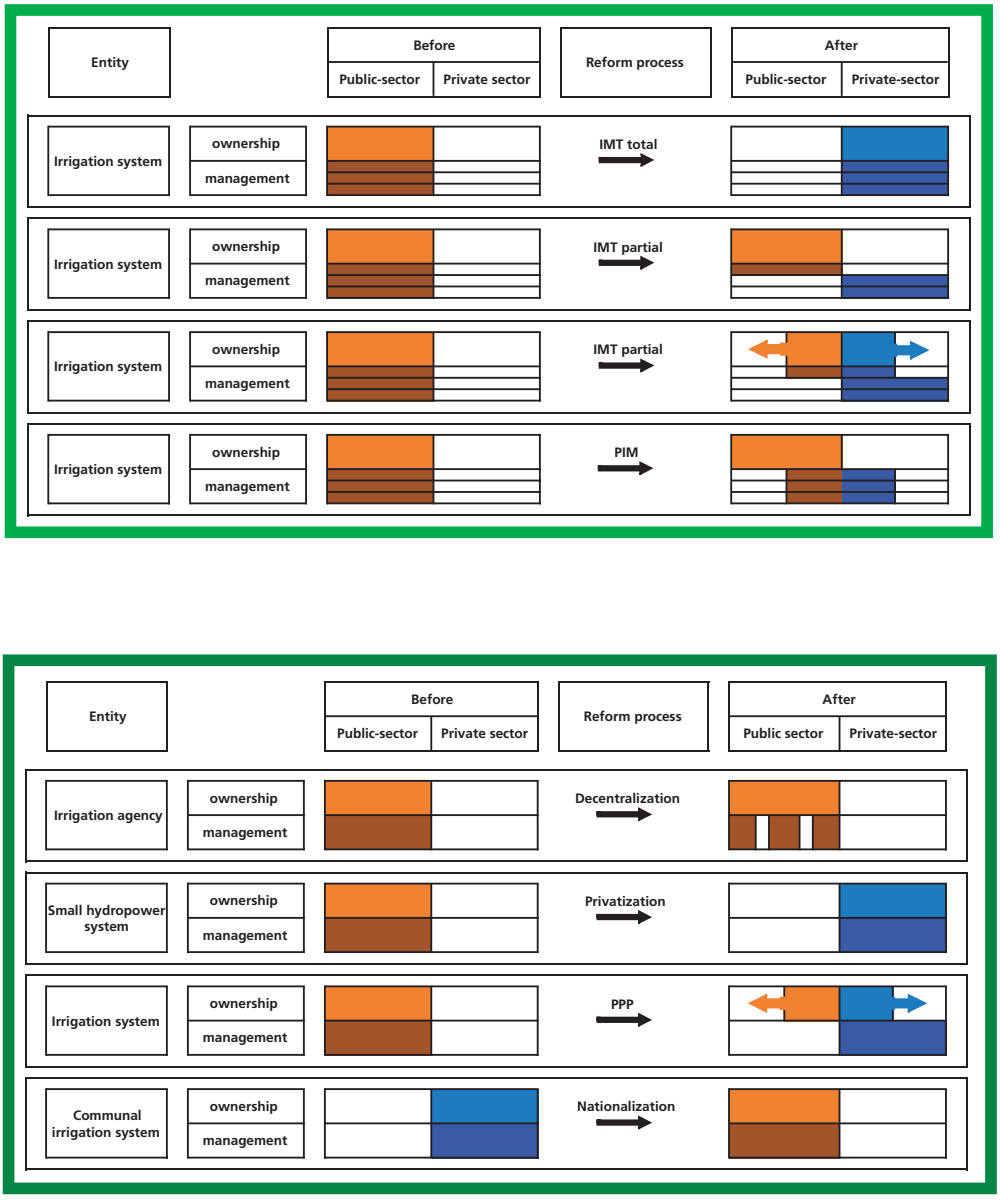
The concept of IMT normally refers to the process that seeks the relocation of responsibility and authority from the controlling government agencies managing irrigation systems (under the public sector) into the hands of non-governmental organizations (NGOs), such as WUAs, or other private-sector entities. Usually, these are established as recipients of the transfer or handover of management.

In dealing with IMT issues, a second, interrelated concept, referred to as participatory irrigation management (PIM), is often encountered. Normally, this refers to the increased involvement of water users in irrigation management, along with the government; thus, it consists more of a behavioural or attitudinal change than a reform process per se. Thus, while the IMT concept intends to replace the role of the government, PIM seeks to strengthen the relationship between water users and government by adding farmer participation to government management. The concepts intersect at the "comanagement" stage of IMT, where, before a final transfer takes place, the government agency and the recipient organization agree to share responsibilities. The point here is that, while having intersecting elements, the two concepts are not exactly the same and, therefore, they should not be interchangeable. However, owing to a number of factors, mostly related to the acceptance of terms, PIM is widely used in many circumstances and contexts that really correspond to the concept of IMT.

In order to further capture the meaning of IMT, it is worth defining other concepts that are found in the realm of institutional reform and that often touch irrigation. Decentralization is the movement of decision-making authority to regional or local levels from a central authority, but still within the same organization. Privatization refers to the transfer of ownership of assets from the government to the private sector. In the case of irrigation, the assets would be represented by the systems themselves (irrigation and drainage network) and by equipment. As shown in Chapter 2, governments rarely transfer the ownership of the irrigation and drainage networks and, therefore, the use of the term applies to few cases. The concept of public–private partnership (PPP) refers to an arrangement in support of irrigation reform that can be viewed as a "third way" or link between farmers, government and the private sector. A final concept worth mentioning is nationalization, defined as the transfer of ownership from the private sector to the public sector. An example of this in the context of irrigation would be a government irrigation agency taking over a communal system.

Figure 1 uses diagrams to represent the reform concepts discussed. They are all provided in the light of irrigation subsector reform. The upper "block" shows several degrees of IMT and PIM. The lower "block" includes all the other related concepts. For simplicity, and recognizing that a weakness may be introduced, the entity to undergo the reform process is portrayed through the standing conditions of its "ownership" and its "management" (left side of Figure 1), with the "governance" component included in the latter. The "before" and "after" conditions as a result of the reform process (arrows) are indicated. Taking as an example in the upper block the second IMT partial condition in the diagram, both ownership and management previous to the reform are in the hands of the public sector. After an IMT "partial" reform, the management is now "shared" between the private and public sector. The sliding arrows indicate that the percentage of public–private management can vary and is a function of whatever particular agreement is conceived under the reform process. In the lower block, on decentralization, the diagram shows that, after the reform process, ownership remains the same but management is now divided into different areas or regions but still within the public sector.

FIGURE 1
Schematic diagram on definitions of irrigation sector reform



EXTENT OF IMT WORLDWIDE

Irrigation management transfer is taking place in five continents. This type of reform began to be implemented as far back as the 1960s in Taiwan Province of China, Bangladesh and United States of America; in the 1970s, in Mali, New Zealand and Colombia; and in the 1980s, in the Philippines, Mexico, Tunisia and the Dominican Republic. The bulk of the irrigation reform peaked in the 1990s, when countries such as Morocco (1990), Australia (1994), Turkey (1994), Peru (1995), Albania (1996) and Zimbabwe (1997) initiated the process. The new century already shows examples of interventions taking place in the Sudan and Pakistan (2000), India (2001) and China (2002), each of which has experienced a unique process and result. Today, more than 57 countries have embarked on some type of irrigation sector reform that has IMT. This corresponds to 40 percent of countries reporting more than 10 000 ha under irrigation. These represent 72 percent of the world population as they include among others China, India, the United States of America, Indonesia, Pakistan and Bangladesh, and represent 76 percent of the irrigated area of the world (FAO, 2007).

The list of 57 countries includes the 42 countries listed in Table 1 plus: Cyprus, Georgia, Ethiopia, Guatemala, Jordan, Kazakhstan, Lao People's Democratic Republic, Madagascar, Mauritania, Moldova, Poland, Tajikistan, The former Yugoslav Republic of Macedonia, Ukraine and Viet Nam. In addition, there are other countries where the application of IMT is traditional (prior to 1960), e.g. Germany, Italy, Netherlands and Spain, and the traditional irrigation systems of France.

IMT-RELATED ACTIVITIES UNDERTAKEN BY FAO AND THE IWMI

The present report is the culmination of an IMT-related programme on the subject of irrigation sector reform initiated by FAO and its partners in 2000. With the generous support of the Ford Foundation and in collaboration with the IWMI, a broad set of activities were designed. Other organizations, such as the World Bank and the International Network for Participatory Irrigation Management (INPIM), also made specific contributions.

The programme was designed around five distinct but interrelated initiatives:

- An international e-mail conference, held from June until November 2001, and for which more than 400 participants from 80 countries registered. This conference led to the establishment at FAO of an IMT specialized Web page that is still active today and the hub of the activities of the programme. This page, now renamed Irrigation Sector Reform, provides a worldwide forum for identifying and sharing lessons and concerns about the growing global experience with irrigation sector reform (available at http://www.fao.org/nr/water/topics_isr.html).
- The preparation of a range of specific IMT case studies in countries that have gone through a major process of IMT.
- The compilation of IMT country profiles (meant to be an abbreviated version of case studies).
- The compilation of WUA legislation country profiles.
- The compilation of and links to key studies and other documentation on IMT carried out by a range of renowned institutions.

This publication summarizes the efforts of three of these five activities. With respect to the IMT country case studies, a total of 13 cases have been prepared, covering 11 countries. These provide in-depth assessments of the experiences of those specific countries in carrying out their IMT interventions. They document the:

- context,
- strategy,
- policy and legal framework,
- implementation process,
- outcomes and impacts,
- lessons learned.

These types of studies have required a considerable amount of time from professionals that have been closely associated with the process.

The IMT country profiles provide more concise assessments of IMT for a much wider geographical coverage. These documents summarize the IMT strategy, results and lessons learned for a particular country, province or pilot area. A total of 43 profiles are included, representing 33 countries. Some larger countries, such as China and India, have several profiles for different states or programmes. These country profiles have been prepared by experts directly involved or very familiar with the reform process. It is recognized that, because a mostly qualitative questionnaire was used to gather the information, a bias may have been introduced by having persons that were directly involved or responsible for the IMT implementation. In several cases, this was the only option available for gathering the information needed for this study.

Finally, and with respect to the WUA legislation profiles, the FAO Water Development and Management Unit, jointly with the Development Law Service, conducted a worldwide inventory on the legal and regulatory framework supporting WUAs. It includes a summary analysis of readily available primary and secondary legislation governing their:

- establishment,
- internal structure,
- functions and powers,
- funding,
- dissolution,
- control by government.

In two cases, in addition to the WUA study, the legal and regulatory framework supporting IMT has been documented. These profiles focus on legislation governing the transfer of functions and powers from the government to WUAs. A total of 30 cases representing 28 countries are included in the WUA legislation profile inventory.

All the studies mentioned are included on the CD–ROM that accompanies this publication. Table 1 presents the particular countries and the type of studies conducted in each one. In the remaining part of the text, reference is made to the particular type of survey (country profile, country case, or WUA legislation profile) or countries (Table 1) depending of the type of analysis made. Figure 2 shows the location of these countries worldwide.

TABLE 1
FAO irrigation sector reform studies, by country and type

No.	Country (province/state/region)	IMT country profiles	IMT country cases	WUA legislation profiles
1	Albania	X		X
2	Argentina	X		X
3	Armenia	X		X
4	Australia	X		
5	Bangladesh	X		
6	Bolivia			X
7	Bulgaria	X		X
8	Burundi			X
9	Chile			X
10	China (Hebei)	X		
10	China (Hubei)	X		
10	China (Hunan)	X		
10	China (Ningxia)	X		
10	China (Shaanxi)	X		
10	China (Shenyang)	X		
11	Colombia	X	X	X
12	Costa Rica	X		X
13	Dominican Republic	X	X	X
14	Ecuador	X	X	X
15	El Salvador			X
16	Ghana	X		
17	India (Andhra Pradesh)	X	X X*	X
17	India (Karnataka)	X		
17	India (Madhya Pradesh)	X		
17	India (Orissa)	X		
17	India (Rajasthan)	X		
18	Indonesia – large systems	X		X
18	Indonesia – small systems	X	X	
19	Italy			X X X
20	Kyrgyzstan	X	X	
21	Mali	X		
22	Mexico	X	X	X
23	Morocco	X		X
24	Nepal	X		X
25	Netherlands			X
26	New Zealand	X		
27	Niger	X		
28	Nigeria	X		
29	Pakistan (Punjab)	X		X
29	Pakistan (Sindh)			X
30	Peru	X		X
31	Philippines	X		X
32	Romania	X		X
33	Senegal	X		
34	South Africa		X X	X
35	Sri Lanka	X		X
36	Sudan	X	X	
37	Swaziland			X
38	Taiwan Province of China			
39	Tunisia	X		X
40	Turkey	X	X	
41	United States of America	X	X	
42	Zimbabwe	X		
	Total number of studies/countries	43/33	13/11	30/28

* Number of Xs indicates number of studies conducted under each type.

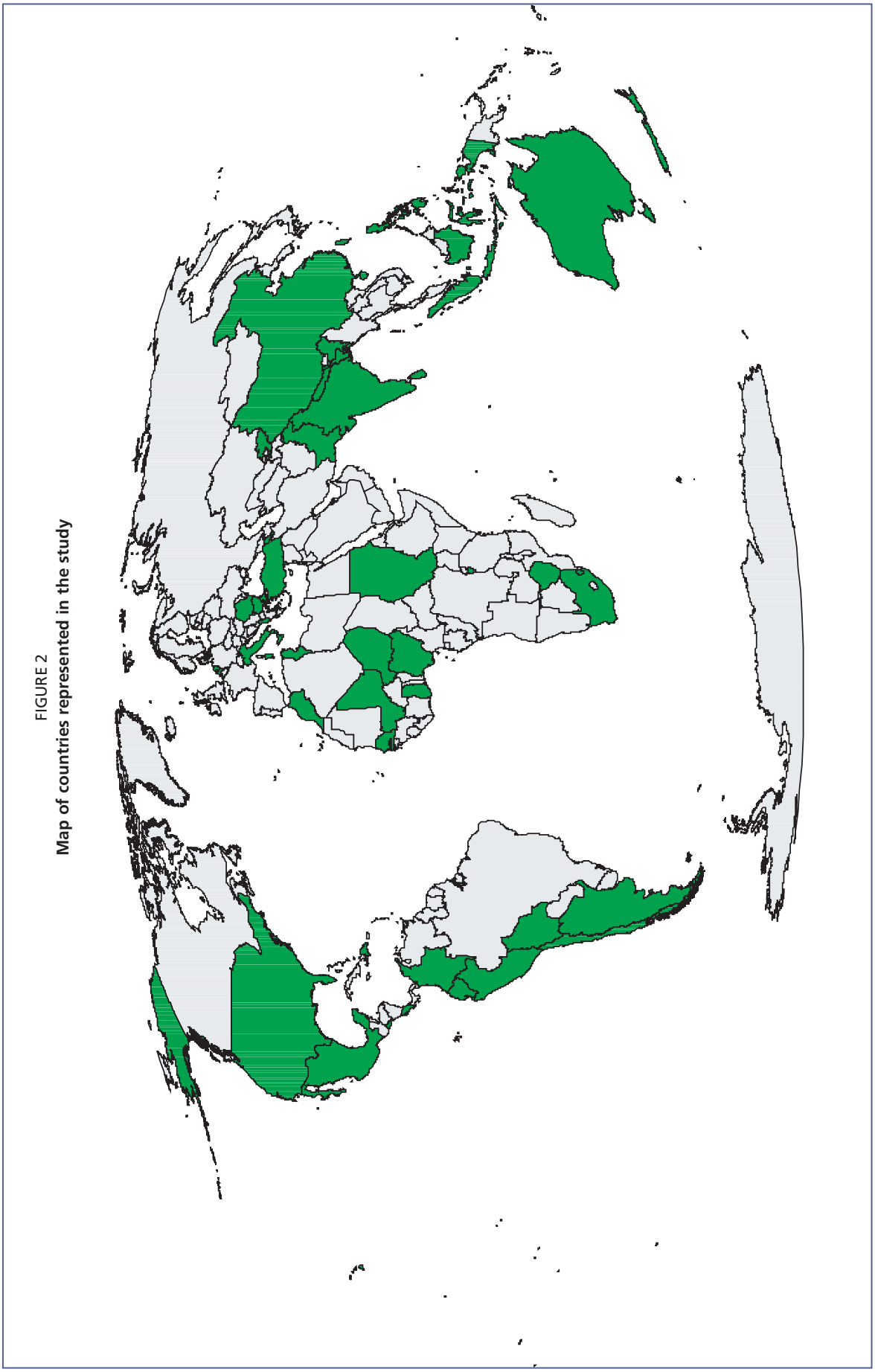


FIGURE 2
Map of countries represented in the study

Chapter 2

Policy and legal framework for irrigation management transfer

This report defines IMT as the transfer of responsibility and authority for management of irrigation systems from government agencies to private-sector organizations that are meant to represent the interests of water users. Most commonly, these are WUAs, which provide a forum whereby water users act collectively to govern an irrigation system or subsystem. This may include the roles of deciding which irrigation services should be provided, how and by whom they will be provided, and under what terms and conditions. The actual management of the irrigation system (i.e. delivery of services) may be done by the WUA or third parties. After IMT has been adopted, such services may be financed entirely by farmers or with some combination of resources provided by farmers and government.

This chapter examines sample cases of IMT from around the world in order to discover how the policy, legal and institutional framework for IMT has been constructed in many different contexts. Annex 1 summarizes basic information on how IMT was structured in the 43 cases for which there are IMT country profiles.

RATIONALE FOR ADOPTING IMT

A significant aspect of IMT is its relative similarity across different parts of the world. This is partly related to the basic need for sustainable irrigation management under declining levels of government investment. It is also related to the similar ways whereby the technical, agricultural, organizational and economic aspects of irrigation systems have to interact with one another in order to ensure productive and self-sustainable management.

There are five main expectations held by governments, financing institutions, technical experts and even farmers that motivate them to promote IMT:

- It will reduce the burden of costs, staff requirements and technical or management problems faced by governments. Although in the beginning IMT may increase the cost of irrigation for farmers, it is expected that farmers organizations will impose more cost-effective measures and that over time the productivity of systems will increase more than will their costs for farmers. Thus, the most commonly stated reasons for adopting a policy of IMT are to reduce financial and managerial burdens on governments and to stimulate a more productive and self-reliant irrigated agriculture.
- It will lead to improvements in the agricultural productivity and economic profitability of irrigation systems because this is the core concern of farmers, whereas it may not be an essential concern of bureaucracies. Farmers will be inclined to manage irrigation systems so as to increase the area irrigated, cropping intensities and/or crop diversity, yields and economic returns.
- It will motivate farmers to pay more for their irrigation system because they will be empowered to take over the authority to define what their irrigation services will be, who will provide them, and how and at what costs these will be provided.
- Because of farmer interest in results, governance by farmers organizations will improve the accountability of irrigation system management to farmers, and this will produce more efficient and equitable water delivery, canal maintenance and settlement of disputes.

BOX 1
Adoption of IMT in Albania

In 1994, Albania adopted IMT after a period of civil unrest that followed collapse of the central government in the early 1990s. By 1994, most of the irrigation infrastructure was badly deteriorated or damaged. At first, the irrigation agency resisted management transfer. Farmers lacked money to pay the cost of O&M. However, the Government and the World Bank agreed on a programme to transfer management to WUAs and rehabilitate irrigation systems. The WUAs played a key role in planning, supervising rehabilitation, collecting water charges, and paying part of the cost of rehabilitation. This participatory role helped to generate a new feeling of ownership of the systems by farmers. Extensive training was given to farmers in technical, financial, administrative and agricultural topics. Agency staff were trained and reassigned. By 2001, Albania had 404 WUAs and 22 WUA federations, serving a total area of 169 550 ha.

Source: Vermillion (2004).

TABLE 2
Factors motivating adoption of IMT

Factors	Number of countries where factor is:	
	Most important	Second most important
Shortage of government funds to allocate to irrigation O&M	24	6
Poor maintenance of irrigation systems	5	13
Government not able to collect enough fees from water users	4	11
Part of general liberalization policies of government	3	0
Poor operation of irrigation systems	2	2
Farmers requested to take over management of schemes	2	4
Donors and international agencies	2	0
Political transition in former Soviet Union countries	2	0
Pressure from central department (such as planning or finance)	0	3

- Collective organization for irrigation management will probably produce collective action in related areas, such as in the group purchase of agricultural inputs, development of agribusiness ventures and marketing. It is expected that this larger collective action will promote development of more responsive support services and will create pressures to ensure more reliable provision of water to the system.

The FAO/IWMI database of IMT profiles provides data on key factors that motivated the adoption of IMT in locations around the world. By far (24 cases) the most important motivation for adopting IMT programmes was the shortage of government funds for irrigation O&M (Table 2). Box 1 illustrates that the implementation of IMT in Albania responded to most of the expectations described above.

Two other related factors are the inadequate collection of water fees (first or second most important reason in 15 cases) and poor O&M of irrigation systems (first or second most important reason in 22 cases).

Finally, with respect to motivation for transfer adoption, IMT is sometimes promoted primarily by farmers (as originally in Colombia) and sometimes by donors and technical assistance agencies (as in Indonesia and Romania). It is often part of a broader pattern of liberalization and privatization in the economic policies of the government (as in Mexico and Andhra Pradesh, India). In Uzbekistan and the Kyrgyz Republic, it accompanied the political and economic transitions following the demise of the Soviet Union.

POLICY AND LEGAL BASIS FOR IMT

Where irrigation agencies are strong and/or transfer policies are modest, IMT policies can be adopted by the sectoral line agency, as was the case in 26 of the 43 country profiles of IMT from the survey. However, in 20 cases, the policy was adopted by the head of state, and in 19 cases it was adopted by an act of parliament or the legislature. In 15 cases, the policy was issued by a cross-sectoral department (e.g. a finance or planning ministry).

TABLE 3
Authority transferred

Function devolved	Number of countries where authority is:			
	Fully devolved	Partially devolved	Not devolved	Total
Operations	31	12	0	43
Maintenance	30	13	0	43
Finance O&M	21	19	1	41
Can apply sanctions & resolve disputes	20	20	0	40
Can develop cooperative business	17	9	9	35
Finance rehabilitation & modernization	10	18	9	37

Table 3 shows that full authority for operations or water delivery was transferred in 31 cases whereas partial authority (i.e. where the agency still plays a role) was transferred in 12 cases. A similar pattern exists for transfer of maintenance responsibility. There was less of a tendency to transfer full financial responsibility to WUA. The policy to transfer responsibility for future financing of rehabilitation and modernization of systems was often less clear than that of O&M, but in 10 cases it was apparently fully devolved. This tends to be a function that agencies prefer to retain because of the ability to access funds from loan programmes. The authority to apply sanctions and resolve disputes was similarly fully devolved in only half the cases. In the other half, rights of appeal or larger problems required involvement by the government, and explicit measures were retained for this. In 17 cases, WUAs had the right to develop cooperative businesses beyond just managing irrigation O&M. This was often because of a desire by farmers to either subsidize the cost of water or to increase the productivity of the WUA. This result represents a discontinuity from the former management of the system by the public sector (which was normally concerned only with the activities related to the management of water). However, it also indicates the desire of farmers to run their activities in a more collective manner.

Irrigation management transfer occurs at different hydraulic levels of irrigation systems. The question of up to what level IMT should be implemented is often a complex issue involving considerations of:

- agency staff displacement;
- managerial or financial capacity of the government;
- financial and governance capabilities of farmers;
- availability of alternative management capacity;
- fragility of the infrastructure.

In 25 cases, IMT has been implemented up to the distributary or secondary canal level. This means that the WUA only manages the system directly up to the distributary level. Although WUAs at the distributary level may send representatives to a main system council, they do not have management authority above the distributary level.

Although most of the WUAs now manage subsystems at distributary level, this has often been the result of an evolution from lower levels. In several countries (Argentina, Armenia and Indonesia), IMT processes were started by developing WUAs at the tertiary canals (watercourses). However, in general, such small organizations have shown little financial autonomy and reduced technical capacity for an efficient operation of the system. As a result, a migration process from lower to higher hydraulic levels has often taken place. In some cases, it has taken the form of a federation of the smaller associations. In others, the larger association has integrated some of the elements of the smaller associations but remains the main body for governing the system.

In 10 cases, IMT includes main and branch canals; and in another 10 cases, it includes the entire system, including the head works (i.e. dam or weir). In some cases, where IMT was, in the beginning, officially declared to be implemented up to the main system level, such as in Andhra Pradesh, India, and in Mexico, subsequent experience

TABLE 4
Type of organization taking over management after transfer

Type of organization	Number of country profiles	Examples
Water users association	39	Widespread
Irrigation district	5	United States of America, China
Mutual company	3	United States of America, Spain
Local government	3	Turkey
Public utilities	2	France
Joint government / farmer committee	1	Sri Lanka, Philippines
Limited responsibility entity	1	Mexico

has shown a reluctance to do this for large-scale systems. Political resistance (mainly from irrigation agencies) and technical/financial challenges for farmers organizations can make this level of transfer more problematic.

Another key policy issue for IMT is the question of what kind of governance and/or management entity will take over authority and responsibility for irrigation management after the transfer. While several types of organizations are being used, by far the most common type is the WUA (WUA-based entity), to which management has been transferred in 39 cases (Table 4). Management has been transferred to irrigation districts in five cases. Districts often have a higher level of legal recognition than WUAs, including receipt of water rights, legal status as a semi-municipal entity, and infrastructure property rights. In three cases, mutual companies took over management. Generally, these are companies owned and governed by farmer shareholders. Public agencies may also transfer management to local governments (Turkey), public utilities (France), joint government/farmer organizations (Sri Lanka), and limited responsibility entities (Mexico). Often, these organizations already existed and were adapted, or they were established for the purpose of IMT.

In small irrigation systems or in distributary and tertiary blocks of large systems, it is common to see WUAs that handle both governance and management functions after transfer. Here, governance means mobilization of authority, adoption of policies, and selection and supervision of key management staff. Management means the mobilization of staff and resources to deliver those services mandated by the governing authority. In larger systems or at higher hydraulic levels, it is common for WUAs to handle only governance or oversight functions, while professional staff or third-party companies handle day-to-day management tasks. However, in countries as diverse as Nepal, China, the United States of America and Taiwan Province of China, WUAs hire and manage their own staff and mobilize farmers for occasional maintenance works for systems as large as 10 000–100 000 ha.

Table 5 details which parties have provided water delivery and canal maintenance services after IMT at field, distributary and main system levels. In 38 out of 42 cases, either farmers or WUA staff have been responsible for water delivery at the field canal level after transfer. In 32 of 38 cases, either farmers or WUA staff have been responsible for canal maintenance at the field canal level after management transfer. In the majority

TABLE 5
Entity providing water delivery and canal maintenance after IMT

Entity delivering water	Water delivery			Canal maintenance		
	Field level	Distributary level	Main system level	Field level	Distributary level	Main system level
Farmers coordinated by WUA	17	5	4	14	8	3
Staff of WUA	16	14	9	15	10	6
Farmers not coordinated by WUA	5	0	0	3	1	0
Staff of government agency	3	11	14	2	10	14
Staff of private-sector contractor	0	1	2	2	3	1
Staff of public utility or state-owned enterprise	0	3	2	0	3	4
Staff of company owned or contracted by WUA	1	1	0	2	2	1
Total cases reported	42	35	31	38	37	29

of cases where farmers are performing water delivery and canal maintenance at the field canal level, farmers are coordinated by their WUA. In about 38 percent of case, WUA staff provide water delivery or maintenance of field canals. This indicates a high proportion of WUAs where staff takes full management responsibility from the head to the lowest level of the system.

At the distributary canal level, the most common situation is for staff of a WUA or farmers under the coordination of the WUA to manage water delivery along the distributary canal (19 cases). For canal maintenance, in 19 cases, routine canal maintenance is handled either by farmers or staff of the WUA, compared with only 10 cases where distributary canal maintenance is handled by staff of the government agency.

At the main system level, the predominant entity responsible for water delivery and maintenance is the staff of government agency, with 14 cases for each category, out of 31 and 29 cases, respectively. Nevertheless, the number of cases where the management entity is the WUA staff or farmers coordinated by WUA is also significant (13 and 9 cases for the respective categories of water delivery and canal maintenance).

POLICY AND LEGAL BASIS FOR WUAS

There is a diversity between countries in the institutional framework for WUAs that is established prior to or during adoption of management transfer. In most cases, this framework is only partial at the time of policy adoption and is elaborated further over time.

Table 6 shows the number of countries that have adopted each of several key policy and institutional features of WUAs. The right for WUAs to make profits is restricted in many countries owing to the requirement that WUAs maintain a tax-exempt status.

Table 7 shows (for 24 cases) the kinds of legal rights and responsibilities that have been granted to WUAs. In 15 cases, the WUA has been granted a water-use right, but often this is not an absolute legal right and is more an official allocation rule by government. In the 14 cases where the WUA has been established voluntarily, this means by approval granted through a majority vote of a general assembly of the members.

Water users associations vary in their mandates that they have received from governments. However, in all 24 cases reported, irrigation management is the key function (Table 8). An issue in many countries is whether or not WUAs should focus only on irrigation management or whether they should take on other secondary functions, such as managing water used for non-irrigation uses (e.g. fish, livestock, or domestic use), developing agribusiness, and marketing. In some countries, farmers may feel the

TABLE 6
Institutional framework for WUAs

Element included in institutional framework	Number of countries
WUAs have clear right to use & maintain irrigation infrastructure	32
WUAs have legal status to obtain credit & enter into contracts and to enforce sanctions against members who break rules	29
Arrangement for settling irrigation-related disputes, including process of appeal	26
Arrangement to extend technical advisory service to WUAs	24
Legal water right for WUAs	20
A policy to reorient the mandate of the irrigation agency	18
A policy to redeploy agency staff previously assigned to O&M	14
Legal water right for individual water users	14
WUAs have legal right to develop businesses and make profits	12
Organizational link for the WUA to water basin management	7
Virtually no specific policies or legal framework for IMT/WUAs	5

TABLE 7
Legal rights of and responsibilities granted to WUAs, 24 countries

Legal rights and responsibilities granted to WUAs	Number of countries
WUA pays for O&M	24
WUA has legal status	23
WUA has water use right	15
WUA established voluntarily	14

TABLE 8
Purposes of WUAs as specified by law

Purposes of WUAs as specified by law	Number of countries
Irrigation	24
Drainage	19
Groundwater	7
Agribusiness	6
Manage watershed	5
Construct or extend system	4

TABLE 9
Legal rights of WUAs

Legal rights of WUAs	Number of countries
Have bank accounts & make contracts	18
Can fine members	17
Water right or water-use right	15
Can own property	11
WUA canals have rights of way	7
Can cut off water supply to users	6

TABLE 10
Rights and responsibilities of WUA members

Rights and responsibilities of WUA members	Number of countries
Pay O&M fees	23
Voting rights	23
Membership is voluntary	13
Water rights held by members	7
Must give land for irrigation & drainage infrastructure	6
Members can obtain compensation for damages	3

need to engage in secondary business enterprises in order to cross-subsidize the cost of irrigation maintenance (as is often the case in China). In Sri Lanka and the Philippines, some WUAs organize the provision of agricultural inputs and other services to farmers who lack such support from government or private-sector sources. In the Philippines, Indonesia and Romania, WUAs develop agribusinesses in order to increase the profitability of irrigated agriculture for their members.

Table 9 indicates the legal rights that have been granted by governments to WUAs. The most common of these (18 out of 24 cases) is the right to enter into contracts with third parties (including the government) and hold bank accounts. Although most of the legal rights mentioned in Table 9 are desirable in WUAs, a significant number do not posses them and, hence, the scope for improving their legal structure is considerable.

Table 10 indicates the rights and responsibilities that have been legally granted to WUA members (24 countries). The most important of these are obligations of WUA members to pay O&M fees and the right of WUA members to vote in general assembly elections. Despite pressures in many places for WUA membership to be mandatory (in order to ensure financial and managerial viability of irrigation systems), it is often kept voluntary. This is often done with the proviso that non-member water users have to pay more for the water charge and are still under obligation to obey WUA rules. Water rights are more often held by individual members in Latin American countries, Europe and the United States America than elsewhere. Farmers are often required to give land away for the installation of irrigation canals and other structures but they often receive some compensation. In most cases, the actual water right is held by the WUA, which in turn grants rights to the users. The criteria for granting such rights should be reflected clearly in the by-laws of the association, but this is not always the case.

In all 24 cases, WUAs have a general assembly of members, an executive council of representatives, and a chief executive officer. In 19 out of 24 cases, the WUA can federate to higher than base levels. WUAs are often simple organizations that lack significant checks and balances to prevent misuse of power within them. WUAs had audit committees in only 7 cases of the 24 cases reported.

One issue of growing concern is the role of gender in WUA membership and management of WUA. Inequalities occur where women play significant roles in water use or management and have key interests in irrigation management but are not represented in the WUA. However, people often find it easier to place trust in women when they are not perceived to have significant roles in factions. In some cases, such as Turkey and Nepal, efforts are being made to include more women on WUA boards

and in WUA positions, including that of treasurer and WUA head. Box 2 reports an interesting initiative in Madhya Pradesh (India) to promote greater opportunities for women to vote and be represented in the management committees.

Box 3 illustrates a case where the government can authorize a WUA to expropriate land within their service area for reasons of public interest.

IMT AND FINANCING IRRIGATION

A key issue for IMT is how to make irrigation become financially sustainable. As indicated above, transfer of management responsibility to farmer organizations is normally accompanied by transfer of financial responsibility to water users. There are a number of policy questions related to financing irrigation management. These become prominent for countries considering or implementing IMT. Key financial policy issues include:

BOX 2

Helping to ensure that WUAs represent women's concerns

The state of Madhya Pradesh in India recently adopted an act that includes many aspects of PIM that are similar to the reform in Andhra Pradesh. Although the act states that the management committee of the WUA should include a woman member with a voting right (if she were not formally a landholder, she would not have a voting right). Some officials and others believe that the issue of gender representation has not yet been addressed effectively. Some are proposing that the Land Revenue Act be amended to enable a wife or other woman family member of a landholding family to, if elected, automatically have the landownership be transferred to her temporarily so that she could be made a member of the management committee and have equal voting rights with other committee members. The issue is still under discussion but the principle of representation of women

Source. R.K. Chachondia, personal communication, 2003.

BOX 3

Theoretical process for establishing WUAs in Morocco

In Morocco, WUAs are public-interest associations and have legal status. They are established voluntarily, and membership is open to all owners and tenants of land within the irrigation scheme. They can be established either on the initiative of the Government or on the initiative of two-thirds of the owners or tenants of the lands served by the same irrigation system. Existing agricultural associations (associations syndicales agricoles) that are involved in water resources management for agricultural purposes can also be transformed into WUAs. The law provides a model statute for WUAs.

The WUA general assembly elects six out of a total of seven members of the council, the remaining one being a representative of the Government. The council is responsible for preparing the annual budget of the WUA and for implementing the decisions taken by the general assembly. The functions of WUAs are specified in an agreement stipulated between each WUA and the Government. These agreements include *inter alia* the rates of contributions of the WUA and the Government to cover the costs of maintenance and repair works, and the responsibilities of the WUA to carry out all works and to cover all costs related to the delivery of irrigation water and canal O&M.

WUAs are responsible for determining and collecting the annual dues to be paid by their members. In addition to this revenue, they can receive government subsidies. Moreover, the Government can delegate WUAs to collect other government charges from their members. In relation to rights and powers, although WUAs in Morocco are not granted specific water rights or rights on the irrigation infrastructure, the Government can delegate to them the power to expropriate land within their service area for reasons of public interest.

Source: Morocco IMT country profile (2003).

- Who should pay for irrigation – owners of irrigated land, farmers who rent or sharecrop on irrigated land, those who use irrigation for non-farming uses (e.g. rural industry, household use or livestock), or consumers of irrigated crops? In most case, the owner is responsible for the payment, but this responsibility can be delegated to renters of any kind if stipulated in the rent contract. However, this varies between countries, and how this is done depends on political pressures and other local factors.
- Are water users already paying for part or all of the cost of irrigation when they pay land taxes that are higher on irrigated land?
- Can farmers afford to pay the full cost of irrigation? Under what conditions are subsidies justified?
- How should water charges be designed so as to not only pay for irrigation but also provide incentives for careful water use and accountable provision of service? Evidence from China and other countries where volumetric fees have been instituted suggests that this is a key tool for improving water-use efficiency.
- How to increase the collection of fees? In Maharashtra, India, even strict enforcement of fee collection with police involvement rarely obtains more than a 50-percent collection rate. Introduction of WUA and IMT can provide incentives to farmers to increase their payment of fees. This has happened in the Philippines, Indonesia, and Mexico.
- How should the funds raised be allocated? The allocation of funds collected by WUAs should be allocated according to the pre-established priorities set by farmers, which further increases the incentives of farmers to pay water charges. Should government play a role in this allocation? In principle, government should refrain from such interventions, but where it finances part of the O&M costs (Box 3), it could play a role.
- How to finance rehabilitation and modernization of systems? Prior to the transfer, rehabilitation and modernization works were financed by the government. However, governments often lacked the necessary financial resources, and this has led to a state of malfunctioning of many irrigation systems. After the transfer, farmers and WUAs are keen to make their system function well or improve it, and they are willing to contribute to the financing. However, in most cases, they cannot afford to pay the full cost of the rehabilitation works. Some examples of how to share the financial burden are given below.

In the late 1990s, the collection of the irrigation service fee in Indonesia had fallen to very low levels. It was based on having the fee collected and channelled to district revenue departments. However, it was unclear to what extent the funds collected were actually reallocated to the irrigation systems from which the funds were collected. At the outset of a new nationwide IMT programme at the turn of the century, the Government decided to allow WUAs to set, collect and allocate the fees themselves. This increased substantially the incentives of farmers to pay their fees, insofar as their WUA was viable and trustworthy.

The main challenge in financing irrigation management after IMT is to collect and allocate enough funds to prevent rapid deterioration that leads to premature demands for rehabilitation. Around the world, countries experience the cycle of irrigation construction, followed by underinvestment in maintenance, followed by rapid deterioration, followed by pressures for "premature" rehabilitation, which weigh heavily on the debt burdens of developing countries. This is a widespread problem, especially in developing countries.

In response to this problem, collaboration between the World Bank, the Government of the Netherlands and the Government of Indonesia has resulted in pilot implementation of a new model to replace the widespread pattern of premature and repeating rehabilitation programmes. As part of recent water sector reforms, the

Government of Indonesia, through sample provinces and districts in Java, experimented in 2002 and 2003 with a district, or "kabupaten", irrigation improvement fund. The fund is set up at district level using district and/or provincial funds (and perhaps loan funds for startup). A simple formula is established whereby funds are allocated among irrigation systems to federated WUAs that have submitted proposals. The funds are mainly used for incidental repairs and improvements. In order to submit a proposal, an irrigation system must have an established WUA and should be conducting an agreed standard of maintenance. Districts adopt certain criteria for prioritizing proposals, such as the amount of WUA investment pledged, and the number of farm families who will benefit. It is expected that the fund will operate annually and will diminish the need for rehabilitation programmes through increasing investment in routine maintenance and incremental repairs and improvements. In Mexico, the government contributes 50–75 percent of the cost of the works. As in the case of Indonesia, the governing bodies of WUAs define the works to be undertaken in cooperation with the public irrigation agency. The financing arrangements are only for short periods, and this limits considerably the affordable amount of the works to be done.

Regarding the issue of how IMT programmes themselves are financed, the survey indicated that, financing for IMT programmes came primarily from international sources in 19 countries (through loans). In 15 countries, IMT was financed primarily from national funds. In five cases, IMT was financed about equally by international and national sources of funding. In most cases where international assistance is involved, some grant funds are also provided by bilateral public or NGO sources. This is particularly the case in the early stages of reform in order to conduct pilot testing and to derive a methodology appropriate for national dissemination.

REFORM OF IRRIGATION AGENCIES

Irrigation departments tend to resist IMT where they perceive it to be a threat to their jobs, budgets or decision-making powers. Irrigation agencies may be able to reassign their staff to higher hydraulic levels (above the level of transfer), to relocate staff to systems where IMT is not taking place, to assign them to other functions than irrigation O&M, or to have staff deputed to work for WUAs (as has happened in Andhra Pradesh and Madhya Pradesh, India). Where such options are feasible only to a limited extent, irrigation agencies may slow or resist the process of reform.

Table 11 displays the main roles that government irrigation sector agencies continue to play during and after IMT has occurred. The most common of these are to make policies, laws, strategies and plans about irrigation and WUAs. In most cases, governments continue to construct, rehabilitate and modernize irrigation systems after

TABLE 11
Roles of government irrigation sector agencies relative to WUAs and water users

Roles	Asia (11)	Latin America (7)	Africa (3)	Europe (3)	Worldwide (24)
Make policy, laws, strategy, plans about WUAs	11	7	3	3	24
Establish WUAs & approve WUA statutes	11	7	3	3	24
Regulate, supervise & inspect WUAs	11	6	3	3	23
Provide technical assistance & training	10	3	3	3	19
Construction & rehabilitation	10	2	2	2	16
Manage main system/large systems	9	3	2	1	15
Help settle disputes	7	4	2	0	13
Grant water allocations & concessions	5	6	1	1	13
Conduct technical & management audits	6	3	1	1	11
Arrange maintenance contracts with WUAs	4	0	0	1	5
Approve WUA O&M plans & budgets	1	2	1	0	4
Set water service charges	3	0	0	0	3

IMT. They also tend to continue to manage higher hydraulic levels of irrigation systems and help settle disputes with WUAs. In cases where the government retains a close role in irrigation management, the irrigation agency may arrange maintenance contracts for WUA and review and approve WUA O&M plans and budgets. In countries where the government prefers to retain a common level for water charges between different irrigation systems, it may continue to set water charges.

In south Australia, South Africa and the "Office du Niger" in Mali, IMT programmes have included comprehensive strategic planning and restructuring of the irrigation agency. In the United States of America, IMT has included negotiations between farmers and bureau staff about changes in staff jobs, assignment of expenses, and benefits and responsibility for payment of pensions and insurance for staff transferred to farmer-managed irrigation districts. Agency reform may include:

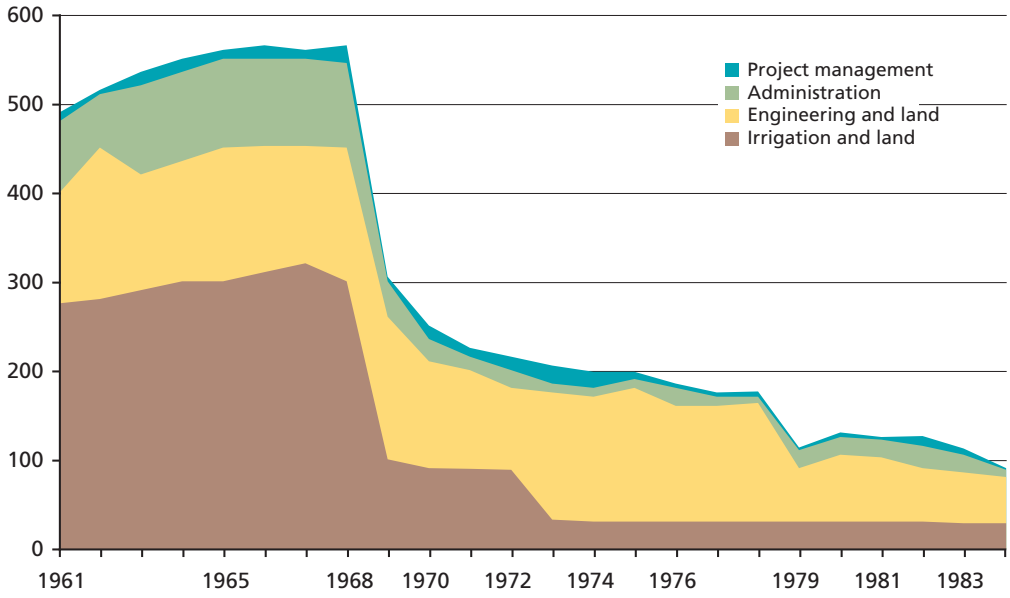
- downsizing or "rightsizing" of the agency;
- staff re-deployment;
- training;
- early retirement;
- compensation packages;
- restructuring of the agency;
- changing the roles of the agency.

Figure 3 shows the downsizing effects of IMT in the case of the Columbia Basin Project in the United States of America.

New roles that are taken on by agencies after IMT include:

- more river basin management tasks;
- regulation of water use;
- watershed protection;
- monitoring water quality;
- providing technical and financial support to WUAs;
- monitoring and auditing WUA performance.

FIGURE 3
Trends in agency staff following IMT implementation, Columbia Basin Project



Source: Svendsen and Vermillion, 1996.

IMPROVEMENTS NEEDED IN THE INSTITUTIONAL FRAMEWORK

The experts who provided the IMT profiles were asked about the policy and institutional problems and issues that arose during IMT or remained thereafter. Table 12 ranks these in order of how frequently such problems and issues were identified by the respondents. The most commonly mentioned problem was the lack of clarity about what financial and technical assistance the government would provide to WUAs after management transfer (28 cases). This is related to three other common concerns about financing (Table 12).

TABLE 12
Policy and institutional issues for IMT

Outstanding policy or institutional issue	Number of cases
Political support provided for IMT	28
Unclear legal status of WUA	28
Unclear who pays for rehabilitation in the future	22
Unclear water-use rights	17
Unclear rights over infrastructure	14
Inadequate policy or legislation	13
Unclear role & authority of agency	11
Farmers cannot afford O&M	8
Unclear who owns equipment/machinery after IMT	7
Interference of government in WUA affairs	6
WUA lacks authority to apply sanctions	6
Need new water fee system	6
Unclear land tenure or fragmentation	4
WUA leaders unaccountable to WUA members	3
Debt settlement after IMT	3
WUA not based on hydraulic boundaries	3
Subsidies for irrigation after IMT	1

The issues listed in Table 12 were all key issues requiring further consultation, negotiation and agreement with the stakeholders involved. They give an indication of the extent of complex issues that accompany an IMT reform process. They also indicate the importance of providing extensive negotiations and opportunities to build the institutional framework and common support for IMT.

Chapter 3

Implementing irrigation management transfer

This chapter summarizes information obtained from the IMT country profiles about how IMT has been implemented in the 43 cases in the sample. Annex 2 provides data on the scale and rate of implementation of IMT for the 43 cases.

MOBILIZING SUPPORT AND PUBLIC AWARENESS

Normally, an IMT programme is supported and developed initially by a small group of proponents, being government officials, NGOs, technical experts or donors. In the beginning, IMT is sometimes promoted by farmer representatives (as in Colombia), but more often it is promoted by central governments and donors. It is often resisted, especially in the early stages, by: (i) irrigation agencies that fear they will lose jobs and funds; (ii) farmers who do not think they can pay for the full cost of irrigation; and (iii) by politicians who want to offer free water services to rural populations.

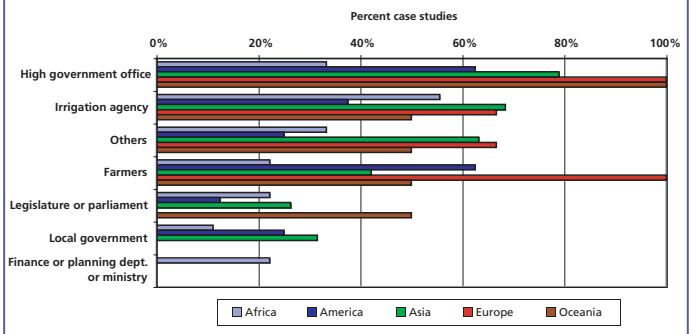
There are a number of approaches whereby sector reform organizations promote or generate a common vision of IMT among stakeholders. The most common of these are:

- workshops and policy/planning meetings;
- adoption of liberalization or privatization policies related to the agriculture and irrigation sectors;
- holding negotiations with farmer groups;
- pilot projects;
- research;
- study tours;
- attendance at international meetings;
- loan programmes and related consultations from international financial institutions;
- making assistance from international agencies or government contingent on adoption of IMT;
- public awareness campaigns;
- stakeholder consultations;
- adoption of preliminary policies and a legal framework that supports IMT.

Before Mexico adopted its IMT programme, senior water resources officers made several visits to farmer-governed irrigation districts in the United States of America. Prior to Turkey launching its management transfer programme, several of its lead water resources officers went to Mexico to study its experience with IMT. In Indonesia, government staff and experts held stakeholder consultations around the country in order to present their views and generate support for IMT. The World Bank, FAO and other technical assistance agencies, foundations, NGOs, and the INPIM have sponsored study tours, pilot projects, and meetings whereby government officials, technical experts, and farmers have witnessed firsthand progressive experiences around the world with implementing IMT.

The most common main source of support for IMT has been central government at the national or provincial level (32 cases). There are a large number of sources of support, and irrigation agencies were identified as a main source of support in 25 cases. Farmer organizations (19 cases), financing organizations and international technical agencies (16 cases), legislatures or parliaments (14 cases) and local governments

FIGURE 4
Sources of support for IMT by region



(9 cases) were also significant sources of support for IMT programmes. Support was also generated by pilot projects and the media. By region (Figure 4), it seems that Africa shows much less support across sources than all others. It is also interesting to note that support at the higher levels of government and farmers has occurred in the developed world (Europe and Oceania) while the irrigation agencies seem to have provided more support in Asia and Africa.

It is often the case that initial resistance by irrigation agencies and local governments changes to support after a period of raising awareness, pilot projects and negotiations. One interesting case is that of the Columbia Basin, United States of America. The main IMT activity was a five-year period of negotiating agreements on a number of issues, including staff jobs and benefits, and assignment of costs and responsibilities for different components of the irrigation system. After the negotiations, all the parties concerned supported management transfer. This case highlights the fact that the time frame for real negotiations can be an important element in the IMT process.

Change Finance or Planning dept or Ministry to Finance or planning dept. or ministry

IMPLEMENTING IMT AND PROBLEMS ENCOUNTERED

Implementing IMT involves *inter alia*:

- creating formal farmers organizations such as WUAs;
- preparing water users to take over the governance and management of irrigation schemes;
- making essential technical and physical improvements in irrigation systems with farmer participation;
- reforming the irrigation agency;
- training staff for new functions, introducing new forms of auditing and monitoring.

TABLE 13
Process of implementing IMT

Steps included in implementing IMT	Number of countries
Creation of WUAs	35
Democratic selection of WUA leaders	33
Technical training in O&M for WUA leaders/staff	32
Farmer contribution to cost of repairs/rehabilitation works (money, labour and/or materials)	32
Farmer participation in identifying repairs/ rehabilitation works	31
Training for WUA leaders & staff in finance & administration	30
Training for irrigation agency staff	27
Repair, rehabilitation and/or modernization of infrastructure	27
Formation of an IMT programme steering/coordination committee	24
Planning & review meetings with farmer participation	23
Monitoring & evaluation programme	23
Agency O&M staff previously in units that were transferred have been assigned new jobs or moved to other locations after IMT	17
Agency O&M staff have remained in units transferred to WUAs but have been put under direction of WUAs after IMT	13

Table 13 shows the number of cases where each of the potential steps in implementing IMT has been included in IMT programmes. Many steps are common across the world.

Part of the reason for this commonality in approaches across countries is the extensive involvement of international financing agencies and technical assistance agencies in IMT programmes. Less common in IMT are actions to restructure or reform the irrigation agency (implemented in Mexico, Colombia and the United States of America), issuance of new

water rights (Mexico), transfer of ownership or clear legal use and repair rights for irrigation infrastructure (the United States of America, New Zealand and transfer of use/repair rights in Indonesia), and building an effective support system for WUA in irrigated agriculture. Both Mexico and Colombia have developed WUA networks that provide support services to WUAs. Although agency reform and support services for WUAs are also important to ensuring success, they are more sensitive or complex and are often not implemented. Box 4 provides an example on the process followed for IMT implementation in Colombia.

Creating a WUA normally involves adopting a constitution (or charter of authority or articles of association) and by-laws. This is often followed by the preparation and adoption of a transfer agreement. These constitute the essential rights, responsibilities, authority and rules that guide WUAs, the government and third parties. Annex 3 provides a brief indication of what these key documents includes. The WUA may prepare irrigation service plans on an annual basis. These detail responsibilities, schedules, and budgets for O&M works to be undertaken. Where third parties help in providing management services, irrigation service agreements may be prepared by both the WUAs and third-party service providers.

BOX 4

The Colombian IMT methodology

The Government of Colombia has not promulgated a formal, standard IMT model or methodology. Rather, it has followed an ad hoc series of negotiations between the irrigation agency and the water users, on a case-by-case basis. However, based on interviews with key officials, a general format for the Colombian IMT process is summarized below:

- Promotion. Once a system has been chosen for transfer, users are informed of the purpose and scope of the programme, as well as their rights and obligations.
- Assessment of district conditions. The agency (directly or through a contract) conducts an assessment of the physical, administrative and organizational conditions of the system.
- Preparation of an IMT "support plan". Based on the results of the previous step, the agency and the WUA prepare a support plan to structure the transfer process. The plan is based on the particular conditions of each district. It includes training and strengthening of financial and organizational aspects.
- Agency–WUA negotiations. This is the core of the IMT process. It is done on a district-by-district basis. In general, the main issues negotiated concern the extent and nature of rehabilitation, the amount and conditions for subsidies, and the extent of training required.
- Agreement on key issues. Generally, implementation of IMT and the support plan begins as soon as an agreement is reached on key issues. It is an iterative process. The support plan is generally implemented partly before transfer and continues well afterwards.
- Signing of "administrative concession". This occurs when all negotiations are settled and transfer conditions have been agreed on. Law 41 mandates that a "concession" or "contract" between the Government of Colombia and a WUA must be signed in order to enact transfer. The concession transfers virtually full powers for management to the WUA, with the exception that ownership of scheme infrastructure remains with the government.
- Formal transfer of the district. Transfer of an irrigation district to a WUA is formalized with the signing of the concession.
- Agency-sponsored monitoring and evaluation. It is the responsibility of the agency to supervise and assist the district in order to monitor and evaluate the management performance of the WUA-governed district for six months to a year after transfer.

Source: Colombia IMT case study (2004).

FIGURE 5
Decision tree for the Colombian IMT model

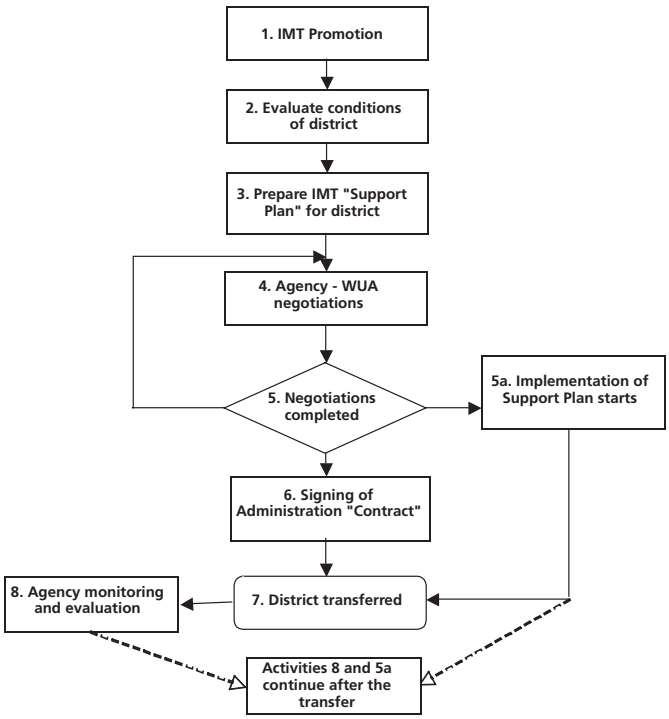


Figure 5 is a schematic representation of the decision-making process adopted in Colombia for the implementation of the IMT programme. At some point, if the farmers do not agree with the plan proposed by the Government, the negotiations will continue until agreement reached or the system concerned is left out of the IMT programme.

Several unforeseen problems have emerged during the implementation of IMT. Table 14 shows (by continent) the most commonly reported problems and issues involved in implementing IMT. Again, many of these problems are universal. Thirty-one of 43 cases reported that the irrigation agency resisted IMT, either in terms of slowing it down, making it more modest in scope, or stopping it. This was the case in the majority of countries in Asia, Latin America, Africa and Eastern Europe. However, as noted above, initial resistance often switches to support later on, after negotiations and adjustments are made to protect some of the interests of agency staff.

In addition to the main key problems listed in Table 14, other specific problems or issues that arose during implementation of IMT have included:

- disagreements over whether WUAs should be profit-making or not (Colombia, Morocco and Romania);
- late or poor disbursement of funds for IMT activities (Ecuador, Andhra Pradesh in India, and Indonesia);
- lack of markets for private-sector providers of support services for WUAs (Niger, Tunisia and Argentina);
- difficulties in registering WUAs as legal entities (Rajasthan in India, and Indonesia);
- concerns about outstanding debts of WUAs or farmers (the United States of America, and Colombia);
- organizational problems related to water shortages (Costa Rica);
- problems caused by WUAs not being based on hydraulic boundaries (Armenia and Indonesia);
- inadequate public awareness about IMT (Hebei in China, and Madhya Pradesh in India);
- cumbersome government procedures for implementing IMT (Orissa in India, Sri Lanka and Indonesia).

Boxes 5 and 6 illustrate different approaches for IMT implementation in New Zealand and Mali. The experience of the Office du Niger, Mali, suggests that a series of modest infrastructure improvements and reform steps work well and are easier to adopt when government resources are limited.

TABLE 14
Problems and issues in implementing IMT

Problems & issues in implementing IMT	Asia (21)	Latin America (7)	Africa (9)	Eastern Europe (3)	United States of America, Australia, New Zealand (3)	Worldwide (43)
Resistance to IMT by agency	16	5	7	2	1	31
Inadequate training of WUA	18	2	4	1	0	25
Difficult for govt. to finance IMT	12	0	3	0	0	15
Irrigation systems heavily deteriorated	6	2	4	1	1	14
Weak capacity to train WUA	11	0	2	0	0	13
Weak legal framework for IMT	9	2	2	0	0	13
Inadequate farmer payment for O&M	7	0	4	2	0	13
Weak techn. & mngt. capacity of WUA	10	1	1	0	0	12
Inadequate training for govt. staff	11	0	0	0	0	11
Agency reform & staff disposition	5	3	1	0	1	10
Farmers resist IMT	4	4	1	0	1	10
No clear/single IMT policy or programme	5	3	1	0	0	9
Resistance to IMT by local government	8	0	0	0	1	9
Democratic elections of WUA officers difficult to achieve	7	0	1	0	0	8
Conflicts between farmers/villages	4	1	3	0	0	8
Politicians resist IMT	6	0	1	0	0	7
Inadequate support services	3	0	3	0	0	6
WUA cannot apply sanctions	3	0	2	0	0	5
Farmers lack access to credit	2	0	3	0	0	5

REHABILITATION AND MODERNIZATION OF SYSTEMS

In 31 out of 43 cases and without regional differences, it is reported that farmers have contributed towards financing the repairs and rehabilitation works either in the form of cash or by providing labour or materials. However, this is the lowest ranking aspect when considering the extent of authority devolved to users in general (Figure 6). This is an indication that financing of the rehabilitation and modernization remains in most cases is in the hand of governments or remains unclear. Different arrangements are being experimented with in order to find the right proportion of government and farmers funds, e.g. the examples of Indonesia and Mexico mentioned above. However, in most cases, long-term financing arrangements are missing and most countries have not defined a policy to resolve this important issue. In spite of the importance of the subject, the number of responses and the limited information available did not permit a deeper analysis.

BOX 5
Characteristics of IMT implementation in New Zealand

As an example of what countries have considered to be important elements to include in the transfer programme, the list below shows the case of New Zealand. Characteristics of the implementation process:

- formation of an IMT programme steering/ coordination committee;
- planning and review meetings with farmer participation;
- creation of WUAs;
- democratic selection of WUA leaders;
- technical training in O&M for WUA leaders/staff;
- repair/rehabilitation/modernization of infrastructure;
- farmer participation in identifying repairs / rehabilitation works;
- farmer contribution to cost of repairs / rehabilitation works;
- agency O&M staff remained in units transferred to WUAs but were put under the direction of WUAs;
- agency O&M staff previously in units that were transferred were assigned new jobs or moved to other locations.

Source: New Zealand country profile.

BOX 6
Incremental change in the Office du Niger, Mali

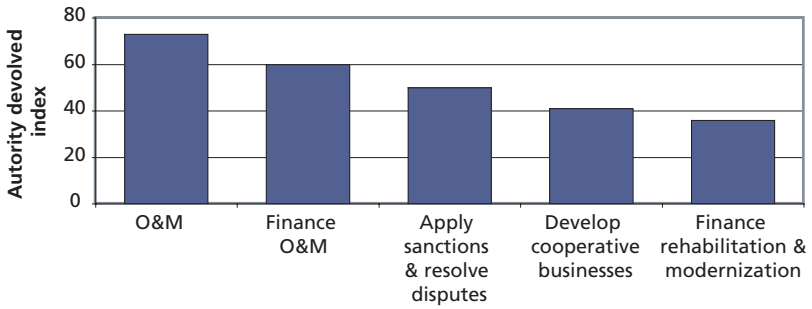
In the early 1980s, financing agencies stimulated reform gradually by promoting small steps of change, such as establishment of village-level WUAs that could implement maintenance at secondary and tertiary canal levels. The Office du Niger agreed to allow tenant farmers to have long-term rights to remain on their plots. By 1984, the financing agencies had obtained the agreement of the government to grant farmers freedom to market their grains. They promoted successful distribution of small threshers and hullers, which broke the dependence of farmers on the Office du Niger for threshers and hullers. In 1987, financing agencies promoted adoption of a new farming licence that gave farmers permanent tenure if they agreed to cultivate rice intensively and pay the water charge.

Adoption of PIM occurred in Mali in the mid-1990s with an act of parliament and policy declarations by the prime minister. This reform granted partial authority of WUAs over O&M and dispute resolution and full responsibility to pay for O&M. Staff of the Office du Niger were made responsible to elected farmer representatives through joint management committees at secondary and main canal levels. Elected farmers represented half of the membership of these committees. Farmers prioritized maintenance works and arranged three-year O&M contracts, which are now signed between government, farmers and the Office du Niger.

Market liberalization and better land tenure gave farmers the incentives to improve production, and rice yields increased from 2 tonnes/ha in 1982 to 6 tonnes/ha in 1996. This gave farmers sufficient confidence in scheme management that they agreed to a 50-percent increase in the water charge. The experience of the Office du Niger suggests that a series of modest infrastructure improvements and reform steps worked better than if financing agencies had refused to provide assistance unless the Government agreed to a comprehensive reform all at once.

Source: Mali country profile, 2003.

FIGURE 6
Authority devolved index



Notes:
Based on data in Table 3.
The authority devolved index is calculated as the sum of countries or cases where an IMT responsibility has been transferred to users affected by the following coefficients: if the activity is partially transferred, the number of cases is multiplied by 1, but if the activity is fully transferred, the multiplier is 2. The final value is the sum of both terms. Example: Operations has been fully transferred in 31 cases and partially transferred in 12 cases. The ADI is: (31 × 2) + (12 × 1) = 74.

SUPPORT SERVICES

Table 15 shows the kinds of support services needed by WUAs after IMT. Significantly, the top six identified are all concerned with training and consultation. Improvement of irrigation infrastructure was still needed in 16 cases. Availability of credit for farmers

TABLE 15
Support services needed by WUAs after IMT

Support services needed	Asia (21)	Latin America (7)	Africa (9)	Eastern Europe (3)	United States of America, Australia, New Zealand (3)	Worldwide (43)
Train WUA in technical aspects	19	7	8	1	1	36
Train WUA in financial aspects	20	6	6	0	1	33
Train WUA in administration	17	6	6	0	1	30
Technical consultation	16	6	3	0	2	27
Extension, agribusiness, marketing	8	5	6	0	3	22
Train & motivate agency for IMT	16	0	1	0	0	17
Rehabilitation & modernization	11	1	3	1	0	16
Credit for WUA & farmers	4	2	5	0	1	12
Legal support / dispute resolution	5	3	0	0	1	9
M & E of management performance	7	0	1	0	0	8
Subsidy for cost of water	3	0	1	1	1	6
Private-sector extension service	0	3	3	1	2	9
Communications with agency	4	0	0	0	0	4
Govt. ensures fair WUA elections	4	0	0	0	0	4
Formation of WUA networks	3	1	0	0	0	4

and WUA was noted in 12 cases. This is frequently inaccessible to farmers in many countries.

Additional support services that were needed included:

- environmental monitoring and regulation (Colombia, Shaanxi in China, and Indonesia);
- private-sector management service providers (Niger, Tunisia and Argentina);
- crop price supports (Nigeria and Uzbekistan);
- technical/managerial auditing (Andhra Pradesh and Madhya Pradesh in India, and Indonesia);
- assistance to develop a capital replacement fund (Australia and Indonesia).

REFORM OF PUBLIC-SECTOR ORGANIZATIONS

One of the changes that should accompany IMT is reform of public-sector organizations, especially the irrigation agency. However, often this does not happen. The respondents were asked in what ways the irrigation agency needed to change, in relation to IMT. Table 16 summarizes their responses. The most common response (34 out of 43 cases) was that the agency needed to withdraw from O&M at lower hydraulic levels that have already been transferred to WUAs. This suggests that agencies frequently do not withdraw their staff from canals that have, ostensibly, already been transferred to WUA for management. A key challenge is how to make needed reform of the irrigation agency happen – both to accommodate and support management transfer and to provide needed support services to WUAs after transfer.

In addition to the points summarized in Table 16, respondents also suggested the following way in which the irrigation agency needed to be reformed or reoriented:

- increase the role of the irrigation agency in producing and communicating information to WUAs and to others in the sector (Australia, Madhya Pradesh in India, and Uzbekistan);
- greater activity in developing strategies for the sector (Australia, Turkey and Uzbekistan);
- increased role in water and agricultural extension (Senegal, Andhra Pradesh in India);
- restricting the role of the agency to higher level maintenance and rehabilitation (Indonesia and Bulgaria).

TABLE 16
Reorientation of the irrigation agency

Ways agency reorientation is needed	Asia (21)	Latin America (7)	Africa (9)	Eastern Europe (3)	United States of America, Australia, New Zealand (3)	Worldwide (43)
Withdraw from O&M at lower hydraulic levels	19	5	6	1	3	34
Restructure/decentralize	11	3	8	2	3	27
Increased role in building capacity of WUAs	15	5	4	1	1	26
Downsize/reassign staff	11	4	6	1	2	24
Increased role in providing technical & financial guidance	16	0	0	0	2	18
Increase regulation of irrigation sector	5	4	2	2	2	15
Increase management at main system & river basin levels	6	2	2	1	2	13
Become financially self-reliant	5	0	1	0	1	7
Increase M&E	3	1	2	0	1	7
Increased role in water rights administration	3	1	1	0	0	5
Need plan and commitment to reorient agency	4	0	0	0	0	4

LESSONS LEARNED DURING IMT IMPLEMENTATION

Key informants who provided the IMT profiles identified a number of additional institutional changes that were needed after IMT had been adopted (Table 17). The list is diverse and shows the wide scope of issues that may be related to IMT. Regarding the suggestions for new agricultural policies and programmes, these tended

TABLE 17
Institutional changes needed after IMT adoption

Additional institutional changes needed	Asia (21)	Latin America (7)	Africa (9)	Eastern Europe (3)	United States of America, Australia, New Zealand (3)	Worldwide (43)
Law on WUA & IMT	12	3	3	2	0	20
Regulation on water charges & WUA finance	10	1	3	2	1	17
Water rights & allocation law	10	2	2	1	1	16
Regulation on ownership of irrigation infrastructure	6	3	3	1	0	13
Restructure irrigation agency	8	2	1	0	2	13
Increased regulation of WUA	5	1	1	0	1	8
Right of WUA to decide O&M plan & budget	6	0	1	0	0	7
Regulation for WUA federations & networks	5	0	1	1	0	7
Regulation on who pays for rehabilitation & modernization	2	2	0	1	1	6
Land tenure reform	1	0	5	0	0	6
Institutional arrangements for water basin management	4	1	0	1	0	6
Update agricultural policy and programmes	4	1	0	0	0	5
Improve enforcement of contracts, fees & debt payments	3	1	1	0	0	5
Tax waiver for WUA	4	0	0	0	1	5
WUA become profit-making	2	1	1	0	0	4
Speed up settlement of disputes	2	0	2	0	0	4
WUA needs authority to apply sanctions	4	0	0	0	0	4

to include measures to improve the profitability of irrigated agriculture for farmers, such as through new methods of extension to WUAs to promote innovations in water management, agribusiness and marketing.

Altogether, the suggestions in Table 17 seem to indicate that IMT is often adopted and implemented initially with a relatively narrow view of the reform. Then, as implementation proceeds, it becomes necessary to expand the scope of the reform in order to make it viable.

In addition to the above-mentioned institutional changes, respondents also mentioned the needs for:

- regulations for compensation for land used for irrigation infrastructure (Ghana);
- bank loans for WUAs (Indonesia and Morocco);
- environmental regulations, including for water quality (Australia and Turkey);
- drainage boards (Albania);
- establishment of water service enterprises (Argentina).

Table 18 gives an example of the IMT implementation stages and the implications for the different types of management adopted in Turkey. This shows the legal orientation of IMT in Turkey, where legal establishment of the irrigation associations and transfer protocols are key steps. Moreover, formal training is less important that ongoing technical guidance and consultation between irrigation agency staff or municipality engineers and irrigation association officers.

Table 19 summarizes the key lessons learned from implementing IMT. Again, there is a common relevance of similar lessons across continents. One of the most common lessons stated by the informants was that more clarity and details are needed on the actual roles, responsibilities and authority of WUA, the irrigation agency and towns and village governments after transfer (25 cases). There is a tendency for these to become confused when the policy is not clear or where there is resistance to IMT. Regarding support for the process, the most common lessons mentioned were: the need for more financing for IMT; the importance of pilot projects, study tours, sharing of experiences, public awareness campaigns; and efforts to ensure more democratic election of WUA leaders.

In addition to these points, respondents also mentioned the following lessons learned from implementing IMT:

- there is a need for a market of O&M service providers that can be acquired by contract or hiring of staff (Argentina and Niger);
- farmers need to have free crop choice in order to be able to support IMT (Indonesia, Sudan and Uzbekistan);
- different forms of support services are needed for large commercial farms and small subsistence farms (South Africa).

TABLE 18
Stages in the transfer of irrigation schemes, by type of management, Turkey

Stage	Irrigation agency (IA) management	Village management	Municipality management	Cooperative management
1. Initiation	Initiative generally comes from the General Directorate of State Hydraulic Works (DSI); involves meetings with muhtars, mayors & local assemblies. Agreement to continue must be given by muhtars, mayors and their respective assemblies.	Initiative generally comes from DSI; involves meetings with the muhtar and council of elders. Agreement to continue must be given by the muhtar and the council of elders.	Initiative generally comes from DSI; involves meetings with the mayor and municipal assembly. Agreement to continue must be given by the mayor and municipal assembly.	Initiative must come from a minimum of 15 farmers prior to construction of a groundwater or surface scheme.
1a. Legal establishment of the management agency	1) Application for the legal establishment of an irrigation association signed by muhtars and mayors with the authority of their respective local councils. 2) Reviewed by the provincial governor's office. 3) Reviewed by the Ministry of Interior. 4) Approved by the Council of Ministers.	Not necessary.	Not necessary.	Cooperative registered as a legal entity in accordance with cooperatives legislation administered by the Ministry of Agriculture and Rural Affairs.
1b. Selection of chairperson & board	1) General Assembly constituted by muhtars, mayors (automatic members) and 2–3 times as many additional members selected either by the automatic members or (less often) by irrigators. 2) The general assembly elects a chairperson and 4 members of the management committee.	Constituted by the muhtar and the council of elders.	constituted by the mayor and the municipal council.	Elected annually by the general assembly made up of member/partners of the cooperative.
2. Transfer agreement	1) Prepared by DSI. 2) Signed by the chairperson of the IA with the approval of the IA management committee. 3) Signed by DSI regional office. 4) Reviewed in Ankara by DSI O&M Transfer Section. 5) Approved by Minister of Public Works and Settlement	1) Prepared by DSI. 2) Signed by muhtar with the authority given by the village council of elders. 3) Signed by DSI regional office. 4) Reviewed in Ankara by DSI O&M Transfer Section. 5) Approved by Minister of Public Works and Settlement	1)Prepared by DSI. 2) Signed by the mayor with the authority given by the municipal council. 3) Signed by DSI regional office. 4) Reviewed in Ankara by DSI O&M Transfer Section. 5) Approved by Minister of Public Works and Settlement.	Incorporated in the regulations relating to the establishment of the cooperative.
3. Transfer protocol	Prepared by DSI: sets out the characteristics of the irrigation system.	Prepared by DSI: sets out the characteristics of the irrigation system.	Prepared by DSI: sets out the characteristics of the irrigation system.	Prepared by the General Directorate of Rural Services in accordance with the provisions of cooperative legislation.
4. Preparation of O&M plans	Prepared by DSI with management committee and staff appointed by the management committee.	Prepared by DSI with muhtar and other staff appointed by the muhtar.	Prepared by DSI with mayor and other staff appointed by the mayor.	Prepared by operational staff employed by the cooperative under the supervision of a 5-person board of directors elected annually by the general assembly, which is made up of all its partners/members.
5. Implementation	Responsibility of the chairperson, the management committee and staff appointed by the chairperson.	Responsibility of muhtar and other staff appointed by the muhtar	Responsibility of mayor and other staff appointed by the mayor	Responsibility of the board of directors and operational staff employed by the cooperative.

Note: A muhtar is the head of a village (normally elected).
Source: Turkey case study.

TABLE 19
Key lessons learned about IMT

Key lessons learned	Asia (21)	Latin America (7)	Africa (9)	Eastern Europe (3)	United States of America, Australia, New Zealand (3)	Worldwide (43)
Need clarity on roles, responsibilities, authority of WUA, agency & towns	14	5	4	1	1	25
WUA & agencies need substantial training	17	3	5	0	0	25
Need to reorient agency & handle staff disposition	14	4	3	1	3	25
Need clear legal framework	14	3	3	1	3	24
Address financial capacity of WUA along with IMT	14	3	3	2	1	23
High-level political commitment essential	13	3	3	0	2	21
Need clearer water rights & infrastructure rights	11	3	3	0	2	19
Multistakeholder involvement important	14	1	3	0	2	20
Need more government financial support for IMT	11	1	3	0	0	15
Pilots, study tours, information sharing important	10	2	2	0	0	14
Need to address severe deterioration of infrastructure	7	3	2	1	0	13
Need public awareness campaign	9	0	1	0	1	11
WUA should be able to make profits	6	0	3	0	1	10
Need to better design & enforce water charge collection	6	1	2	0	0	9
IMT supports financial sustainability of irrigation	3	2	2	0	1	8
Need democratic selection of leaders	8	0	0	0	0	8
IMT should address disposition of equipment	1	2	1	2	1	7
IMT should be adaptive & flexible	2	1	3	0	1	7
WUA need banks & credit	4	0	1	0	1	6
Need dispute settlement & contract enforcement	3	1	1	0	1	6
Need independent organization to direct IMT	5	0	0	0	0	5
Integrate agribusiness & extension with IMT	4	0	1	0	0	5
Incremental better than rapid, comprehensive reform	2	0	3	0	0	5
Link WUA to local governments	5	0	0	0	0	5
WUA should act according to members' interests	3	0	0	0	1	4