

# Lessons Learned and to be Learned about Irrigation Management Transfer<sup>1</sup>

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## 1. Introduction

### 1.1 Purpose, scope and justification for the paper

This paper includes an assessment of international experience with IMT and an analysis of strategies for mobilizing support, developing the necessary institutional framework and implementing reforms. The objectives of this paper are to:

- 1) Provide a framework for adopting and analyzing IMT,
- 2) Identify key lessons on IMT from international experience,
- 3) Propose strategic priorities for agency reform and provision of support services, and
- 4) Summarize key findings and recommendations on IMT.

The paper has drawn on the experiences of 46 countries as reported in 46 Irrigation Management Transfer Profiles collected by FAO, IWMI and INPIM.<sup>2</sup>

### 1.2 Key concepts

Irrigation management transfer (IMT) is based on a number of concepts that we need to define here. First, we define an *irrigation system* as the technology, infrastructure, human organization and management system employed to extract water from a source, deliver it to farms and other uses, apply it to fields and other uses, and drain excess water away, for the purpose of producing crops and delivering water for other uses. Especially in areas of high population density and economic diversification, increasingly, irrigation systems are taking on multiple uses in addition to irrigating crops, such as for domestic water use, rural industry, livestock watering, producing fish, etc.

We define *participatory irrigation management* (PIM) as the involvement of farmers and other water users in the governance, management and/or financing of irrigation systems. PIM implies that farmers and other water users are enabled, at some hydraulic level, to manage and/or finance an irrigation system. To *manage* an irrigation system is to utilize resources to provide a designated irrigation service. To *finance* the irrigation service is to mobilize and allocate resources for irrigation governance and management.

By *irrigation management transfer* (IMT), we mean the transfer of responsibility and authority for the management of irrigation systems from a government agency to an organization representing or serving the interests of water users. IMT is primarily about transfer of governance authority, and hence, empowerment of water users. To *govern* an irrigation system is to define what services an irrigation system will provide and to select who will provide them and under what terms and conditions. An irrigation system may be transferred to farmer-governed irrigation

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<sup>2</sup> The profiles were collected by FAO, INPIM (International Network on Participatory Irrigation Management) and IWMI (International Water Management Institute) for the International Email Conference on Irrigation Management Transfer in 2001 and through subsequent collection of materials until 2005.

districts or mutual companies, contractors, NGO's, but most commonly, they are transferred to water users associations.

A *water users' association* (WUA) is a group of water users that organize themselves together for the purpose of governing an irrigation system and overseeing its management and, to some extent, its financing. *WUA federations* may be formed from groups of WUA's at higher hydraulic levels of irrigation systems, such as on distributary and branch canals. *Water boards* are created in some countries to oversee water management at higher levels. They tend to combine management of irrigation, drainage and sometimes other functions at levels at which integrated management becomes important. *Irrigation districts* are generally organizations that oversee irrigation management at the scheme level and are either single-purpose, semi-municipal governments (as in the USA) or are closely regulated, semi-autonomous management organizations (as in China). *Irrigation mutual companies* are generally bodies formed by farmers who, as a group, invested in construction of the irrigation system and manage it as a jointly owned stock company with shares distributed among investors (China, USA).

Full authority and responsibility for an irrigation system or sub-system may be transferred (such as in Mexico, USA, Turkey) for water delivery, canal maintenance, payment for O&M and even rehabilitation. Most commonly, authority transferred within an irrigation system is only partial, such as when a government agency continues to manage the main system while management is transferred to WUA's at the secondary and tertiary levels (as in the Philippines, Sri Lanka and Indonesia). Or authority and responsibility for O&M services and payments may be shared between government and farmers. Medium to large-scale irrigation systems are often governed, managed and financed by multiple organizations at different hydraulic levels, such as government agencies or "joint management committees" having control over the main system (Sri Lanka, Uzbekistan) and WUA's taking responsibility for secondary and tertiary networks. (as in the Philippines, Turkey, Mexico, etc.)

IMT may also include transfer of ownership of scheme infrastructure (such as has been done through direct sales or grants to water users for lift systems in New Zealand, Bangladesh, and Pakistan). This is consistent with the general meaning of *privatization*. Management transfer may also be accompanied by allocation of water rights to newly-created WUA's (as in Mexico). (See Vermillion & Sagardoy 1999)

### **1.3 Trends in the irrigation sub-sector**

Farmers have developed, governed, managed, and financed irrigation systems for hundreds, and in some places thousands, of years. The colonial era placed the state in the role of developing and managing irrigation systems and this continued thereafter, resulting in the enormous expansion of the world's irrigated area from about 98 million ha in 1950 to over 270 million ha by 2000. But by the mid 1970's, governments and development agencies led a world-wide effort to develop water users associations (WUA's), though primarily as an appendage to state-sponsored irrigation development.

PIM and IMT have developed in two phases, which we call the limited *participation* and full *empowerment* stages. From the late 1970's to latter 1980's, international development agencies and developing countries promoted farmer participation in irrigation more or less as a complement to the main emphases of construction and technical improvements. Donors and governments imposed large targets of numbers of WUA's to be established under tight schedules. It was intended that farmers would "participate" in government projects through assignment of responsibilities rather than through empowerment and autonomy. The results were often that large numbers of WUA's were created undemocratically, rapidly, and through external

manipulation. (Add references) WUA's were artifacts of projects, dominated by village leaders, and generally, they did not remain active or become effective. This was typical of what happened during this time in Indonesia, the Philippines, Thailand, and Sri Lanka.

From the late 1980's until the present, a new paradigm has emerged from participatory irrigation management in such places as Mexico; Turkey; Andhra Pradesh, India; and Indonesia. It is IMT, which includes a degree of *empowerment* that was not generally associated with the early period of participation. It is increasingly recognized that devolution must be accompanied by a more integrated and responsive support system for WUA's that includes both the public and private sectors in a new partnership.

The IMT empowerment model of reform is an attempt to restructure the entrenched government-dominated organizational structures with a new framework that places water users in the role of governing irrigation systems (through management transfer) and places government in the roles of facilitating the formation and capacity building of WUAs, regulating and providing support services. Under the IMT model, farmers are seen more as clients than beneficiaries and WUAs define what services are provided, who will provide them and under what terms and conditions (subject to government regulations). Actual restructuring of irrigation sectors to empower water users is relatively recent and cases are still few in number. Mexico, Andhra Pradesh and Madhya Pradesh in India, some areas in China, Taiwan, Pakistan, and, recently, Indonesia are at least partial examples. Although empowerment may be enshrined in policies and legislation, its adoption is often limited by resistant bureaucracies, local elites and limited efforts at capacity building.

## **2. International Experience with Irrigation Management Transfer**

We will now examine international experiences implementing IMT, where both responsibility and authority for irrigation system management is transferred from government agencies to water users associations. This is done by examining results obtained from the 46 cases of IMT reported by the IMT profiles.

### **2.1 National programs and pilots**

The earliest cases of IMT for medium and large-scale public irrigation systems occurred in the USA--beginning in the late 1960's, followed by cases in Taiwan, South America, France, Mexico, Turkey, and elsewhere in Asia. IMT stepped from a local, historically derived phenomenon to a worldwide movement promoted by leading developing agencies, most prominently the World Bank. The 46 cases of IMT analyzed here include the most prominent experiences with IMT and many others. (See Appendix 1) Of the 46 cases, 25 are nation-wide programs, 10 are adopted at the state or province level and 10 are pilot systems where IMT had not yet spread throughout the country or province. One case (Ghana) included transfer of all small schemes within the Volta River basin. (Appendix 2)

The cases of transfer include those which pertain to all government schemes in the nation or state (31 cases), only public schemes below or above some size category (6 cases), pilot schemes (7 cases), and tubewell schemes only (Gujarat, India). In the case of Costa Rica, there was still no clear policy whether IMT would apply to all schemes or only those for which farmers could raise part of the cost of rehabilitation prior to transfer. Most often, especially for large and medium-scale systems, IMT is adopted at the sub-system level. The most common hydraulic level at which IMT is implemented is at the distributary or secondary canal level and below (28 cases).

IMT was officially designated to occur up to the headworks level (weir, dam or pump) in 13 cases and at the main or branch canal level and below in 5 cases. In some cases IMT was designated to occur up to the main system level, such as in Mexico and Andhra Pradesh, but it remains questionable whether this will, in fact, happen any time soon. Technical challenges and political resistance make this kind of large-scale transfer more difficult.

## 2.2 Functions and authority transferred

It is not the case that full authority and responsibility for all aspects of irrigation management and financing has been transferred in all cases. Out of the 46 cases of IMT reported here, full authority over canal operations was transferred in only 34 cases and authority over maintenance was transferred in 32 cases (see **Table 1**). Full authority means that the WUA's had sole authority and responsibility for decided on and implementing O&M. Partial authority over operations was transferred in 12 cases and partial authority over maintenance was transferred in 14 cases. This means that WUA's did not have complete authority or control over O&M decisions and implementation, but that this was shared with the government agency that retained some authority. Full authority and responsibility for financing O&M was transferred in 25 cases versus partial transfer in 20 cases. Partial authority was transferred in 27 cases for applying sanctions and resolving disputes, while full authority was transferred for these in 17 cases. Similarly, 27 cases involved partial transfer for financing future rehabilitation and modernization while full authority for these was transferred in only 6 cases.

**Table 1. Authority transferred**

	Operations		Maintenance		Finance O&M		Apply sanctions & resolve disputes		Finance rehabilitation & modernization	
	WB	Total	WB	Total	WB	Total	WB	Total	WB	Total
<b>Full authority</b>	20	34	20	32	15	25	9	17	1	6
<b>Partial authority</b>	7	12	7	14	11	20	18	27	18	27
<b>Not transferred</b>	0	0	0	0	1	1	0	2	8	13
<b>Total countries</b>	27	46	27	46	27	46	27	46	27	46

Patterns for transfer of authority are similar between all countries in the sample and World Bank countries, except that there is a greater tendency to transfer full authority and responsibility for financing rehabilitation and modernization to WUA's in non-World Bank countries. For all cases, it has been more likely for full authority to be transferred for O&M and financing O&M, while it is more common that only partial authority is transferred for applying sanctions, resolving disputes, and financing rehabilitation and modernization.

## 2.3 Type of organizations to which management is transferred

IMT must deal with the issue of what types of organizations should take over irrigation systems, for governance (i.e., defining and authorizing the service), management (i.e., providing services) and financing (i.e., who pays for management). In small systems or sub-systems of large irrigation schemes, it is common to see WUA's handling both governance and management roles at a relatively small scale. In larger systems after management transfer, it is more common to see WUA's performing only governance functions and irrigation district staff, utilities or companies providing management services. However, in the USA, Taiwan, Nepal, and China, WUA's with hired staff and/or contributed labor from members can be found that manage systems from 10,000 to 100,000 ha in service area.

For all 46 cases management authority was transfer from government agencies to water users associations. In a few cases, irrigation districts (5), local government (4), a public utility (3), a

mutual company (3), and joint government/farmer organizations (2) also took over management after management transfer. **Table 2** shows what kind of entity has taken over responsibility and authority for managing irrigation after IMT was implemented. In most cases water users associations (WUA's) take over authority for water delivery and canal maintenance at the field and distributary levels, although loosely coordinated farmers often remain responsible for managing field canals. Since most cases of IMT are implemented only up to the distributary canal level, in most cases a government agency continues to have responsibility for the main canal and headworks after IMT. In some cases (Sri Lanka, Mexico, Taiwan) distributary canal level WUA federations have representation in planning meetings at the main system level. Private or mutual companies and public utilities are still relatively rare in irrigation management.

**Table 2. Entity providing water delivery and canal maintenance services after IMT**

	Water Delivery			Canal Maintenance		
	Field Level	Distributary Level	Main System Level	Field Level	Distributary Level	Main System Level
<b>WUA</b>	<b>23</b>	<b>34</b>	<b>8</b>	<b>23</b>	<b>31</b>	<b>8</b>
<b>Farmers</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>1</b>	<b>0</b>
<b>Agency</b>	<b>0</b>	<b>6</b>	<b>32</b>	<b>0</b>	<b>8</b>	<b>29</b>
<b>Public Utility</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>5</b>
<b>Private Sector</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Total Countries</b>	<b>46</b>	<b>46</b>	<b>46</b>	<b>46</b>	<b>46</b>	<b>46</b>

All of the 3 cases where a private sector entity took over management of water delivery or canal maintenance after management transfer were done through support from the World Bank. There is diversity between countries in the nature of the institutional framework put in place for water users associations prior to or during adoption of a management transfer program. Some countries adopt IMT only after a comprehensive framework is prepared, some adopt it without this and develop it incrementally as part of the learning process.

#### **2.4 Extent of policy, legal and institutional reform**

Indigenous irrigators' organizations have developed over the centuries in traditional societies in Asia, Latin America, and Africa. Since the decline of colonialism, water users associations have been developed most often in conjunction with development of public irrigation systems. Most often, WUA's have been organized by technical assistance agencies and NGO's after irrigation systems were built by the government and contractors. Frequently, WUA's were organized rapidly, in compliance with donor or government blue prints and time tables. WUA's have very often fallen into inactivity shortly after being organized, partly because of conceptions that IMT was only about organizing WUA's, resistance to IMT by irrigation agencies and/or local governments, non-democratic methods of organizing WUA's, and failure to grant WUA's the necessary legal, political and technical support.

The profiles also indicate what kinds of instruments have been used to adopt IMT. They show that IMT is commonly adopted with a policy issuance by a line agency (31 cases), although multiple kinds of legal authorizations are often employed. It is also often adopted in the form of acts of parliament or legislature (24 cases), through issuances by a head of state or cabinet (21 cases), or by a cross-sectoral agency (such as planning or finance, 14 cases). In 10 cases IMT was one of the conditionalities of a loan program.

**Table 3** below shows the frequency whereby different institutional rights and realities were in place at the time IMT was adopted. The most common aspects put into place at the time IMT policies were adopted are the:

- 1) Right of WUA's to use and responsibility to maintain the system;
- 2) Ability of farmers to elect WUA leaders;
- 3) Ability of WUA's to federate to higher levels;
- 4) Right of WUA's to apply sanctions;
- 5) Right of WUA's to hold bank accounts, obtain credit and make contracts with third parties;
- 6) Process for resolving disputes; and
- 7) Legal issuance for IMT.

**Table 3. Policy and Institutional framework for IMT**

<b>Row 1</b>	<b>Right to use &amp; obligation to maintain system</b>	<b>WUA can apply sanctions</b>	<b>WUAs can open bank acct &amp; obtain credit</b>	<b>WUA can make contracts</b>	<b>Dispute resolution process with appeal</b>	<b>Legal issuance for IMT</b>	<b>WUA leaders elected</b>	<b>WUA can federate</b>
<b>WB Cases</b>	<b>27</b>	<b>26</b>	<b>23</b>	<b>23</b>	<b>21</b>	<b>18</b>	<b>15</b>	<b>17</b>
<b>Total Cases</b>	<b>46</b>	<b>42</b>	<b>36</b>	<b>37</b>	<b>34</b>	<b>31</b>	<b>29</b>	<b>29</b>
<b>Row 2</b>	<b>Policy to reorient agency</b>	<b>Water-related extension/training</b>	<b>Use of transfer agreements</b>	<b>WUA gets water use right</b>	<b>Policy to redeploy agency staff</b>	<b>WUA can make profit</b>	<b>Legal water right for users</b>	<b>WUA linked to basin mgt</b>
<b>WB Cases</b>	<b>17</b>	<b>16</b>	<b>14</b>	<b>17</b>	<b>12</b>	<b>11</b>	<b>8</b>	<b>6</b>
<b>Total Cases</b>	<b>28</b>	<b>24</b>	<b>23</b>	<b>23</b>	<b>19</b>	<b>14</b>	<b>12</b>	<b>9</b>

These patterns are similar between all cases and World Bank cases. Due to their frequent status as tax exempt social organizations or semi-municipalities, in only a minority of cases can WUA's make profits. In only a few cases do they have representation at the river basin management level. Most cases of IMT do not have all of these rights, at least not in the formal statutory system, but the more successful cases (Mexico, USA, and parts of Taiwan and China) have most of them. Some of such rights are articulated informally at local levels. Probably not all types of rights and authority for WUA's are essential in order for WUA's to be effective but it is likely that more rights and more clarity about them will help WUA's to be effective. In some cases, political influence by WUA's might be used to help overcome deficiencies in formal statutory rights.

Japan has a clear legal position that irrigation system O&M is the responsibility of farmers through their land improvement districts. Central and provincial governments only provide some financial, technical and legal assistance. Development of new irrigation schemes must be proposed by farmers. However, the relative sustainability of Japan's irrigation systems is the result of both this legal framework as well as its rice prices, which are supported by government at several times above international prices.

## **2.5 Agency reform**

Irrigation agencies tend to resist IMT when their staff perceive it as a threat to their jobs, budgets or independence. This was the case in 28 of the 46 cases of IMT worldwide. Generally, at

whatever hydraulic level IMT is implemented, it normally implies that scheme management staff of the irrigation agency will either relocate to hydraulic levels that are higher than the level of IMT or to non-transferred schemes, or will be deputed to assist the WUA, perhaps with their supervision being divided between the government and the WUA (as happened in Andhra Pradesh and Madhya Pradesh, in India). IMT may become a sham if it is implemented without any changes in agency O&M staff deployments or supervision. Without a clear change in agency staff deployment, mandates and/or capacities, IMT may slow to a halt, as was the case with the Small-Scale Irrigation Turnover Program in Indonesia during the 1990s.

The most common roles for the agency to play after IMT are to prepare policies, legislation and planning (41 cases), provide technical support to WUA's (40), train and support WUA's and service providers (39), design and construct new systems (31), conduct monitoring and evaluation of WUA performance (30), provide management support to WUA's (30), and provide financial support to WUA's (23). The roles of regulation, dispute resolution (13), river basin management (13), and environmental protection (9) were also reported.

Albania, Romania, Sri Lanka and the Kyrgyz Republic have each established special government agencies to provide support for WUA's but these are all severely under-budgeted. In the latter 1990's, Armenia established Drainage and Irrigation Management Agency Enterprises to become financially autonomous service providers for WUAs, but these were later abolished when the concept of reform shifted to a more rapid and comprehensive approach (e.g., "big bang"). Irrigation Committees are also established to coordinate among relevant agencies and WUAs. In more middle income countries, federations or networks of WUA's may become able to provide support services to WUA's (as in Mexico with ANUR and Colombia with Federriegos, which are federations of WUA's).

## 2.6 How IMT has been implemented

The profiles indicate that, in a formal sense, the process of implementing IMT was fairly similar across countries, as noted in **Table 4**. Most IMT programs included: creation of new WUA's (45 cases), system repairs or rehabilitation (45), democratic selection of WUA leaders (39), training

**Table 4. IMT implementation process**

ROW 1	Create new WUA	Repairs & rehabilitation	Democratic selection of WUA ldrs	Training in O&M	Farmer part. in identifying & designing repairs/rehab	Farmer participation in planning & review of IMT	Farmer investment in repairs/rehab	Training In finance & admin
<b>WB Cases</b>	<b>26</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>23</b>	<b>23</b>	<b>21</b>	<b>23</b>
<b>Total Cases</b>	<b>45</b>	<b>45</b>	<b>39</b>	<b>39</b>	<b>39</b>	<b>39</b>	<b>37</b>	<b>37</b>
ROW 2	Train agency staff	IMT steering/ coordination committees	M&E program	Agency O&M staff relocated/ reassigned	Transfer agreements	Agency staff put under WUA direction	Service agreements between WUA & agency	Mgt audits
<b>WB Cases</b>	<b>21</b>	<b>22</b>	<b>17</b>	<b>16</b>	<b>10</b>	<b>11</b>	<b>3</b>	<b>2</b>
<b>Total Cases</b>	<b>35</b>	<b>32</b>	<b>28</b>	<b>23</b>	<b>17</b>	<b>15</b>	<b>6</b>	<b>3</b>

in O&M (39), farmer participation in designing physical repairs or planning and reviewing the IMT program (39), requirements for farmer investment in repairs (though these were sometimes small, 37 cases), training in finance and administration (37), training for agency staff (35), IMT steering committees (32), monitoring and evaluation of IMT (28), and reassignment of agency staff due to IMT (23). In several cases, official transfer agreements were made for each scheme (17) and agency staff were put under the direction of the WUA (in 15 cases, which is more common than one might expect). Trends were similar between World Bank and other programs. The similarity of activities might be explained by common perspectives of donors and international consultants. But the similarity breaks down in more local matters such as the means and extent to which farmers really participated, extent of training or investment, and so on.

## **2.7 Financing IMT programs**

Of the 46 cases of IMT, 21 were financed through a rough balance between national and foreign donor funds, 20 were financed mainly through foreign donors, and only 5 were financed primarily by national or provincial/state funding. World Bank projects followed the general trends of the other cases except that they had only one case where WUA's raised virtually all funds needed for O&M after IMT, versus 7 total cases where this happened.

## **2.8 Why IMT is adopted**

So what is the rationale for IMT under these varied circumstances? Donors, technical experts, government policy makers and even farmers who support IMT often assert that IMT will do one or more of the following. We list these here as working hypotheses.

1. IMT will empower farmers to obtain governing control over what their irrigation services should be, who should provide them, at what cost, and under what terms and conditions. This is the argument used by farmers when they hired lawyers and took over management of the first two schemes in Colombia. It is the rationale in support of the IMT reforms in several states in India, in parts of China, Albania, and Mexico.
2. IMT will reduce the cost of irrigation for government, because these will be taken over by farmers. For farmers, the cost of irrigation often rises after IMT but this will decline over time as farmers impose more cost effective management. In any case, IMT will increase the productivity of irrigation by more than its costs. This is the logic often used by government officials in finance, budget and internal affairs departments in hopes that IMT will reduce the cost of irrigated agriculture to governments in developing countries.
3. Through improved transparency and accountability that IMT will bring to the irrigation sector, IMT will lead to improved water distribution and drainage, better maintenance, fewer water-related conflicts and more rapid responses to disputes. This is the rationale used by researchers in pilot projects, NGOs, technical experts and farmers who promote IMT.
4. IMT will improve the productivity and profitability of agriculture and water because it places farmers in the role of governing irrigation services and makes irrigation management more responsive to farmer economic aspirations. Results will be seen in increased area irrigated, cropping intensities, yields and economic returns. This is also a common argument put forward by technical experts, researchers, NGOs and farmers.
5. IMT has the side benefit of facilitating cooperative purchase of inputs, marketing and



formation of agri-businesses. The more collective voice for farmers that IMT provides can help improve the responsiveness of support services and upstream provision of bulk water supplies. The multiplier effect of organizing farmers for irrigation management upon cooperation in farming and agri-business has been shown in many pilot projects and reforms in Asia and Latin America.

### 3. Issues and Results of Implementing Irrigation Management Transfer

In this section we examine the main issues, results and lessons learned so far from the world's experience of implementing IMT.

#### 3.1 Mobilizing support and creating a strategy for IMT

There are a number of methods whereby sector reform organizations promote a common vision of IMT among stakeholders. These include pilot projects, study tours, IMT policy working groups, research, international meetings, and workshops. Mexico's IMT program was preceded by visits of senior water resources staff to irrigation districts in the USA. Before Turkey launched its management transfer program several of its lead water resources officers visited Mexico to observe its experiences with IMT. Technical assistance agencies, foundations, NGOs, and the International Network for Participatory Irrigation Management (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.

#### **Box 1. Adoption of PIM in Albania**

In 1994, Albania adopted PIM after a period of civil unrest that followed collapse of the central government in the early 1990's. 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. But the Government and World Bank agreed on a program to transfer management to WUA's and rehabilitate irrigation systems. WUA's 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 WUA's and 22 WUA federations, all of which served an area of 169,550 ha.

*(Program supported by World Bank. Source: Ylle Dede, IMT Case Study for FAO 2001)*

Normally, an IMT program is supported and developed initially by a small group of proponents, being government officials, NGO's, technical experts and donors. IMT is sometimes promoted in the beginning by farmer representatives, but more often it is promoted by central governments and donors. It is often resisted, especially in the early stages, by irrigation agencies that fear they will lose jobs and funds, by farmers who don't want to pay for the full cost of irrigation, or by politicians who want to offer free water service to rural populations.

From our sample of 46 profiles of IMT,<sup>3</sup> information has been obtained about practices with reform that have been used in many countries. Twenty-

seven of the cases have been supported with World Bank assistance. **Table 5** below shows the most common factors that have motivated adoption of irrigation management transfer policies. The most common factor motivating adoption of IMT is the shortage of government funds to pay for routine irrigation operations and maintenance (28 cases reported this). Other reasons reported

<sup>3</sup> See Appendix 1 for the list of locations from which profiles were obtained.

were a general trend toward liberalization of agricultural policies, poor system maintenance, inability of government to collect enough water charges, poor operations, and pressure from international donors. Countries where IMT was driven by World Bank loan programs followed this similar pattern. Most often, IMT is promoted in the beginning by a central government office that is under some fiscal pressure to reduce expenditures. But eleven countries reported farmer lobbying to promote IMT as a reason for its adoption.

**Table 5. Factors motivating adoption of IMT**

	Govt O&M Funds Short	Liberal-ization & govt pressure	Poor mainten ance, fast deterioration	Govt can't collect fees	Poor Operations	Intl donors promote transfer	Farmers Promote Transfer
<b>World Bank program countries where this was most important factor</b>	<b>18</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>1</b>
<b>Total countries where this was most important factor</b>	<b>28</b>	<b>11</b>	<b>10</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>3</b>
<b>Total countries where this was 1 of top 4 factors</b>	<b>40</b>	<b>24</b>	<b>37</b>	<b>28</b>	<b>24</b>	<b>23</b>	<b>11</b>

The central government, at national or state levels, was the most common source of support for IMT (in 34 cases), followed by the irrigation agency (26), farmers (26), parliament (16), pilot projects (14), and others.

Armenia started implementing irrigation management transfer in 1995, with support from the World Bank and IFAD. For several years the process was driven by donor pressure and there was a lack of a government strategy, clear commitment, and action plan. Government agencies and politicians often interfered with WUA affairs. WUA's lacked autonomy and authority over their own affairs, including the ability to apply sanctions against rule breakers. Local experts recommended establishment of a government strategy and a coordination committee that represented the interests of all key stakeholders, public awareness and consultation campaign, development of the legal framework, extensive training, and participatory rehabilitation of schemes. By 2003, finally enough support was mobilized for a "big bang" adoption of complete IMT. (Samvel Ghazaryan, IMT Country Profile, 2001)

Many methods are employed to generate support for IMT. The most common are workshops and policy/planning meetings (31 cases), adoption of liberalization or privatization policies (28), negotiations with farmer groups (28), pilot projects and study tours (25), pressure from donors (25), assistance from government for rehabilitation or upgrading is contingent upon IMT (17), public awareness campaigns (12). Ten cases reported that new policies and law that support IMT helped to generate support for it.

Despite the finding that irrigation agencies were often a source of support for adoption of IMT programs, they are also the most common reported source of resistance to IMT, as reported in 28 cases. Water users also often resist IMT programs (14 cases), especially when governments attempt to transfer responsibility and costs without adequate authority and support services. Local governments sometimes resist IMT as independent water users associations may constitute a

threat to their authority in local affairs. In Orissa, India, even NGOs resisted IMT as it was seen as a move towards privatizing water resources.

### **Box 2. Negotiating support for IMT in Sudan**

For decades Sudan's large Gezira irrigation scheme has been managed by large government organizations. This included not only irrigation but also provision of agricultural inputs, crop quotas and marketing. In 2001, with assistance from the World Bank and FAO, the Government transferred a pilot block of 3,000 ha to WUA's. Negotiations among Government, donors and the influential Sudan Farmers Union culminated in a national workshop in 2003 that resulted in a number of decisions aimed to satisfy the concerns and interests of the different stakeholders and adopt IMT as a general program. A high-level coordinating committee consisting of all key stakeholders was formed and it was decided to extend IMT to 18 blocks. The Gezira branch of the Sudan Farmers Union agreed to help pay for the training program. It was agreed that a Revolving Fund would be set up and jointly financed to provide support for incidental repairs and improvements to be implemented by the new WUA's.

It was also agreed that the irrigation agency would restrict its focus to intensified management of the main system and that, over time, most staff of the Sudan Gezira Board would be transferred to become staff of the WUA's that will be formed on 1,500 minor canals. It was also agreed that free crop choice would be given to blocks transferred and that many more agricultural extension officers would be needed to support privatization of agricultural production and marketing. Government staff now see the likelihood of there being an increase in jobs and they support the reforms. Farmers welcome gaining management authority for the minor canals and the new opportunities for free crop choice and farmer-driven marketing and agri-business. The innovations were derived from field experience and negotiations among farmers and government officers. Virtually all of these decisions involved compromises between stakeholders with differing fears and concerns. Negotiations, rapid appraisals, public awareness events worked to enable decisions to be reached among different stakeholders.

*(Program supported by World Bank. Source: H.S. Adam, IMT Country Profiles, FAO 2003)*

In Senegal, the main source of resistance to IMT was the irrigation agency (SAED), which unsuccessfully opposed it out of fear for loss of jobs. The concern was not unfounded, as staff numbers fell from 1,200 in 1987 to 350 by 2002. The agency reduced its mandate to regional or river basin water management, provision of technical support to WUA's, monitoring and evaluation, research and development of new technology and practices, and coordination of public and private sector organizations involved with irrigation.

### **3.2 IMT policy, legal and institutional framework**

Experts who provided the profiles were asked what policy and institutional problems and issues arose during IMT or remained thereafter. **Table 6** ranks these in order of how frequently they 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 WUA's after management transfer (28 cases reported this). This is related to three other concerns about financing, which were, "Who would pay for rehabilitation or modernization after transfer?" (22 cases), "Would farmers be unable to pay for O&M?" (8), and "To what extent does the water charging system still need to be changed?" (6 cases). Thirteen cases reported that policy or legislation about IMT was still lacking. World Bank program cases had significantly fewer cases of unclarity about the legal status of WUA's but 19 of its 27 cases reportedly had inadequate policy or legislation for the reform program. This may be an indication of a tendency for IMT programs to emphasize WUA's and under-emphasize parallel needs for sectoral and agency reform.

**Table 6. Policy and institutional issues for IMT**

<b>Row 1</b>	<b>How much assistance provided for IMT</b>	<b>Unclear legal status of WUA</b>	<b>Unclear who pays for rehab in future</b>	<b>Unclear water use rights</b>	<b>Unclear rights over infrastructure</b>	<b>Inadequate policy or legislation</b>
<b>WB Cases</b>	<b>12</b>	<b>3</b>	<b>15</b>	<b>8</b>	<b>10</b>	<b>19</b>
<b>All Cases</b>	<b>28</b>	<b>28</b>	<b>22</b>	<b>17</b>	<b>14</b>	<b>13</b>
<b>Row 2</b>	<b>Unclear role &amp; authority of agency</b>	<b>Farmers cannot afford IMT</b>	<b>Unclear who owns equipment / machinery after IMT</b>	<b>Interference of govt in WUA affairs</b>	<b>WUA lacks authority to apply sanctions</b>	<b>Need new water fee system</b>
<b>WB Cases</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>4</b>
<b>All Cases</b>	<b>11</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>6</b>
<b>Row 3</b>	<b>Unclear land tenure or fragmentation</b>	<b>WUA leaders unaccountable</b>	<b>Debt settlement after IMT</b>	<b>WUA not based on hydraulic boundaries</b>	<b>Subsidies for irrigation after IMT</b>	
<b>WB Cases</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>8</b>	
<b>All Cases</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	

One issue of rising importance in many countries is whether or not WUA's should focus solely on irrigation or whether they should take on multiple functions, such as managing irrigation system water used for non-irrigation uses (such as fish, livestock, domestic use), agri-business, or marketing. WUA's may feel the need to engage in secondary business enterprises in order to cross-subsidize the cost of maintenance (such as is common in China). In some countries, such as Sri Lanka and the Philippines, some WUA's provide agricultural inputs and other support services to farmers who lack such support from government or private sector sources. Some WUA's in countries as different as the Philippines and Romania develop agri-businesses to increase the profitability of irrigated agriculture.

The second most frequent problem noted about legal/institutional aspects of IMT was the weak or unclear legal status of water users associations, which was reported in 28 cases. Related to this was the reported unclear authority of the WUA to apply sanctions to enforce rules (6 cases). National and local governments are often reluctant to make water users associations become significantly independent bases of power for farmers, especially where water users associations cut across local administrative boundaries. And yet, without sufficient autonomy WUA's often cannot make decisions and enforce rules. Several cases reported a lack of clarity about the division of rights or authority between government and the WUA (or the entity to which management was devolved). This included weak or unclear water use rights (17), property rights over irrigation infrastructure (14), role and authority of the irrigation agency (11), unclear ownership of equipment or machinery after IMT (7), and government interference in WUA affairs (6). All this suggests that the IMT process is most often not a comprehensive reform but more a process of incremental changes with forces continuing to work for and against it.

IMT profile respondents were asked what legal changes were still needed after IMT had been adopted. The most common ones noted were: the need to reorient the irrigation agency (a sensitive matter left out in 27 cases), the need to strengthen or clarify the legal status of WUA's (21 cases), the need for water rights legislation (18 cases), rights of the WUA's relative to irrigation infrastructure built by government (14 cases), the legal mandate for IMT (13 cases), and the need for a new or fundamentally revised water law (8 cases). Other issues less frequently mentioned were land tenure, status or role of private sector service providers, extent of

responsibility of the WUA for debts incurred in rehabilitation or uncollected water charges, and the extent to which representation of females in the WUA governing council should be required.

### **Box 3. Incremental Change in the Office du Niger, Mali**

In the early 1980's donors stimulated reform gradually by pushing small steps of change, such as establishment of village level water users associations that could implement maintenance at secondary and tertiary canal levels. The ODN agreed to allow tenant farmers to have long-term rights to remain on their plots. By 1984 donors obtained the agreement of the government to grant farmers freedom to market their grains. Donors promoted successful distribution of small threshers and hullers, which broke the dependency of farmers on the ODN for threshers and hullers. In 1987, donors promoted adoption of a new farming license 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 1990's with an act of parliament and policy declarations by the prime minister. This reform granted partial authority of WUA's over O&M and dispute resolution and full responsibility to pay for O&M. Office du Niger staff 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 that are now signed between government, farmers and the Office du Niger (ODN).

Market liberalization and better land tenure gave farmers the incentives to improve production and rice yields increased dramatically from 2 tons/ha in 1982 to 6 tons/ha in 1996. This gave farmers sufficient confidence in scheme management that they agreed to a 50% 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 donors had refused to provide assistance unless the Government agreed to a comprehensive reform all at once. (*Program supported by World Bank. Source: Geert Diemer, IMT Profiles, 2003*)

In Colombia in the 1970's, farmers in the Saldaña and Coello irrigation districts hired their own lawyers and pushed through transfer of management to the farmer-governed districts. However, this was without the needed legal framework to enable the districts to become empowered and sustainable as self-governing entities. This led to a more comprehensive reform that included a new law that empowered WUA's to take over full responsibility and authority for the districts, to define what services would be provided, to set budgets and to hire and release staff (including agency staff).

In the Kyrgyz Republic, after the initial legislation was passed to establish WUA's, the process of management transfer and capacity building has shown the need for further and broader development of the legal framework to deal with ownership of irrigation system assets, whether WUA's should be taxed as commercial entities, provision of water rights to WUA's, and federation of WUA's. These issues are under discussion and development in the ministry and parliament.

Since 1997, Zimbabwe has had a policy to transfer management of secondary canal commands for irrigation systems up to 800 ha in service area to farmer organizations. By 2000, about 4,000 ha of a target 12,000 ha had been transferred, but it became apparent that a more comprehensive legal framework was needed. Lack of land ownership by farmers made farmers unwilling or unable to invest in irrigation management, including maintenance of infrastructure. The newly-formed irrigation management committees did not have legal status and hence, were unable to enforce rules, collect payments, settle disputes, etc. Farmers also lacked access to agricultural credit and support services, which further inhibited farmer ability or willingness to invest in

irrigation. This is a good example of how these aspects are all inter-related. The legal framework is currently under further discussion and development.

#### **Box 4. Management Transfer in Turkey**

In the 1990's, as financial pressures mounted in the Turkish government with a substantial irrigation development program in the eastern part of the country and a growing irrigation bureaucracy (DSI), senior officials in DSI decided to support transfer of management of existing systems, partly as a means to relieve financial pressures and facilitate the development program. The World Bank provided funding to send more than 50 DSI staff to Mexico to observe its transfer program. They returned enthusiastic about the prospects for IMT in Turkey. It was determined that existing laws would enable management transfer of many schemes, at least up to distributary canal level, to local governments and newly-created irrigation associations. Initially, DSI unionized field staff were resistant and farmers were skeptical. But DSI implemented a great deal of training for DSI field staff, local officials and farmers, which generated awareness, trust and widespread support for IMT. DSI made arrangements to reassign surplus staff (many to construction activities in the eastern region) and to encourage voluntary retirement with special benefits. These were essential steps in order to obtain the support of DSI field staff for IMT.

A new irrigation association law is being developed, which will make election of association leaders more democratic and allow for federation of associations. Future issues to be resolved include development of a strategy for future restructuring, development of a water rights system, and a policy and organization to develop and protect water quality standards.

Key lessons learned from IMT in Turkey are: 1) study tours to Mexico were a powerful way to learn and mobilize support, 2) substantial training and information exchange were important, 3) transferring management to local governments facilitated early implementation (as an initial step), 4) support and professionalism of senior DSI officers was essential, 5) lack of a legal basis to ensure that irrigation associations were democratically constituted and that they could federate was an initial constraint, and 6) it was important that the change process allowed, and continues to allow, adaptation during the learning process.

*(Supported by World Bank. Source: M. Svendsen, IMT Profile for Turkey, FAO 2001)*

There are two founding documents that are commonly used to legally establish WUA's, the constitution (or articles of association) and by-laws. The **constitution** is the basic document for legalizing the basic principles of the WUA. Typically, it explains the mandate, roles, membership, organizational structure, area of jurisdiction, and the basic rights, powers and obligations of the WUA and its members.

The **by-laws** are a second document that elaborates in more detail how the constitution is made operational. It may include descriptions of the procedures for admitting and expelling members, functions and powers of leadership positions, methods for selecting and removing leaders, rules and sanctions for water delivery and maintenance, procedures for setting and collecting water charges, procedures for making decisions, process for entering into contracts, procedure for federating the WUA, and so on.

**Management transfer agreements** are documents signed by WUA leaders and representatives of the irrigation agency and perhaps by district or provincial government representatives at the time management is transferred to a WUA. They document the terms and conditions whereby management is transferred and generally include such aspects as an inventory of infrastructure and equipment transferred to the WUA, service area and membership of the WUA, role and jurisdiction of the WUA, basic rights, authority and obligations of the WUA, terms and conditions whereby transfer is granted or revoked, protocol for interactions between the WUA, government and third parties, regulatory and supporting roles of the government, procedures for dispute resolution that involve parties external to the WUA, protocol for service agreements, and procedures and criteria for irrigation management audits.

Many respondents reported on the importance of empowering WUA's, both legally and politically. 34 cases stated that WUA's needed to have clear legal recognition in order to be effective. Similarly, 32 cases stated that real participation and empowerment of farmers was needed to make IMT successful. 28 cases noted the importance of genuine negotiations and agreements between farmers and the government over management transfer and related issues. 28 cases stated that rehabilitation of deteriorated irrigation infrastructure was needed along with the reform. Interestingly, 5 cases reported that rehabilitation or upgrading should be done after IMT, so that farmers would be in a better position to guide the process of rehabilitation and upgrading. 20 cases said that financial reform and cost sharing needed more attention. 15 cases reported on the need for both major reform (for politically important yet sensitive matters) and a more incremental set of reforms and improvements, through a gradual process of learning and adjusting after the basic reform. 14 cases mentioned the need for IMT to be a more clear process, step by step, while 7 cases reported that IMT should be part of a broader reform of liberalization, decentralization or privatization that cut across sectors of the economy. Eleven cases specifically mentioned the need to have an acceptable program for agency downsizing.

The issue of gender and IMT is growing in importance, partly because of the trend in many areas for males to leave farms for work in cities while women take over more and more agricultural and irrigation tasks. Women tend to be excluded from WUA leadership positions where they play a minority role as farmers in male dominated farming systems (as in much of India, Sri Lanka and Pakistan). Some rules for affirmative action to include women in WUA positions may be needed and could be effective in improving women's representation in WUA's (as is reported in Nepal's West Gandak scheme). Inclusion of women on WUA boards is apparently more acceptable to males in female-oriented farming systems in parts of Africa, the Himalayas and Latin America. Applying minimum quotas of female membership on WUA boards and other arrangements to empower women farmers in WUA's should be sought where needed.

#### **Box 5. Helping to ensure that WUA's 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 Managing Committee of the WUA should include a woman member with a voting right, if she is 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 land ownership be transferred to her temporarily so that she could be made a member of the Managing Committee and have equal voting rights with other Committee members. The issue is still under discussion but the principle of representation of women is generally accepted. (*Supported by World Bank. Information provided by R.K. Chachondia & N. Kaushal, 2003*)

Irrigation systems where significant numbers of farms are cultivated by leaseholders and tenants can make it difficult for WUA's to develop. Such water users may be excluded from membership or leadership positions in the WUA, even though they are sometimes made responsible to pay water charges. This can also weaken the incentives of farmers to invest in irrigation system maintenance and repair.

Profile respondents identified ten lessons that they said their countries had learned about creating and developing WUA's. The most frequent point was that long-term training was very important to make IMT successful (42 cases). In most cases IMT-related training is quite short term, on the order of a few training sessions over the first year or two of implementation. 37 cases stated that farmer participation in O&M was necessary to achieve sustainable management of irrigation

systems. 35 cases noted it was essential to give WUA's legal status and empowerment to perform their essential duties. 25 cases indicated that WUA's should be able to federate. 21 stated that government should give financial autonomy to WUA's and improve the current system of water charges. 20 noted that the responsibilities and roles of WUA's needed to be made clearer. 20 cases stated that WUA's needed to have clear water rights. This was often a long-term issue that IMT reforms could not resolve in the short-term. Sixteen cases stated, as a finding from experience, that WUA's can improve farmer repayment of credit extended for agriculture and can improve collection of water charges. Eight cases said that WUA's needed to be made more democratic. Six cases reported that WUA's should be organized on a hydraulic basis. These patterns were similar for World Bank and all cases of reform.

Findings from these profiles and experiences with IMT worldwide (See Vermillion 2004a and Vermillion & Sagardoy 1999) suggest that the following are the most important kinds of capacity that WUA's will generally need in order to govern irrigation systems effectively and sustainably:

- 1) Primary authority over O&M, asset management, financing, over use and repair of irrigation infrastructure and rights of eminent domain;
- 2) Primary responsibility to finance O&M and to share with government the cost of rehabilitation and modernization;
- 3) Clear and agreed definition of who are the members of the association and reasons and means for excluding non-members and/or non-payers from irrigation services;
- 4) A constitution and by-laws, with democratic rules and procedures for decision making that include election and removal of WUA leaders, acceptance of the irrigation service plan and water charge rates;
- 5) Right to choose third party providers of services and accountable administration, financial management, decision making, operations and performance;
- 6) Audits on technical, financial and organizational matters of irrigation system governance and management (done by the agency, a third party and WUA representative);
- 7) Powers to impose strong incentives and sanctions to ensure compliance of water users, WUA officers and WUA management staff with WUA rules and decisions and government regulations;
- 8) Powers to hold a bank account, obtain credit and enter into contracts with third parties.

### **3.3 Toward sustainable financing of irrigation systems**

Under-investment in irrigation O&M is widespread in developing countries as is an unnecessarily large expenditure on rehabilitating deteriorated irrigation systems. The majority of loan programs to finance rehabilitation are, in fact, responses to deferred maintenance.<sup>4</sup> When governments and international donors build irrigation systems without prior agreements with farmers about responsibility for payment, both the government and farmers generally consider the systems to be the property of the government. Farmers tend to consider it to be the responsibility of government to also pay for routine O&M. When management is under-financed and inadequate, schemes deteriorate rapidly, water is mal-distributed and farmers refuse to pay water charges.

From the IMT profiles, we see in **Table 7** that at least 21 of the 46 total cases found that WUA's were able to raise all or most of the funds required for O&M after transfer (an additional 15 cases

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<sup>4</sup> "O&M problems can be seen in the Bank's financing of so many rehabilitation projects. Almost all of them, when scrutinized, turn out to be deferred maintenance projects." Jones 1995, p. 104.



**Table 7. Funding for management and the IMT process**

	Adequacy of funds raised by WUA after IMT		Extent of O&M being implemented by WUAs after IMT			
			Field Level		Distributary or Secondary Level	
	WB	Total	WB	Total	WB	Total
<b>Virtually all</b>	<b>1</b>	<b>7</b>	<b>5</b>	<b>9</b>	<b>4</b>	<b>6</b>
<b>Most</b>	<b>9</b>	<b>15</b>	<b>14</b>	<b>17</b>	<b>9</b>	<b>17</b>
<b>Half</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>2</b>
<b>Minority</b>	<b>5</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
<b>Unknown</b>	<b>12</b>	<b>15</b>	<b>8</b>	<b>17</b>	<b>10</b>	<b>17</b>
<b>Not applicable</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Total Countries</b>	<b>27</b>	<b>46</b>	<b>27</b>	<b>46</b>	<b>27</b>	<b>46</b>

reported that this was unknown). In at least 24 cases out of 46, WUA's managed O&M at the distributary level. Only three cases reported that WUA's were implementing O&M in less than half of the schemes transferred in those countries. Management by WUA's was more comprehensive at the field canal level. Also, the profiles showed a near balance between the number of countries where irrigation management transfer was financed by mostly international donor funds, in the form of either grants or loans (21 cases) versus national funds (19).

International experience suggests that farmers are more willing to pay for the cost of O&M when farmers are in collective control over defining the irrigation service, setting the water charge, and determining the use of funds collected. Willingness of farmers to pay is stronger where farmers can rely on when water is delivered, as reported by Easter, et al (1998) for Mali, Niger and Senegal. In Andhra Pradesh farmers were willing to triple the water charge if they were empowered to determine their irrigation service plan and keep and use a majority of the funds collected. Studies by IIMI have shown that both cost recovery and the performance level of O&M are improved with granting of financial autonomy to WUA's. (Small, et al 1989) However, in cases where WUA's are responsible to pay for O&M but they can expect government to make repairs and improvements periodically, they (as with the agency) may defer maintenance.

After the reforms in Mexico, the Government developed an arrangement for cost sharing for rehabilitation, modernization and canal extension. This has encouraged WUA's to develop capital replacement funds to finance their share of such costs. The irrigation agency in the Dominican Republic is now promoting the policy that funds collected from water charges should be used only for the system from which the charges were collected. This was based on the experience where farmers had low motivation to pay charges when funds collected went to the central government and not to their own scheme. The Government also changed from assigning area based fees to volumetric fees, in order to increase farmer accountability and efficiency in use of water (GDR, Decree 79-2001).

Similarly, IMT in Indonesia led to a substitution of the previous policy of applying a standard irrigation service fee across systems and collecting the funds centrally (farmers wouldn't pay it) for allowing the WUA's of each system to set a unique fee based on its actual costs and to keep funds collected for use within their scheme. This was much more acceptable to farmers than the previous approach.

### **Box 6. Indonesian District Irrigation Improvement Fund**

In 2002 and 2003 Indonesia was pilot testing a new and incremental strategy to repair and improve its irrigation systems, as an alternative to the widespread cycle of construction, under-investment in maintenance, rapid deterioration, rehabilitation, followed by continuing under-investment in maintenance, and so on. As part of recent efforts to reform its water sector, the Government of Indonesia, several provinces, districts and WUA's experimented with the District Irrigation Improvement Fund. The fund was set up at the district (kabupaten) level using a combination of district, provincial and donor-assisted funds (World Bank and Netherlands). Each district agreed on a simple formula for allocating assistance for incidental repairs and improvements among federated WUAs in response to proposals submitted by the WUAs. Criteria used by districts to allocate funds included a ratio between amount of corresponding investment pledged by the WUA, number of farm families benefited, and implementation of an acceptable standard of maintenance by the WUA. Key objectives of the Fund are to increase the level and regularity of farmer investment in irrigation and reduce the need for occasional major rehabilitation projects. Incentives to encourage farmers to support these objectives are created when the district government and farmer representatives agree on such allocation criteria as: level of WUA investment in maintenance, compliance of WUAs with service agreements, and amount WUA pledges to invest in repairs and improvements. Under these conditions, initial results showed that WUA's are often willing and able to provide 30% of the cost of investment, most often in the form of labor and materials.

*(Supported by World Bank. See Vermillion, et al 2002)*

Experience with Bank irrigation reform projects in China has shown that volumetric water supply and payment of water charges normally results in a 10 to 30% reduction in water use by WUA's because of the intention of farmers to use water more efficiently and save on water charges. Such water saved is generally reallocated and charges are reassigned within the WUA or the irrigation system, and used to expand the paying service area. Although the water charge rate tends to increase moderately (in order to cover the additional cost of the greater management intensity of volumetric charging), this is more than offset by the reduction in water requested and, where irrigated area increases, the increase in numbers of people paying for the water. In the future, introduction of a more legally recognized system of water rights could enable sale of water saved, which could further increase incentives for WUA's to use water efficiently.

In either developing or developed countries, it is difficult for governments to mobilize sufficient funds to cover their share of the cost of irrigation repairs, improvements, rehabilitation, modernization, system extension and construction of new systems. Sources and amounts of such funds vary and are especially scarce in developing countries. Some developing countries are experimenting with alternative sources of funds for this purpose. The state of Karnataka in India has attempted to raise funds through corporations from domestic bond markets. (Raju, et al 2003)

In summary, these experiences suggest that, unless governments can afford to finance the cost of irrigation O&M, sustainable management of irrigation systems can only be achieved when the following conditions are met:

1. WUA's are created democratically and are empowered to determine what irrigation service will be provided, by whom, and under what terms and conditions;
2. WUA's determine seasonally, with democratic consent, how much will be spent for O&M and incidental repairs and improvements, and how such funds, labor and/or materials will be mobilized;
3. WUA's also determine how water charges will be collected and do not pay the fees to the government but are in control of how they are utilized;
4. WUA's have adequate technical support, including staff skills, consultation, audits, and regulation;

5. Pricing of water based on actual local costs and amount of water used are powerful incentives that tend to improve the productivity of water for agriculture;
6. Productivity and profitability of irrigated agriculture is sufficient to enable farmers to pay for the cost of irrigation.

#### **Box 7. PIM and agency reform in China**

Since 1995 the World Bank has been helping China develop Self-financing Irrigation and Drainage Districts through creation of WUA's at tertiary and secondary canal levels that contract with a Water Supply Corporation (WSC) that, in turn, operates and maintains main canals and sells water to the WUA's. About 800 WUA's have been established in Bank projects and another 2,500 through other domestic projects. 41 WSC's have been established and all have functioned successfully, are still functional and demonstrate that the reform strategy works.

Experience so far suggests that the WUA's are not likely to survive unless they have a responsive service provider like the WSC, nor is the WSC likely to survive without bulk supply customers like the WUA's. In other words, both PIM and agency reform are necessary.

Bank experience has found that it is much more difficult to develop WSC's than WUA's because the former requires fundamental restructuring of the water sector bureaucracy. It remains to be seen to what extent the GOC is willing to push through the difficult process of reforming its water sector. However, public sector officials are often averse to sharing power with uneducated farmer groups and the ability of the Bank to apply pressure toward reform is probably less in China than elsewhere.

*(Supported by World Bank. Information provided by R. Reidinger, 2004)*

### **3.4 Reforming the public sector and building support services**

Since resistance to IMT so often comes from irrigation agencies, it is surprising that more efforts aren't made to promote reform of government irrigation agencies along with or prior to IMT. But some IMT programs, such as in South Australia, South Africa and the Office du Niger in Mali, have included strategic planning for the whole irrigation sector and restructuring of the irrigation agency. IMT in the USA has included extensive negotiations between farmers and Bureau staff about changes in staff jobs, assignment of expenses, and benefits. Agency reform can require downsizing or "right sizing," re-deployment and training, early retirement and compensation packages, restructuring, and adoption of new responsibilities. New roles that are taken on by agencies after IMT include more river basin management tasks, regulation, watershed protection, monitoring water quality, providing technical and financial support to WUA's, and monitoring and auditing WUA performance.

The issue of how or to what extent irrigation agencies change because of IMT is a controversial and highly variable one between countries. 35 cases reported that agency reforms were still under discussion at the time of IMT or shortly thereafter, suggesting some reluctance or political difficulty in reforming the agency along with management transfer. However, very often some change did occur. There were 27 cases where the agency was given new roles, 16 cases where agency staff downsizing occurred, 11 cases where the agency was reorganized or restructured, and 8 cases where the agency's personnel policies changed. Financial management was improved in 5 cases and financial restructuring of the agency (including from where its revenues came) occurred in 4 cases. The agency was replaced or totally eliminated in only 3 cases.

One of the main obstacles to adoption of IMT has been the resistance of government agencies who feel that their jobs, budgets and/or power are under threat. Related to this is the feeling that engineers or other government officials with higher education have that farmers are incapable of taking over O&M functions. Part of this may be justified, but part of it is an effort to defend

vested interests. But in many countries there is a growing pool of skilled labor available in the private sector that does have the engineering and managerial skills required for even sophisticated irrigation systems.

The most common roles for the agency to play after IMT are to prepare policies, legislation and planning (41 cases), provide technical support to WUA's (40), train and support WUA's and service providers (39), design and construct new systems (31), conduct monitoring and evaluation of WUA performance (30), provide management support to WUA's (30), and provide financial support to WUA's (23). The roles of regulation, dispute resolution (13), river basin management (13), and environmental protection (9) were also reported. In most cases of IMT government agencies retain control for managing large weirs and dams, branch and main canals of large-scale systems, primary or feeder canals and drains, large pumping stations and other large hydraulic works.

**Box 8. WUA Support Units in the Kyrgyz Republic**

WUA Support Units were set up under the World Bank irrigation sector loan program but the Government has agreed to make their staff become permanent civil servants and that the Units will be regular units within district and provincial offices of the Irrigation Department.

WUA Support Units have become quite successful in organizing WUA's, training WUA staff, registering WUA's under the new law on WUA's, and providing technical and managerial support to new WUA's. This includes the responsibility to organize and support WUA's, including building their capacity in WUA governance and operation of the board, irrigation operations and water distribution, canal maintenance, finance and book-keeping, record keeping, monitoring, reporting, improved agricultural production and even marketing. Their ability to be effective is less in question than the ability of the Government to finance them sustainably.

*(Supported by World Bank. Information provided by Sam H. Johnson III, 2003)*

Failure to develop a basic support system for WUA's is one of the most common weaknesses of IMT programs and is a key reason why WUA's often are not sustainable. As noted by Skogerboe:

*The most common cause of failed support systems is enacting laws and regulations without establishing units to carry them out, without providing the equipment and a full complement of trained staff to do the tasks, and without ensuring the ongoing budget to match the required work. (Skogerboe, et al 2003, p. 81)*

The main forms of technical and financial support services needed by

WUA's after IMT were technical support for irrigation management (43 cases), technical support for rehabilitation and modernization (41), financial support for rehabilitation and modernization (39), and financial support for irrigation management (37).

There appears to be a growing number of cases where farmers, once they are organized and placed in a position to govern their irrigation service, select and make contracts with private or semi-public sector companies to provide those services. In countries as different as Vietnam, Iran and Chile, WUA's make contracts with third parties to provide irrigation O&M services. In

China, legally established WUA's are now making contracts with local public water bureaus to provide services and are paying for water supply similar to townships or other enterprises. Contractual provision of irrigation or water supply services to WUA's depends on reliable and measured provision of services. For this to happen, both WUA's and service providers need special training and capacity building and the government must provide regulatory and dispute resolution services.

Several kinds of legal and regulatory support were needed by WUA's after IMT. The two most important kinds of support needed by WUA's were support for the legal rights and authority of WUA's (29 cases) and government regulation of the irrigation sector (20). Other significant needs for support that were reported were government support to settle water disputes (13), water rights for farmers (14), comprehensive legal and regulatory framework for water resources (10), support to involve the private sector to assist WUA's (9), and a clearer policy for rehabilitation (7).

### **Box 9. Three innovations to ensure accountability in WUA's**

Andhra Pradesh's "big bang" irrigation management transfer program introduced three innovations that were designed to ensure accountability between farmers, WUA officers and the State's irrigation and agricultural policies. The first was the concept of *territorial constituencies*, which were territorial blocks within a WUA command, each of which were represented by one elected farmer on the WUA council. This helped to prevent a WUA from being dominated by head-end or large farmers.

The second innovation was to appoint junior or field engineers of the Irrigation Department to WUA's as *competent authorities*, who provided ongoing technical advisory support to WUA officers regarding maintenance plans, contracts and operational issues. While the competent authority provided technical guidance in support of sectoral policy and guidelines, the WUA officers made final decisions.

The third innovation was *irrigation management audits*, which are repeating joint audits by government officers and WUA representatives of technical, financial and social/organizations aspects of irrigation management. The audits help ensure compliance of WUA activities with both government policy and constituent interests. These three concepts have also been applied in other states in India that have adopted PIM. (Supported by World Bank. Source: Oblitas & Peter, 1999)

The growing competition for water and growing populations in developing countries brings about the need for a shift in emphasis from providing more water for irrigated agriculture to increasing the productivity of water for agriculture and increasing how responsive its use is to agricultural markets (FAO 2003). Respondents also mentioned two areas where changes were needed in support services for the agricultural sector. These were, first, the need for a new, more farmer driven approach for agricultural extension (17 cases) and, secondly, the need to support development of agri-business and improved marketing by WUA's or other farmer groups (15). Sudan and Indonesia reported that the government still imposed crop quotas and suggested that farmers should have free choice to select what crops they wanted to plant.<sup>5</sup>

Regarding the requirements of WUA's for training and extension during or after IMT, the profiles indicated that the most important training needed by WUA's were technical or managerial aspects of O&M (43 cases), financial management (40), and administration and policy (21). Respondents noted the following priorities for extension: agricultural production (19); extension for marketing, agri-business and credit (14); crop processing, storage and transport (12), legal support (12) and preparation for agricultural exports (2).

In summary, some agency reform is normally needed along with IMT but it is often not done because of resistance by the agency. Where changes are made, the most common ones are for the agency to "move upstream" or intensify management at the main canal and river basin levels, to increase its regulatory activities, to build capacity of WUA's, to provide technical and financial support to WUA's, and to further develop sector policy and legislation. Another need in parallel with IMT, but which is also often neglected, is the development of support services to meet the long-term needs of WUA's to become more self reliant. The most important of these are for legal

<sup>5</sup> Although this policy was officially discontinued in Indonesia in the mid 1990's, it is still practiced in some places at the district level.

and regulatory support, training in technical and financial aspects of O&M, demand-driven agricultural extension, and development of agri-business and marketing.

After IMT sometimes WUA's take initiatives to provide their own support services. In Colombia, after IMT was adopted and after two irrigation districts in the Tolima valley had experienced rising salinity and declining flows in the river, their WUA's decided to invest their own resources to rent land and work to prevent excessive clearing and land use of the catchment area of the river basin. While Mexico implemented its IMT program the WUA's and government created ANUR, the Association of Water Users Associations, to provide support services to WUA's. These now include support for agricultural extension, technical assistance for the irrigation system, legal and administrative support and training. These also promote formation of farmer group agri-business organizations in parallel with the WUA's.

### 3.5 Implementing and adapting IMT

Experience indicates that IMT is a learning process that requires high and sustained levels of political support, multi-stakeholder dialogues and agreements, monitoring and evaluation, and modifications in strategy over time. Unity about basic principles is important, but diversity about modalities is inevitable at local levels. Experience suggests that the structure of a national plan and technical requirements should be balanced with the flexibility of negotiation and agreement.

#### **Box 10. Negotiating IMT in the Columbia Basin, USA**

Since its founding in 1903, the US Bureau of Reclamation has had a policy to transfer management of its irrigation districts to farmer-controlled irrigation district management boards as soon as about half of the construction cost is repaid by farmers. Before construction of irrigation districts began, farmers had to agree to the proposed project, to repay a share of the cost of construction, and to pay for the full cost of O&M after construction. Since farmers were already paying the full cost of O&M prior to transfer, transfer did not involve an increase in cost of irrigation to farmers. In general, farmers welcomed acquisition of governing authority over the schemes, which included authority to determine O&M plans, set irrigation fees, implement O&M, and even make sideline income from sale of excess water.

In the 225,000 ha Columbia Basin Project in Washington State, the main constraint to IMT was USBR field staff who feared for loss of jobs. Over a five-year period of negotiations, studies of technical issues, assignment of costs between districts, disposition of agency personnel, and legal issues resulted in a transfer agreement between the USBR and three farmer-controlled irrigation districts in the Basin. It was decided that the districts would re-hire 90% of the USBR field staff and that the State of Washington would take over responsibility for staff insurance, retirement and benefits. Each of the districts hired lawyers to assist with negotiations. Transfer occurred in 1969 and was followed by further agreements over installation and payment of drainage facilities. It was also agreed that the USBR regional office would conduct periodic management audits of the districts and that any significant technical or financial failures of the districts could result in the USBR taking over the districts again. Also, the districts agreed to pay a surcharge over and above the O&M fee to build up a capital replacement fund to cover costs of future rehabilitation. (*Source: D. Vermillion, IMT Profile for the Columbia Basin Project, FAO, 2003*)

The process of implementing IMT was generally a process of realigning the roles between the state and farmer groups. It sometimes involved trade off's between technical, financial and organizational needs and constraints. **Table 8** shows that the most common issue reported was the widespread deteriorated condition of irrigation infrastructure at the time of transfer (32 cases). As noted above, in most cases, IMT programs included some physical repairs or rehabilitation. This suggests that often more rehabilitation was needed than could be implemented as part of IMT. The need for physical repairs was the result of failed management and financing under public management, but it was also the result of vested interests among government agencies,

consultants and contractors. Farmers sometimes refuse to take over responsibility for management until essential repairs are made.

**Table 8. Issues for implementing IMT**

Row 1	Deteriorated infrastructure	Govt staff need more awareness & training	Inadequate coordination -- agency & farmers	Farmers need more awareness & training	Resistance to IMT by some in government agencies	Resistance by some farmers	Shortage of WUA resources for mgt costs	Unclear implementation program
<b>WB Cases</b>	<b>21</b>	<b>14</b>	<b>10</b>	<b>21</b>	<b>18</b>	<b>7</b>	<b>7</b>	<b>7</b>
<b>Total Cases</b>	<b>33</b>	<b>22</b>	<b>13</b>	<b>14</b>	<b>13</b>	<b>11</b>	<b>10</b>	<b>10</b>
Row 2	Shortage of Govt funds for IMT	Farmers Lack Irrig Skills	Resistance by some politicians	Problems with rehabilitation	WUA too weak to enforce rules	Farmers lack access to credit	Poor repayment of credit	Poor payment of water charge
<b>WB Cases</b>	<b>6</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Total Cases</b>	<b>9</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>2</b>

Other issues about implementation concerned the need for more awareness raising and training for government staff (21) and farmers (13). Six cases reported that farmers lacked skills in irrigation management. Ten cases reported that WUA's had inadequate resources to cover the cost of management and nine cases noted a shortage of government funds to implement IMT adequately. Ten cases reported that the implementation program was unclear. Other problems were lack of access of farmers to needed credit (3), WUA's were too weak to enforce their rules (4), poor farmer repayment of credit (2), and poor payment of water charges (2).

In countries such as the USA, Mexico, Colombia and New Zealand, implementation of management transfer is focused primarily on negotiation of the terms and conditions of transfer. In the transfer of the Columbia Basin Project in the USA, the transfer negotiations took five years, with the key issues being disposition and benefits of agency staff after transfer and assignment of responsibilities and costs for different parts of the large scheme, some of which required research. (Svendsen and Vermillion 1994). In Colombia, the Government and farmers negotiated over how much rehabilitation would be done, disposition of agency staff, whether the government would continue to provide subsidies (especially for schemes with pumping stations), ownership of district equipment, and responsibility for outstanding debts. The issues of whether WUA's can be for-profit organizations, can access credit, and can establish cooperatives are still not resolved. Colombia's experience suggests that it might have been more effective if it had established an independent, high-level office to negotiate and implement management transfer at the national level.

Regarding lessons about IMT program design and implementation, the most common lessons learned were that much more training was needed, especially for WUA's but also for agency personnel. 37 cases reported that more technical and financial assistance was needed than was made available. 32 cases said that more public awareness and stakeholder consultations were needed and 24 respondents said that their IMT programs should involve more strategic and participatory planning activities. 20 cases stated that the IMT program was too narrow and should be a broader reform than only about WUA's and transfer of authority (meaning, to include other sector aspects such as support services and agency restructuring).

The most significant and widespread issues for implementation of IMT were:

- Deteriorated infrastructure needs to be rehabilitated or farmers may not be willing to take over responsibility for managing and financing the system after IMT;
- Training for both farmers and agency staff is frequently very inadequate;
- Shortage of funds for IMT (for training, organizing, rehabilitation, etc.);
- IMT is often resisted by irrigation agencies, but also sometimes by farmers;
- Given the many issues and different interests of stakeholders, more attention needs to be given to awareness and negotiation;
- Farmers are concerned with IMT within their more basic need to improve the economic productivity of irrigated agriculture, so attention must be given to demand-driven agricultural extension, agri-business and marketing.

### 3.6 Outcomes and impacts of IMT

46 profiles reported on seven types of possible direct outcomes for IMT: cost of irrigation to farmers, cost of irrigation to government, timeliness of water delivery, equity of water delivery, quality of maintenance, collection rate for water charges, and changes in numbers of agency O&M staff, as summarized in **Tables 9a** and **9b**. This shows a tendency for the cost of irrigation for farmers to rise (21 cases) rather than fall (14 cases). There was a strong tendency for the cost of irrigation for government to decrease after IMT (in 33 cases), whereas it rose after IMT in only 5 cases. IMT reportedly led to positive changes in timeliness of water delivery (34 cases), equity of water delivery (32), quality of maintenance (32), and the collection rate for water charges (30). Ten cases reported that IMT led to a decrease in the numbers of agency O&M staff. All these patterns were similar for programs that implemented IMT with World Bank support.

**Table 9a. Outcomes of IMT (Part 1)**

	Cost of irrigation to farmers		Cost of irrigation to govt		Timeliness of water delivery		Equity of water delivery	
	WB	Total	WB	Total	WB	Total	WB	Total
<b>Increased</b>	13	21	1	5	18	34	20	32
<b>Decreased</b>	8	14	23	33	2	2	1	4
<b>Remained same</b>	5	8	2	4	4	5	6	10
<b>Unknown</b>	1	3	1	4	3	5	0	0
<b>Total Countries</b>	27	46	27	46	27	46	27	46

**Table 9b. Outcomes of IMT (Part 2)**

	Quality of maintenance		Water charge collection efficiency		Numbers of agency O&M staff	
	WB	Total	WB	Total	WB	Total
<b>Increased</b>	19	32	16	30	0	0
<b>Decreased</b>	2	4	4	4	10	10
<b>Remained same</b>	4	7	2	6	0	0
<b>Unknown</b>	2	3	5	6	17	36
<b>Total Countries</b>	27	46	27	46	27	46

**Table 10** summarizes key impacts associated with IMT. Of the 46 cases, IMT led to a general increase in the area irrigated in 29 cases, a reported increase in crop yields in 23 cases, and increases in farm income in 24 cases. For these measures, the majority of other cases reported no changes or said that the change was unknown. There was inadequate data to make conclusions



about effects of IMT on environmental matters such as effects of management changes on soil salinity and waterlogging. A key concern of farmers is whether increases in area irrigated, crop productivity and farm income that may be brought about by IMT will exceed in value the generally higher cost of irrigation to farmers. Trends were similar between World Bank and the total cases. The relatively negative results reported for the few cases where soil salinity and waterlogging were applicable and known suggests that the more positive reports on improvements in area irrigated, crop yields and farm income were not just fabricated.

**Table 10. Impacts of IMT**

Country/Location	Area Irrigated		Crop Yields		Farm Income		Soil Salinity		Water-Logging	
	WB	Total	WB	Total	WB	Total	WB	Total	WB	Total
<b>Improved</b>	<b>16</b>	<b>29</b>	<b>17</b>	<b>23</b>	<b>17</b>	<b>24</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>
<b>Worsened</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>6</b>	<b>7</b>
<b>Remained same</b>	<b>7</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>5</b>	<b>10</b>	<b>3</b>	<b>6</b>	<b>5</b>	<b>10</b>
<b>Unknown</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>9</b>	<b>4</b>	<b>10</b>	<b>7</b>	<b>11</b>	<b>6</b>	<b>10</b>
<b>Not applicable</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>25</b>	<b>10</b>	<b>19</b>
<b>Total Countries</b>	<b>27</b>	<b>46</b>	<b>27</b>	<b>46</b>	<b>27</b>	<b>46</b>	<b>27</b>	<b>46</b>	<b>27</b>	<b>46</b>

**Box 12. ‘Private sector’ provision of rehabilitation and management services in China**

In Shanxi province a retired employee of the Guanzhong irrigation district made an offer to finance and supervise rehabilitation of a lateral canal and its intake structure, which served 133 ha. The retired employee offered to farmers served by the canal to invest his own \$10,600 USD equivalent to rehabilitate the canal and its headworks if the WUA would agree to give him a 20-year O&M service contract with a rate of payment of 37.5 cents per 100 m3 water delivered. The farmers agreed and the retired employee became an independent irrigation service contractor. He obtained \$10,600 from personal savings, a commercial bank loan, and personal loans from friends.

This contractor rehabilitated the canal and its headworks and improved O&M using 5 hired staff. This resulted in an increase of discharge into the lateral canal from about 300,000 m3/year before rehabilitation to 500,000 m3/year afterwards. The irrigated area increased from 133 to 187 ha, which increased the annual compensation to the contractor to about \$1,875 per year. (500,000 m3 x Yn 0.03/m3 = Yn 15,000) This private sector investment happened without the availability of large amounts of capital, without contract farming or highly profitable crops, without private property rights, and with normal risks of farming. It was made possible by the pay-for-service arrangement made possible at a local level. In part, it was enabled by the system, now widespread in China, where water is sold volumetrically to irrigation districts and village irrigation management groups or WUA’s. The service provider and water use group jointly agree on a service plan and observe and measure water delivered at the point of turnover. Within villages or WUA areas quasi-volumetric charges are levied against individual water users using proxy measures such as the number of irrigations multiplied by farm sizes. (*Program supported by World Bank. Information provided by Geert Diemer, 2001*)

**4. Conclusions and Recommendations for How to Make Irrigation Management Transfer Programs Successful**

**4.1 Mobilizing support for reform**

Creating a vision and mobilizing support for IMT is a process of building enough consensus and support among all key stakeholders to carry the process through to realization. Methods for mobilizing support include public awareness campaigns, stakeholder consultations, pilot projects, study visits, high-level policy dialogues, workshops, research and exposure of the media to key

issues. IMT programs run the risk of having debilitating resistance to IMT later on if they fail to include all key stakeholders in the process of creating a common vision and mobilizing support.

Mobilizing support for a major reform toward participatory irrigation management requires considerable attention to the sensibilities of key stakeholders. It generally requires systematic planning and consultations, research and information gathering, pilot experiments, study visits, and dialogues and consensus building about policy and strategy. We have five key recommendations for mobilizing support for reform.

**1. Form IMT task force and working groups** – There were several cases of IMT that have been implemented on a system-by-system basis, as ad hoc or project activities, such as in Costa Rica, Colombia, Nepal, and Armenia. In these cases preliminary experiences indicated that more comprehensive changes in policy, law, and institutions were needed to make the reform successful and sustainable. Such changes generally require high-level political support and a common learning experience. Normally, a high-level and relatively independent IMT task force and issue-based working groups are necessary in order to create a systematic process of learning and consensus-building.

**2. Stakeholder consultations and agreements** – A comprehensive process of reform requires consensus about essential principles of reform among all key stakeholders. Such consensus requires consultations, dialogues, negotiation, and agreements. The most common reason for governments to support IMT is that they are unable to mobilize sufficient funds to manage irrigation systems. Typical concerns of farmers are cost of irrigation and desire for more rights and authority. Typical concerns of agency staff are jobs, benefits and reassignments.

The most common source of support for IMT reform is from central governments. Although the irrigation agency often resists IMT (28 cases), this is also often temporary. Both the agency and farmers were sources of support for IMT in 26 cases. The challenge is how to design IMT into an acceptable option for both the agency and farmers. Experience shows that multiple methods are needed to generate sufficient support, but aside from those used, negotiations with the search for mutually acceptable conditions, rights, responsibilities, costs and rewards are the main need.

**3. Generate public awareness and high-level support** – Experience in many places suggests that if only the donors are pushing IMT and there's a lack of commitment in the country, IMT will not succeed. There is a need to make IMT become a national program in order to obtain sufficient support, comprehensiveness and sustainability. Armenia, Colombia and the Kyrgyz Republic started IMT as specific projects only and learned that it could not succeed unless it became a national program. Pilot projects may be successful but whether there is sufficient support for reform may only become apparent at the stage of national dissemination. When only donors and small groups in the country support IMT, there tends to be a lack of a national strategy, agency and local governments manipulate or sabotage WUA, agency staff are not transferred out of systems after IMT, and there is a lack of empowerment of WUA's. A high degree of commitment to reform is needed in order to have coordination committees; an official policy, strategy and action plan; a legal framework, and so on.

The two most common recommendations about reform were: 1) IMT can only work when there is a clear and comprehensive policy and legal framework (which is not normally achieved by ad hoc project approaches); and 2) strong, sustained and high-level support is essential, because of the sensitivity of shifts in power, budgets, and benefits that IMT tends to involve.

**4. Sector performance appraisals and problem assessment** – There is a history of quickly created and quickly inactive WUA's. This tends to happen when WUA's are created as a requirement for a rehabilitation project. There is a need to design an integrated reform in order to introduce compelling incentives and accountability arrangements between farmers, WUA leaders, irrigation agency staff, local government, etc. Generally, this will involve not only creation of WUA's, but also development of a responsive support system for WUA's and farmers, changing the mandate and structure of the irrigation agency, new water rights, new financing arrangements, perhaps even civil service reform. And unless agriculture is profitable it can not pay for the cost of irrigation.

**5. Pilot experiments** – In many cases pilot establishment of WUA's preceded state-wide or nation-wide adoption of IMT. In Andhra Pradesh pilot experience persuaded people that IMT can work. Pilot experiments with new financing methods for O&M and incidental repairs and improvements may be necessary to clarify modalities and generate support for innovation, as was the case with the District Irrigation Improvement Fund in Indonesia.

## **4.2 Establishing the policy, legal and institutional framework**

The step of establishing an institutional framework for empowered water users associations includes all legislation, regulations and institutional change strategies needed in order to create and develop democratically constituted water users associations that have the responsibility, authority and political power to perform their functions effectively.

**1. Issuance of sector policy that includes IMT** – Issuance of a sector policy is often the first official expression that a government has adopted IMT. For irrigation, the policy should lay out the scope and purpose of reform, changes in policies, changes in the irrigation agency, new financing methods and support services, capacity building requirements, and priority innovations, such as information systems, asset management, etc. The experiences of Colombia and Armenia with preliminary reform suggest that they probably would have been more successful earlier if their governments had established a national policy and program and a high-level independent office to negotiate and implement IMT. A sector policy should give room for both rapid “big bang” reform and incremental changes, the first for fundamental changes and the latter for developing new management methods.

**2. Continuation, spread and modification of pilot activities** – Pilot activities for IMT should be continued and can evolve into additional aspects of reform requiring experimentation, especially for “second generation” issues such as WUA federations, innovation in financing, asset management in transferred schemes, agency personnel changes, and development of private sector support services.

**3. Preparation of legislation, regulations and strategy on WUA's and IMT** – Legislation and regulations for WUA's should clearly state the legal status and mandate of WUA's; their basic structure and functions; and their roles, rights, authority, and responsibilities. Legislation and regulations on IMT should state what powers, roles, rights, authority, and responsibilities are to be transferred from government agencies to WUA's.

A weak or unclear legal status of WUA's is widespread (reported in 27 cases). This includes lack of legal status and empowerment of WUA's, inability to apply effective sanctions and settle disputes, and lack of clarity about the division of rights and authority between WUA's, the irrigation agency, and local government. Experience indicates that IMT without empowerment of WUA's and a comprehensive legal framework results in a failure to establish sustainable WUA's. Also, it is apparent that WUA's are often established and operate through non-democratic means,

which can lead to loss of farmer support and effectiveness. Special efforts should be taken to ensure democratic selection of leaders and approval of rules and policies in the WUA.

Where WUA's or WUAF's are only organized at the sub-system level (such as distributary canals) and do not have representation at the main system level, they may lack sufficient authority to influence management. This weakens the incentives for farmers to support WUA's, especially in areas where there is rising competition for water. Despite the increasing importance for WUA's to have representation at the main system and even river basin levels, it is still rare. In 28 cases IMT was only done up to distributary level.

Regarding the role of WUA's, in most cases they are restricted to management and financing of irrigation system operations and maintenance. But in a growing number of cases (China, USA, Mexico, Indonesia, India) WUA's also take on other roles, including group provision of agricultural inputs, group agri-business, marketing, sale of water, and sideline enterprises to cross-subsidize the cost of water for irrigation.

The profiles indicate that there is a tendency for full authority over O&M to be transferred in only some cases (34 cases for operations and 32 cases for maintenance) and for financing O&M (25 cases). Only partial authority is transferred for sanctions, disputes, and rehabilitation and modernization. This indicates a limitation on WUA empowerment and probably inadequate incentives to generate sufficient farmer support for WUA's so as to motivate farmers to invest more in their irrigation system. We recommend efforts be made to extend the empowerment of WUA's in IMT programs to these areas and that the role of government be one of providing support. There is a need to develop strategies to deal effectively with the growing gender gap in agriculture and irrigation, especially in areas experiencing feminization of agriculture. Locally appropriate means should be found to include and empower women in WUA's.

***4. Preparation of procedures to establish WUA's and implement IMT*** – The IMT Task Force or a working group consisting of members from irrigation and agriculture department staff, technical and academic experts, and NGOs should prepare guidelines and manuals for community organizers, WUA leaders, and irrigation agency staff about how to establish WUA's and implement IMT in accordance with the sector policy and lessons from international experience. This should be changed periodically as the learning process develops.

### **4.3 Finding a sustainable means to finance irrigation systems**

Another crucial step in reform is to rationalize how irrigation is financed. Expecting farmers to pay water charges to government agencies that do not manage irrigation systems well has not worked. Governments that substantially under-finance irrigation O&M and then seek funds to rehabilitate systems prematurely are on an unsustainable path. In most third world countries, the primary challenge is three-fold: 1) to empower WUA's to fully manage financing O&M for those parts of the system transferred to them; 2) to establish arrangements to require significant cost sharing of incidental repairs, improvements, rehabilitation and upgrading; and 3) to make irrigated agriculture more profitable. Experience suggests that WUA's are more likely to pay adequate levels for O&M where the government does not intervene in maintenance at the WUA level or where it provides incentives such as repairs and improvements if the WUA provides agreed standards of maintenance.

***Preparation and issuance of regulations and strategy for financing the irrigation sector*** – Empowerment of WUA's to approve irrigation service plans, budgets and water fees is an essential part of IMT, as experience shows that farmers need to have voice over these matters to be sufficiently motivated to pay the charges. Attempts to make farmers pay water charges to

governments that provide unsatisfactory irrigation services do not work well. Empowerment of WUA's to define the service, set the fee, and determine how funds are used appears to be a pre-condition to adequate water fee collection. In their IMT programs, Indonesia and the Dominican Republic changed from government controlled to farmer controlled water charge systems. Where fees became based on the actual costs of management for a given irrigation system and funds were retained by WUA's, fee collection rates increased. Indonesia is also developing an incremental rehabilitation fund aimed at allocating assistance to WUA's on an annual basis, in accordance with agreed eligibility and prioritizing criteria which include farmer investment.

#### **4.4 Reform the public sector, expand the private sector, build support services**

There has been a tendency for governments and donors to merely establish WUAs in a rapid and undemocratic manner, after which WUAs have tended to become inactive for lack of legal or political recognition (as reported in Thailand and Sri Lanka), resistance by local government (Indonesia and the Philippines), lack of needed support services and essential regulations, and supply-driven assistance designed to encourage dependency rather than self reliance. (Meinzen-Dick, et al 1994, for global situation; Molle, et al 2002, for Thailand; Samad & Vermillion 1998, for Sri Lanka; Wijayaratna & Vermillion 1994, for the Philippines) The private sector should be enabled and encouraged to play a larger role in providing irrigation support services, such as maintenance and repairs, operation of hydraulic structures, provision of agricultural inputs and services to WUA's, and so on.

##### ***Preparation and issuance of regulations and strategy on agency reform and support services –***

Because of its sensitive nature, there is a tendency for irrigation agencies to attempt to minimize the amount of reform required for the agency along with IMT reforms. This can leave a lack of clarity among farmers about division of authority, cost sharing, and rights to water and infrastructure. But experience suggests that to reorient the irrigation agency is as important as to establish WUA's. The most common new roles for irrigation agencies to take on as part of sector reforms are: intensified management of the main canal system and river basins, organizing and building the capacity of WUA's, providing support services, and regulating the sector. Unless agencies reform in these ways and a more adequate support system is developed, WUA's may not survive for long. 27 cases reported the need to reorient the irrigation agency, but in most cases this was still pending further discussion. Proactive strategic planning for irrigation agencies and support service providers can help (as has been shown by the examples of South Africa, South Australia, Armenia and the Office du Niger in Mali).

***Preparation of strategy to build capacity of private sector to provide support services –*** This is an aspect of IMT programs that is often missing. Given the widespread shortage of reliable support services for WUA's and farmer groups and the possible alienation of the irrigation agency as a result of IMT, development of responsive support services needs to be given a higher priority in IMT reform programs. After IMT, WUA's may need support for O&M and repair and improvement contracts, technical and financial advice and training, legal support and conflict resolution, cultivation and on-farm water management practices, asset management, management audits, provision of agricultural inputs, development of group agri-businesses and marketing, and so on. Innovative ways to develop the capacity and willingness of the private sector to provide such services should be found.

#### **4.5 Implementing irrigation management transfer**

To design and implement an IMT program, measure the results and adjust the strategy over time is difficult because it requires long-term commitment and creativity. This involves setting up a participatory arrangement to coordinate, plan, conduct pilot projects and study tours, and implement IMT. Normally, it will include inter-departmental coordinating bodies, including

policy makers, technical and academic experts, NGO's and farmer representatives, at the national, provincial and/or district levels.

Implementation tends to include planning and review meetings with farmer participation; creation of WUA's; democratic selection of WUA leaders; training for WUA leaders and agency staff in technical aspects of irrigation O&M and finance and administration; assisting new WUA leaders to learn to prepare irrigation service plans; repair, rehabilitation and/or modernization of infrastructure; farmer participation in identifying repairs/rehabilitation works; farmer contribution to the cost of repairs and rehabilitation (either in the form of money, labor and/or materials); transfer of irrigation management to the WUA; training for irrigation agency staff; reassignment of agency O&M staff (including reassignment or possible placement of staff under the supervision of WUA officers); monitoring and evaluation; and so on. Monitoring and evaluation should be combined with participatory review and dialogue so that adjustments to improve the strategy can be made continually.<sup>6</sup>

Profile respondents were asked to identify key recommendations about what lessons the IMT strategy produced. These were several. The two most frequent recommendations were:

- 1) that a clear and comprehensive policy and legislative framework is needed to make IMT become successful (all 46 cases) and
- 2) strong and high-level political support is needed (41), because of the potentially countervailing interests involved at national and local levels.

35 cases reported the need to reorient the irrigation agency. 28 cases noted that international donors or technical assistance agencies were needed (for funding, exerting political influence and providing technical expertise). 25 cases reported a need for the government to have more incentives to promote IMT and allocate more funds to it. 23 cases stated the need to have special government units dedicated to providing support for WUA's, both during and after IMT. 18 cases stated the need for a systematic public awareness campaign. 16 cases said that the IMT program needed more systematic or comprehensive planning and 14 cases noted the importance of coordination or steering committees. Thirteen stated the need for irrigation service plans and transfer agreements to be made at the level of the irrigation system. Transferring management of irrigation systems to WUA's is a multi-faceted reform requiring a sector-wide transformation of the agency and support service providers as well as formation of WUA's.

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## Appendix 1 Type of IMT Programs Adopted

Country/State	Administrative Level at which Transfer Applied	Schemes to Have Management Transferred to WUA's	Highest Hydraulic Level Transferred	Amount of O&M Authority Transferred
1. Albania	National	All govt. schemes	Headworks & system	Full
2. Argentina: Mendoza	State	All govt. schemes	All system	Full
3. Armenia	National	All govt. schemes	Distributary	Full
4. Australia: Victoria State	State	All govt. schemes	System & headworks	Full
5. Bangladesh	National	Nearly all govt. schemes	Distributary	Partial
6. Bulgaria	National	All govt. schemes	Distributary	Full
7. China: Guanzhong	Pilot system	Pilot scheme	Distributary	Full
8. China: Hebei	Pilot system	Pilot schemes	Distributary	Partial
9. China: Hubei	Pilot system	All govt. schemes	Main/branch	Full
10. China: Hunan	Pilot system	All govt. schemes	Distributary	Partial
11. China: Ningxia	Two pilot systems	Two pilot schemes	Distributary	Partial
12. Colombia	National	All govt. schemes	System	Full
13. Costa Rica	National	Undetermined	System & headworks	Full
14. Dominican Rep.	Pilot system	All govt. schemes over 1,000 ha	Distributary	Partial
15. Ecuador	National	All govt. schemes	Distributary	Full
16. Ghana: Volta Basin	River basin	Small-scale govt. schemes <100 ha	Distributary	Partial
17. India: Andhra Pradesh	State	All govt. schemes	Distributary*	Full
18. India: Gujarat	State	All tubewell schemes	System & headworks (lift irrig)	Full
19. India: Karnataka	State	All govt. schemes	Distributary	Partial
20. India: Madhya Pradesh	State	All govt. schemes	System	Full
21. India: Maharashtra	State	All govt. schemes	Distributary	Full
22. India: Orissa	State	All govt. schemes	System	Full
23. India: Paliganj Canal, Bihar	Pilot sub-system	Pilot scheme	Distributary	Full
24. India: Rajasthan	State	All govt. schemes	Distributary	Partial
25. Indonesia (SSI)	National	All govt. schemes < 500 ha	Entire System	Full



<b>26. Indonesia (Watsal)</b>	National	All govt. schemes	Distributary*	Full
<b>27. Kyrgyz Republic</b>	National	All govt. & collective farms	Distributary	Full
<b>28. Madagascar</b>	National	All govt. schemes, if farmers agree	Entire system & headworks	Partial
<b>29. Mali (Office du Niger)</b>	System	Pilot scheme	Main/branch	Partial
<b>30. Mexico</b>	National	All govt. irrigation districts	Distributary/ maybe system*	Full
<b>31. Morocco</b>	National	All govt. medium & small schemes	Distributary	Full
<b>32. Nepal</b>	National	All govt. schemes < 500 ha in hills & < 2000 ha in plains	Entire system & headworks	Full
<b>33. New Zealand</b>	National	All govt. schemes	Entire system & headworks	Full
<b>34. Niger</b>	National	All govt. schemes	Entire system & headworks	Full
<b>35. Pakistan</b>	Sindh & Punjab	All govt. schemes	Distributary	Full
<b>36. Peru</b>	National	All govt. schemes	Main canal	Full
<b>37. Philippines</b>	National	All govt. schemes	Distributary	Partial
<b>38. Romania</b>	National	All govt. schemes	Distributary	Full
<b>39. Senegal</b>	National	All govt. schemes	Main/branch	Full
<b>40. Sri Lanka</b>	National	All govt. schemes	Distributary	Partial
<b>41. Sri Lanka (Gal Oya)</b>	Pilot system	Pilot scheme	Distributary	Partial
<b>42. Sudan (Gezira)</b>	Pilot system	One large govt. scheme	Distributary	Full
<b>43. Tunisia</b>	National	All govt. schemes	Distributary	Partial
<b>44. Turkey</b>	National	All govt. schemes	Distributary	Full
<b>45. USA (CBP)</b>	System	All govt. schemes	Sub-system	Full
<b>46. Zimbabwe</b>	National	All govt. schemes < 80 ha	Schemes < 800 ha, Distributary	Partial

\* Full and partial transfer by contract included

**Appendix 2**  
**Extent of Implementation of IMT Programs**

Country/State	Year IMT Began	Target Area (ha) to be Transferred	Area Transferred (ha)	Area Transferred by When	Percent Target Transferred	International Donors or Techl Assts. Orgs. *
<b>1. Albania</b>	1996	180,000	110,000	2003	61%	World Bank
<b>2. Argentina: Mendoza</b>	1985	360,000	360,000	2000	100%	None
<b>3. Armenia</b>	1995	200,000	90,000	2001	45%	World Bank, IFAD
<b>4. Australia: Victoria State</b>	1994	Yet to be determined	243,557	2001	-	None
<b>5. Bangladesh</b>	1960	160,000	Unknown	2001	-	
<b>6. Bulgaria</b>	1995	-	-	2001	-	World Bank
<b>7. China: Guanzhong</b>	1998	456,485	323,710	2003	71%	World Bank
<b>8. China: Hebei</b>	2000	4,121	3,910	2003	95%	World Bank
<b>9. China: Hubei</b>	1995	38,800	70,300	2003	181%	World Bank
<b>10. China: Hunan</b>	1994	60,000	27,000	2003	45%	World Bank
<b>11. China: Ningxia</b>	1998	275	120	2003	44%	
<b>12. Colombia</b>	1990	337,283	238,000	2003	70.5%	World Bank, Inter-Amer. Dev. Bank
<b>13. Costa Rica</b>	1980	40,000	25,000	2003	63%	
<b>14. Dominican Rep</b>	1987	270,000	107,000	2001	40%	USAID
<b>15. Ecuador</b>	1995	67,637	70,830	2003	105%	World Bank
<b>16. Ghana: Volta Basin</b>	1999	Yet to be determined	200	2003	-	African Dev. Bank
<b>17. India: Andhra Pradesh</b>	1997	4.84 million	4.84 million	2003	100%	World Bank
<b>18. India: Gujarat</b>	1989	4,000 tubewell schemes	3,200 tubewell schemes	2003	± 60%	
<b>19. India: Karnataka</b>	1987	Yet to be determined	± 15,000	2001	-	World Bank
<b>20. India: Madhya Pradesh</b>	2000	2 million	1.5 million	2003	75%	World Bank
<b>21. India: Maharashtra</b>	1994	169,105	-	2000	-	USAID, Ford Foundation
<b>22. India: Orissa</b>	1996	2.7 million ha	702,000 ha	2005	25%	World Bank, EU, DFID
<b>23. India: Paliganj Canal, Bihar</b>	1989	12,197 ha	12,197	2000	100%	USAID
<b>24. India: Rajasthan</b>	1990	2 million ha	50,000	2000	2.5%	World Bank
<b>25. Indonesia (SSI)</b>	1987	854,214	446,000	2003	52%	World Bank, ADB, Neth., IIMI
<b>26. Indonesia (WATSAL)*</b>	1997	1.47 million	235,000	2003	16%	World Bank, ADB, Neth., EU, IWMI

<b>27. Kyrgyz Republic</b>	1997	1 million	550,000	2003	55%	World Bank
<b>28. Madagascar</b>	1994	All area rehabilitated	16,000	2000	-	World Bank
<b>29. Mali (Office du Niger)</b>	1993	60,000	60,000	2003	100%	World Bank, Bi-laterals
<b>30. Mexico</b>	1989	3.4 million	3,236,000	2003	95%	World Bank, FAO
<b>31. Morocco</b>	1990	1.01 million	333,630	2003	33%	World Bank
<b>32. Nepal</b>	1995	50,000	30,000	2003	60%	USAID, ADB
<b>33. New Zealand</b>	1989	118,858	118,858	2003	100%	
<b>34. Niger</b>	1982	12,500	12,500	2003	100%	Bi-laterals
<b>35. Pakistan</b>	2000	± 14.3 million	87,166	2003	± .6%	World Bank, ADB, IWMI
<b>36. Peru</b>	1995	400,000	± 200,000	2001	± 50%	Multi/Bi-laterals
<b>37. Philippines</b>	1984	678,549	534,389	2003	79%*	World Bank, ADB
<b>38. Romania</b>	1999	700,000	200,000	2003	28.6%	World Bank, USAID, Neth
<b>39. Senegal</b>	1987	-	-	2003	-	World Bank
<b>40. Sri Lanka</b>	1991	350,000	205,000	2003	59%	World Bank, ADB
<b>41. Sri Lanka (Gal Oya)</b>	1981	16,328	16,328	1998	100%	USAID
<b>42. Sudan (Gezira)</b>	2001	54,000	3,000	2003	5%	World Bank, FAO
<b>43. Tunisia</b>	1987	215,000	130,000	2003	60%	Multi/Bi-lat.
<b>44. Turkey</b>	1994	2 million	1,600,000	2001	80%	World Bank
<b>45. USA (CBP)</b>	1969	230,000	230,000	1995	100%	
<b>46. Zimbabwe</b>	1997	12,000	4,000	2001	33%	Multi-laterals

\*WATSAL is the Water Sector Adjustment Loan Program of The World Bank and Government of Indonesia