

Chapter 4

Results of irrigation management transfer

Annex 4 contains tables summarizing the outcomes and impacts of IMT.

OUTCOMES

Performance of WUAs after management transfer

It is not yet clear what proportion of WUAs worldwide are established democratically, function effectively and become sustainable. However, Table 20 provides an indication of the extent to which WUAs are active in performing basic water delivery and canal maintenance functions after management transfer. According to

IMT profile informants, in 22 cases out of 25 reported, WUA were performing their basic water delivery and canal maintenance functions at the field canal level after management transfer. In 17 cases out of 23 reported, WUAs were performing their basic water delivery and canal maintenance functions at the distributary canal level after management transfer. In six cases, only half or fewer than half of these basic water delivery and canal maintenance functions were performed by WUAs. This indicates that, in general, WUAs have the potential to perform their basic functions but that they need sustained training, consultation, support services and a proper legal basis in order to enable them to function effectively.

The informants were also asked the difficult question of, according to their observations, the extent to which WUAs were raising adequate amounts of funds and labour to perform their irrigation management duties. Of 21 cases reported on, in 11 cases the WUA was reported to have mobilized 75–100 percent of the funds and labour required. In 4 cases, it was reported that the WUA had obtained 50–75 percent of the funds and labour needed for adequate water delivery and canal maintenance; while in 6 cases, it was reported that the WUA was only able to raise less than 50 percent of the funds and labour needed for maintenance.

Table 21 shows the sources of financing for WUAs after IMT programmes for a sample of 27 cases. In 26 cases, water charges and dues were collected by WUAs from members. In most of these cases, this was probably the main source of revenue for the WUA. Fines were used worldwide but were not a major source of revenue. In 15 cases, subsidies and contracts awarded by governments and loans from public and private sources provided revenue to WUAs, but the specific amounts were not reported. In 12 cases, private-sector business and sales also provided revenue for WUAs. The extent to which government funds, loans and business provide revenue for WUAs suggests there is a general need for WUA to add revenue and diversify their financing sources beyond what they can obtain from only water charges and dues from members. Private business has not penetrated the financial management of WUAs in Africa and Eastern Europe to the extent that it has in Asia, Latin America and the more developed countries.

TABLE 20
Performance of basic O&M functions by WUAs after management transfer

Basic O&M functions performed by WUAs after management transfer	Number of cases	
	Field canal level	Distributary canal level
All	8	5
Most	14	12
Half	2	3
Fewer than half	1	3
Total cases reported	25	23

TABLE 21
Sources of financing for WUA after IMT, 27 cases

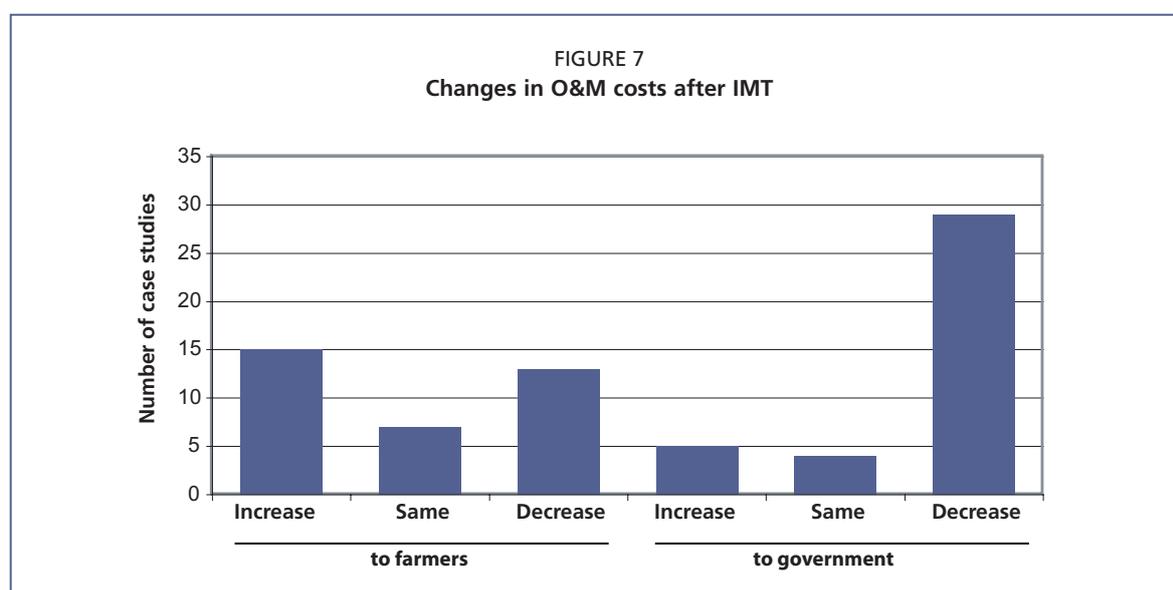
Sources of financing	Asia (11)	Latin America (7)	Africa (3)	Eastern Europe (3)	United States of America, Australia, New Zealand (3)	Worldwide (27)
Water charges & dues	10	7	3	3	3	26
Fines	7	7	1	3	3	21
Govt. subsidies & contracts	6	4	2	1	2	15
Loans	5	4	2	1	3	15
Private sales & business	5	4	0	0	3	12

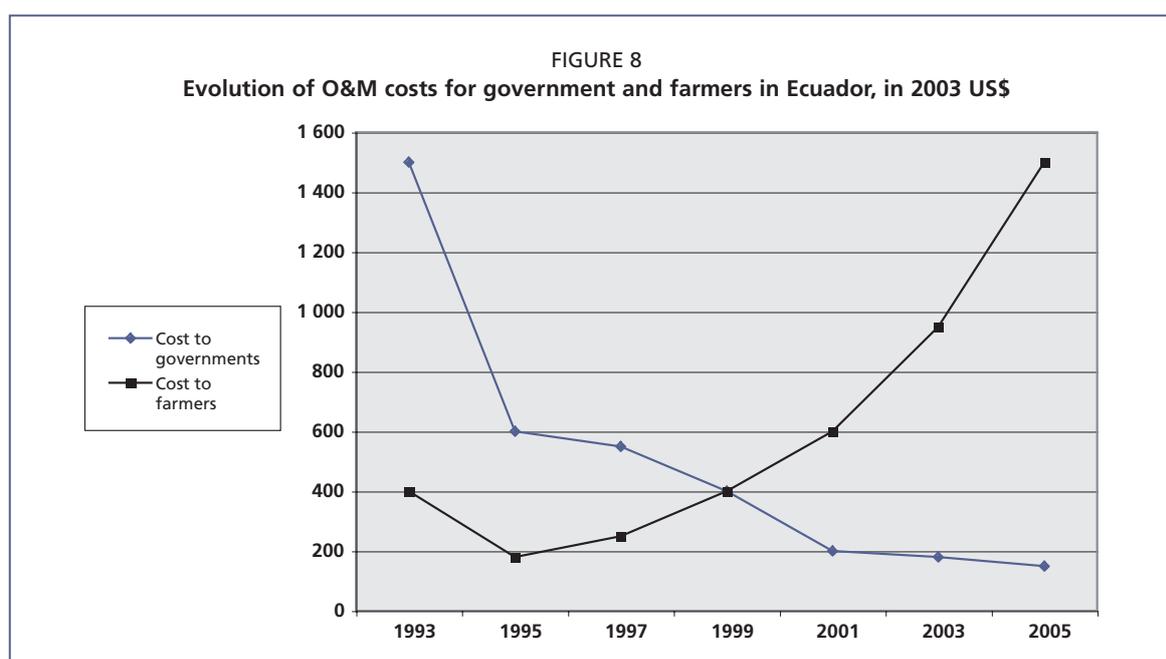
Operation and maintenance costs

One of the most common reasons for governments to start considering the possibility of turning the management of irrigation schemes over to users is the lack of public funds to cover the O&M costs of the scheme (Table 2). Some bureaucrats argue that governments cannot subsidize large irrigation schemes by bearing the O&M costs indefinitely. They argue that when projects mature and farmers reach a stable level of income, these costs should be covered by farmers alone. Although in principle it may be difficult to argue against this premise, it is well documented (Aw and Diemer, 2005) that, even under favourable conditions, often decades may pass before farmers are in an economic position to take full responsibility for the O&M costs of a scheme.

The rate of collection of water fees to cover O&M costs is often used as an indicator of the financial sustainability of a transferred scheme. However, a thorough assessment of the effect of transfer on the financial health of the scheme would also need to consider the change in the amount of resources allocated for O&M costs before and after the transfer.

However, in the set of case studies included in this report, an attempt was made to understand perceptions about changes in O&M costs. In the questionnaire used, a differentiation was made between the perception of change in these costs for the farmers and for the government. The results are mixed, particularly with regard to the change in costs to the farmers. The results are similarly distributed among those cases in which costs to farmers have increased (43 percent of cases), those in which costs have decreased (37 percent of cases), and in the 20 percent of cases where the costs to farmers have remained the same (Figure 7). However, the level of O&M before the transfer was not reported in the survey. It could have been very good, adequate or





Source: Ecuador IMT case study.

inadequate and, therefore, the direction of the costs reported after IMT was necessarily tied to the pre-IMT condition of O&M.

Thus, from this sample of case studies, it cannot be argued that the IMT process will necessarily result in a decrease or increase in costs to farmers. Indeed, unless rehabilitation is undertaken before transfer, logic would suggest that because there has been deferred maintenance in the past (when government agencies were struggling because of lack of resources), O&M costs would have to increase after transfer at least for a period in order to raise the quality of operation to a satisfactory level. This would also explain why the cost of O&M to farmers has increased in many schemes. In cases in which it has decreased, it has been because of savings in staff or other expenditures that have allowed the WUA to save enough money to offset the increased responsibility to pay for O&M, such as reported in Mexico and Colombia. Alternatively, in some cases, maintenance is still being deferred, and financial problems have arisen in the short to medium term (Turkey and Peru). As an example of the information collected, Figure 8 depicts the evolution of costs to cover O&M costs for both the government and the farmers in Ecuador.

On the other hand, in the majority of cases (76 percent), the costs of O&M to governments were perceived as decreasing, and in 11 percent of cases as remaining unchanged.

These mixed results may simply reflect the fact that irrigation schemes are quite different from one another in respect of their O&M costs and in the intensity and complexity of the management they require to be run and maintained properly. Box 7 presents the IMT case of Romania, where the pumping costs of irrigation systems are so high that they can be afforded only with heavy government subsidies. The transfer to WUAs has led to a remarkable reduction in the irrigated area owing to their high O&M costs.

Although there is no single ideal methodology to determine how much has to be allocated for O&M activities, the principle of not deferring maintenance should prevail if schemes are to be sustainable. If financial sustainability is to be achieved, the funds to replace equipment or infrastructure after their life cycle is completed should also be considered.

BOX 7

Operation and maintenance in Romania

In Romania, irrigation systems depend considerably on pumping. Out of a total of 3.1 million ha of developed land, about 2.85 million ha were developed for sprinkler irrigation. Irrigation water is delivered to the first terrace after a primary pump station lifts water from a canal off the Danube River or one of its tributaries. On the first terrace, secondary pressure pump stations extract water from the canals and deliver it to buried pipelines that supply water to sprinkler laterals. Higher terraces are supplied by successive second and third lift pump stations on the main supply canals. The overall static lift to the first terraces is usually 60–70 m while secondary pressure pumps add another 50–60 m of lift to provide water under pressure to sprinklers. Lift for the highest terraces can reach more than 200 m, and including the secondary pressure pumps, the dynamic pumping head for these terraces can exceed 270 m.

After the dissolution of state and collective farms in 1990, there was no clearly designated authority for water distribution or for the O&M of irrigation infrastructure. Initially, an attempt was made to give this responsibility to SNIF (National Land Reclamation Society) and RAIF (Autonomous State Company for Land Reclamation), but these organizations had neither the staff nor the budgetary resources to take over responsibility for O&M.

Cutbacks in government budgets and falling farm incomes resulted in a massive reduction in real investment in irrigation O&M. As a result of ageing of the irrigation infrastructure complicated by an inability of both the Government and farmers to pay for energy costs, the earlier annual irrigation demand of about 2 500–3 000 m³/ha dropped to about 1 000 m³/ha. This has had an impact on O&M as the fees collected for the partial use of the irrigation network are not enough to pay for the maintenance of all the infrastructure. In addition, on-farm equipment and modular pump sets used on many systems have been destroyed, stolen, or are too old to operate properly.

The Land Reclamation Law of 1999 (modified in 2004 and 2005) formalized the creation of WUAs and completely restructured SNIF to a land reclamation agency which included significant staff reduction, and transfer of authority to regional offices, as well as a stronger WUA role in systems management.

Currently, canals and secondary pressure pump stations are operated by WUA staff (normally former SNIF staff hired by the WUA), also responsible for fee collection. Moreover, the new law allows WUAs to be created to take over the management all the way from the primary pumps to the river.

At present only about 700 000 ha are being irrigated owing to lack of maintenance of the irrigation systems and the age of the large pumping units as well as the costs of energy. The Land Reclamation Law established that an irrigation system can only be operated if there is a demand for water of at least 20 percent of its command area both at the distributary canal and overall system levels. The challenge for the WUAs remains that of being able to maintain enough area under irrigation to be able to properly maintain the existing infrastructure.

At this stage, IMT involves transferring the secondary pressure pump stations, the buried distribution network as well as some of the open channels.

Source: Romania IMT country profile.

In more than 60 percent of the cases analysed, water users were given the responsibility to carry out O&M, and a slightly lower percentage of cases also received the responsibility to fund these activities. These results are homogeneous among the regions studied.

Quality of maintenance

Out of the 43 cases included in the survey, only four reported that the quality of maintenance had decreased after IMT implementation. However, all four cases are in

Africa. The situation that emerges from some of the African countries included in the survey is that governments have decreased their contribution towards O&M drastically, and farmers have not been able to increase their share in the same proportion. The most obvious consequence of this situation is an accelerated deterioration of the infrastructure. For example, the case of Morocco shows how the lack of funds delayed unnecessarily the process of WUAs creation and hampered adequate maintenance. This also demonstrates the need for a well-thought, properly funded capacity-building plan to be carried out in order to put farmers organizations in a position in which they can on their own take care of the long-term needs of their irrigation schemes.

Notwithstanding the foregoing, there are some positive outcomes in Africa as well. The Sudan case study describes how, after the transfer of management, farmers increased their in-kind contribution by dedicating more time to seasonal maintenance. They do not see this as an additional burden as it is carried out at the end of the growing season when they are less engaged in other activities. Farmers have soon realized the direct link between improved maintenance and a reliable and equitable water delivery service. Moreover, the farmers' monetary contribution towards maintenance is paid only after they have sold their harvest. The opposite has occurred in Senegal, where decreased quality of maintenance has meant that the problems of inequity continue with no sign of improvement owing to the low management capacity of WUAs and the low rate of fee collection (which has not improved since the transfer).

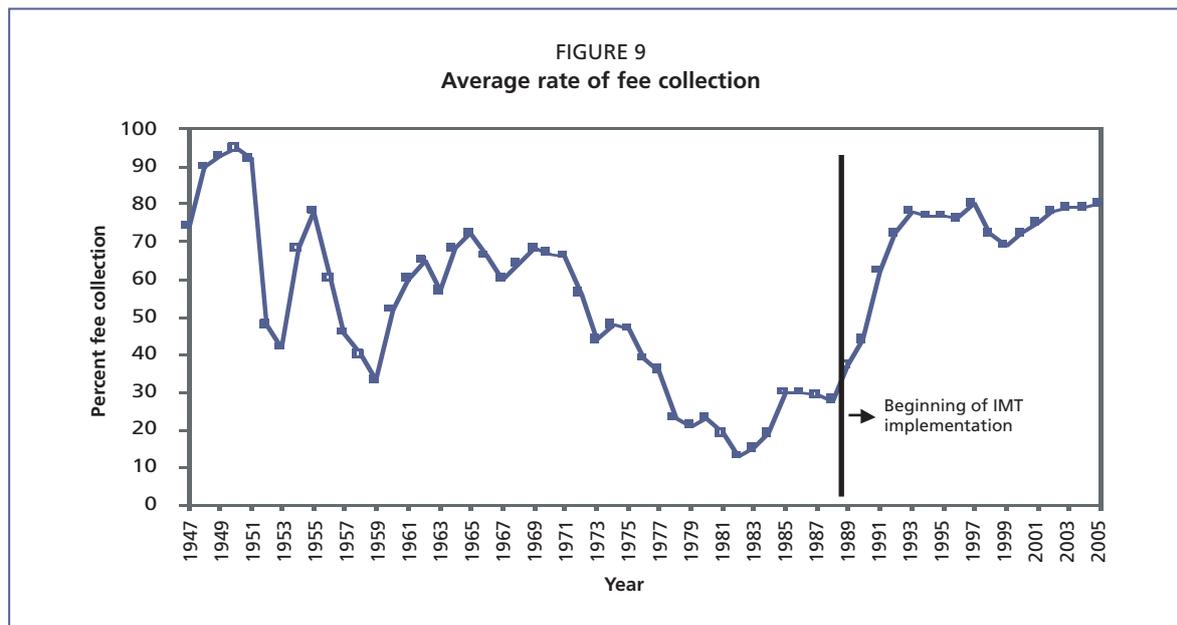
Another positive case comes from Mali, where the Office du Niger irrigation scheme has undergone a profound change through a comprehensive process of reform. Farmers have been given full responsibility not only for carrying out O&M activities but also for their financing. Farmers have decided to outsource maintenance activities to contractors, and the performance is monitored by the farmers themselves. However, this has required substantial training of the WUAs in the technical and legal aspects of the outsourcing process.

Rate of fee collection

In 75 percent of the cases studied, the rate of fee collection has increased. This result is particularly remarkable as it has occurred despite higher water fees in some cases. As an example, the IMT country profile of Mali shows that although water fees rose by 50 percent over 3 years, the efficiency of fee collection also increased in the same period. This result can be traced to increased user participation and to the improved quality of the service delivered. Andhra Pradesh, India, raised its water charges threefold with IMT, while collection rates increased, owing to the support of farmers for the policy that 90 percent of funds collected would be kept and used by the WUAs and federations of WUAs.

There are only 3 out of 43 cases in which a decrease in the rate of fee collection has been recorded. From these results, it can be inferred that farmer organizations taking over the management of their schemes have been able to at least provide the same level of water delivery service, as otherwise it is unlikely that users would pay increased fees more willingly than in the past. However, farmers' willingness to pay is related not only to the quality of the service provided but also, among other factors, to the existence of control mechanisms and transparent water-pricing methodologies.

Mexico provides a typical example of what governments often expect to achieve by embarking on the process of management transfer. Before turning management over to farmers organizations, the government used to pay about 85 percent of what was being used for O&M (with farmers contributing the remaining 15 percent). However, it is recognized that even this amount was inadequate to operate and maintain the schemes properly. As a result, farmers received a low-quality service for which they were not keen to pay. Indeed, prior to transfer, the rate of fee collection was about 30 percent. This meant that there was not enough money to operate and maintain the system



Source: Mexico IMT case study (2004).

properly, and this is how the downward vicious spiral was set in motion. The results were a decaying irrigation infrastructure, and farmers who were becoming increasingly dissatisfied with the service and less willing to pay for it.

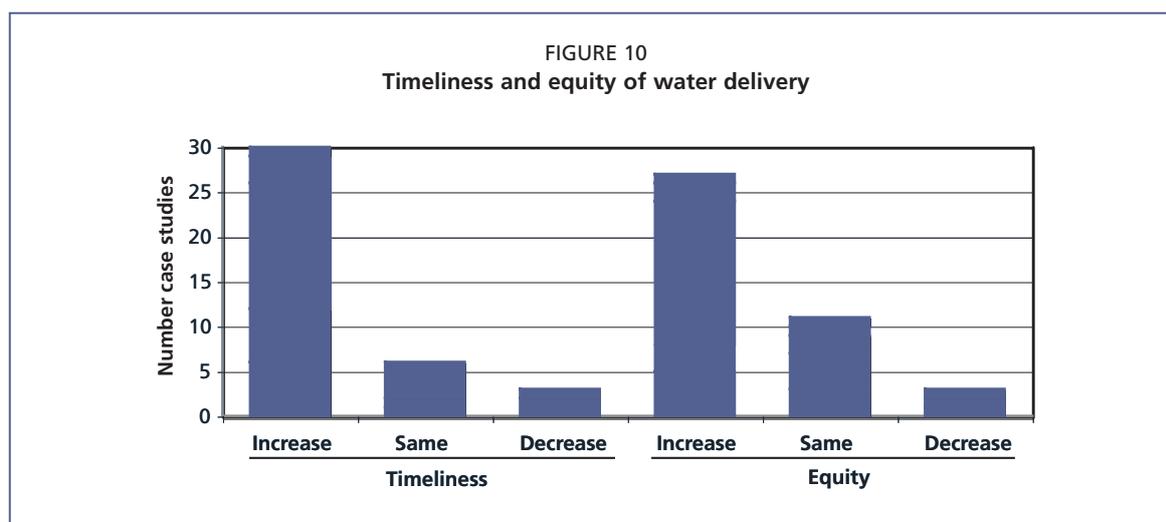
After the transfer, the rate of collection more than doubled in 5 years, peaking in 1997 at a rate of 72 percent. In Figure 9, cost recovery is the ratio of collected fees to the planned O&M costs expressed as percentages. These values are an average of all irrigation districts (IDs) transferred. The original aim of the IMT process was that IDs should achieve financial autonomy for O&M. In the season 2000–01, they collected on average 72 percent of their O&M needs. However, there was considerable variability in the performance of IDs, as by that time some were already financially autonomous while others were only collecting 20 percent of their O&M needs and, therefore, still needed government support. These figures suggest that a considerable number of irrigation districts are still a long way from achieving financial sustainability.

Timeliness and equity of water delivery

Timeliness of water delivery is one of the indicators that have reached high consensus in the countries studied. Indeed, 30 out of 39 replies reported an improved timeliness in the delivery of water, while in only three cases was a worsening registered (Figure 10). That is, farmers are receiving water closer to the moment they need it and have asked for it. As mentioned above, this is partly because of better maintenance but also to simpler operational practices and improved communications. The positive change in timeliness has been reported in all the regions surveyed.

A similar situation emerges in relation to the equity of the service provided to farmers (Figure 10), meaning that users located towards the tail end of canals were receiving a better share of the water resources available. In the only three cases in which a negative impact in the equity of water delivery has been reported, it has been linked to: land tenure problems (Zimbabwe); lack of an adequate transfer programme (Peru); and not receiving enough support, funding and training from central government (Hubei Province, China).

It could be argued that such a clear improvement in these two indicators is per se sufficient reason to advocate the direct involvement of farmers in the governance of irrigation schemes.



IMPACTS

Irrigated area

In 25 out of 39 cases studied, an increase in the area irrigated has been reported. An improved management of water delivery would normally lead to an increase in the cropping intensity or to an expansion of the irrigated land. Adopting one of these possibilities depends on local conditions, but increasing the irrigated area permits a better adaptation to additional water volumes. During processes of reform, there may be changes in the recorded irrigated area that may not necessarily reflect actual changes in land use but may merely bring records closer to reality (Huppert, 2005). The most important change in decreasing irrigated area in the last 15 years has taken place in several of the countries of the Commonwealth of Independent States, largely associated with their difficulty in funding the energy costs to operate the irrigation schemes and their deterioration for lack of maintenance (Box 5). The incipient reforms taking place in the region have already shown potential to increase area under irrigation, as the Kyrgyz Republic country profile reports. Owing to the high heterogeneity of irrigation practices in the region, this potential is yet to be proved under different circumstances. Loss of area under irrigation in the Central Asia region may also be attributed to loss of skills in water management as the public sector has shrunk.

Crop yield

It is not possible to identify distinctively the effects of the reforms in the irrigation sector in crop yields from the many other factors that may affect their seasonal value positively or negatively. Sudden changes in crop yield may stem from major technological changes (positive or negative) or from political decisions unrelated to water use (e.g. changes in access to fertilizers). There are also other elements in crop yield changes that may have a small but cumulative effect over time on crop yields, such as the release and adoption of improved varieties, the uptake of improved agricultural practices, and overall improved management. Under irrigated conditions, the vagaries of weather are attenuated, and the interseasonal climate variability does not affect crop yield noticeably under optimal management conditions.

However, 21 out of 33 replies in the survey reported an increase in crop yields, while another 11 informants reported no change. Most of the cases showing an improvement in crop yield are from Asia. Improvements in crop yield may reflect the normal positive trend in crop yield changes registered in Asia in the last four decades.

An important result is that the information collected did not show a decrease or stagnation in crop yields in areas where water management is being taken up by

farmers organizations. However, in order to determine the real impact of IMT on crop yields, it would be necessary to conduct studies of “before” and “after”, and “with” and “without”, the reform process. No such studies were reported in the survey.

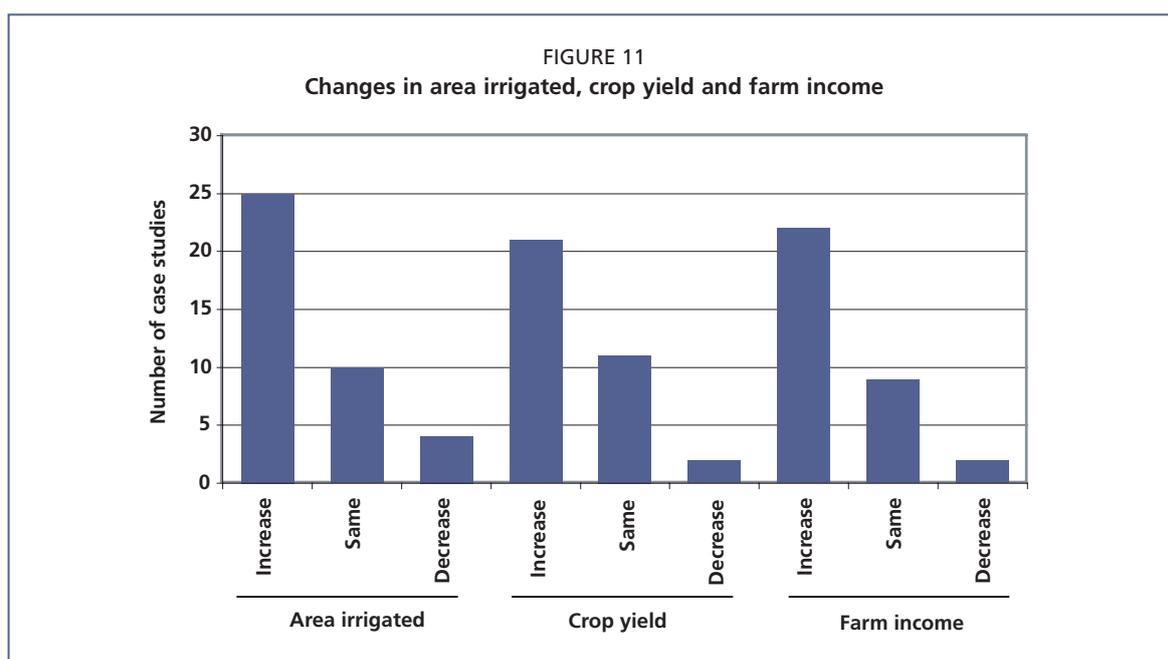
Farm income

Farm income is not a good performance indicator for IMT processes. The reason is that it reflects all the positive and negative impacts stemming from a wide range of factors, such as farm location, ability to produce the adequate crops, access to inputs, access to markets, access to transport facilities, and farmer’s managerial skills. Policies and management decisions do have an important bearing on farmers’ economic performance, but to single out the causes for its fluctuations is rather difficult and would require far more detailed data than that collected through the questionnaire developed for this survey.

The results of the survey show that an increase in farm income was reported in 22 out of 33 cases of those who replied to these questions. During the process of IMT, farm income may increase for a number of reasons. Hypothetically, if things were to evolve according to the common features included in an IMT process, fee collection would improve and more money would be available for O&M activities, which would result in an improved water delivery service. In an improved situation, receiving water in a timely fashion and in the adequate volumes would mean, other factors being equal, that yields could be increased or that the quality of the produce could be improved. If there were no other major limiting factors, this higher production would in turn have the potential to increase farm income per hectare.

When looking at these three indicators together, namely, irrigated area, crop yield and farm income, the results of the survey show a clear tendency confirming the above statement. Most countries reported larger irrigated areas, increased crop yields and increases in farm income (Figure 11).

However, one case shows a decrease in farm income. The report is from Ghana and refers to a pilot case. The reasons for this abnormal outcome can be found in the decreased quality of maintenance as a consequence of both a low fee-collection rate and a lack of technical capacity in the WUA.



Soil salinity and waterlogging

The information collected through the questionnaires and case studies in relation to soil salinity and waterlogging is limited as in few cases were these situations reported as existing or as recognized as an issue. However, out of the 15 countries that reported waterlogging as an issue, seven reported that it had decreased since IMT and only one country reported that it had increased. The remaining seven countries reported no change.

The studies have not provided any direct evidence that the IMT process has translated into a negative environmental impact on the systems involved. At worst, the effect, particularly on salinity and waterlogging, has been neutral, meaning no deterioration has occurred or it has remained as it was prior to IMT.

Chapter 5

Integrating lessons learned into future interventions

SUPPORTING OBJECTIVES AND EXPECTATIONS OF IMT PROGRAMMES

As might be expected from any complex reform process, there are implementation aspects that lead to partial or non-achievement of original objectives. After years of ongoing IMT processes in some countries, there is now evidence of the need to critically review the validity of the common reasons for embarking on reform processes in the irrigation subsector.

Overall, the results of the IMT process undertaken across the globe can be perceived as a mixture of successes and failures. Now that the process is better understood and its implementation has taken hold, efforts should concentrate on the M&E component of the process. This will allow feedback to make corrections for both past and ongoing IMT efforts.

The following sections summarize the main findings from this survey in relation to achievement of the initially envisaged IMT objectives.

Reduction in government costs

Irrigation management transfer has partially achieved this particular government objective. Although some of the main objectives of governments at the onset of the process have been achieved (e.g. decreased government expenditure, or the reorientation of institutional arrangements in the irrigation subsector in some cases), this has been coupled with government disengagement from financing irrigated agriculture, thereby hampering the provision of some support services that basic to the agriculture sector (below). In general, IMT has reduced the cost of government allocations towards the O&M of irrigation systems. However, some irrigation systems were unsustainable, from a financial point of view, before the transfer, and their sustainability after transfer has depended considerably on the government capacity to intervene and prevent the systems from collapsing. In other words, the decrease in government costs has been less than expected.

The role of WUAs in increased accountability and more efficient water supply

The IMT process has forced a new look on the way services are provided to users. This has been perhaps one of the most remarkable achievements of newly established WUAs. There has been growing concern (and pressure) about the need to move from supply-driven to demand-driven services. This is particularly true for the provision of bulk water deliveries at strategic nodes of the systems. The closer involvement of WUAs has resulted in increased accountability, transparency and responsibility, as has been reported from Mexico and China, for example.

Renewed support services to agricultural production

Although WUAs tend to remain responsible for providing services related to water distribution, some farmers organizations have also started to look into the provision of a wider range of agricultural services to their members, making the scope of the reform process more comprehensive. Some governments had high expectations that the private sector would become involved in the provision of some of these basic support services. It seems now that these projections were either too optimistic or poorly conceived, and often the private sector did not or would not react to fill this gap.

Improved payments for irrigation services

The performance of water services in terms of fee collection has been erratic. Initially, in a good number of cases, IMT led to significant increases in the fee collection ratio, but this has not always been sustainable. There are large variations between irrigation systems within the same country and among countries. It has not been the “silver bullet” that was originally presented as one of the main reasons for introducing the reforms. However, the level of cost recovery is higher than before the transfer.

Improving agricultural productivity

Irrigation management transfer does not necessarily lead to increases in cropping intensities or yields. There are only a few documented cases where there appears to be a direct relationship between the reform and agronomic improvements. These can normally be traced to the efforts of pilot studies taking advantage of the reform-derived interventions. However, in most cases, the link to improvements in agricultural productivity cannot be easily made. On the other hand, there is no reference, or case, where decreases in agriculture productivity have been reported.

Enhanced communication between users and managers

In general terms, the IMT process has led to an improvement in communication related to the management-related activities of irrigation systems. There has been an increase in both accountability and responsibility pertaining to the quality of the service provided, which has enhanced the nature of the relations between users and managers. While the magnitude of quality improvement can not be asserted from these studies, in a few countries at least such a change has been reported.

There is ample indication that communication between system management and end users has increased. This creates a better understanding of the water distribution process and its requirements, which translates into enhanced satisfaction of the service provided and received by each party.

In summary, expected objectives have been met but not to the degree initially expected. Therefore, the need to undertake national M&E programmes in order to learn more about how to improve the results obtained is becoming a pressing reality. In general, there has been a tendency to overstate the objectives and expectations of IMT programmes, creating expectations that have not always been fulfilled.

MAIN ISSUES FOUND IN IMPLEMENTING IMT PROGRAMMES

From the information collected in this survey, it can be seen that, in some cases, countries started the adoption of IMT programmes without a thorough previous analysis to evaluate the existence of adequate conditions to support the process. In some cases, correct information would have shown that the country did not have the capacity to engage in a reform of the scope and scale required and that, probably, alternative solutions such as transfer of pilot schemes or of smaller areas would have produced better results.

Essentially, there have been three major constraints. First, there has been a lack of political support in some countries. This has resulted in poor funding of the reforms and inadequate support to the process. The second one is of a legal nature. Often, governments have not wanted to face the difficulties of changing the existing laws through parliamentary processes and have tried to implement the reforms with existing, unsatisfactory legislation or with ministerial decrees that have lacked the necessary weight and authority. The result has been that often the legal responsibilities and nature of WUAs are not clear or do not cover well the real responsibilities. The third and final constraint has been the lack of managerial skills within the WUAs, which has resulted in poor provision of water services.

The following sections present some considerations arising from the results of the survey.

Legal status and degree of authority of WUAs

There is a widespread need for a clearer legal status and clearer water rights given to WUAs and farmers. Without clear legal status, the leaders of WUAs cannot operate properly because they do not know the extent of their responsibilities. In many parts of Asia and Africa, water rights do not exist or they are not functional. Farmers may need greater confidence in their water rights before they will be willing to take responsibility and make investments to ensure the productive and sustainable use of the infrastructure as well as of agricultural inputs.

The degree and type of authority to manage fully the physical infrastructure and the socio-economic aspects of the WUA need to be considered carefully. Where the transfer of authority is partial, the management of the WUA will be limited in a scope and not fully accountable for the results.

Delivering water and providing maintenance

Improvement in the delivery of water and undertaking maintenance has been a central issue for IMT. Various solutions have been adopted, including management by farmers directly, WUA staff, and staff of a governing agency. There have a few cases where the private sector or public utilities are responsible. Although the predominant modality of water delivery and maintenance is by WUA staff, other solutions and combinations appear to work satisfactorily depending on the local situation and local arrangements made at different hydraulic levels.

Purposes of WUAs

The mandates of WUAs vary considerably. Although irrigation management remains the key function, other mandates (drainage, groundwater, etc.) are often added. An issue is whether or not WUAs should focus only on irrigation management or whether they should also take on secondary functions such as developing agribusiness and marketing. The survey has revealed that the number of associations that are taking the second approach is becoming significant, particularly in Asia.

Rights and responsibility of WUA members

While voting rights are generally granted to all members, only in a few cases are water rights held by members. Despite the pressures in many places for membership to be mandatory, it has remained voluntary in nearly half of the cases surveyed. This approach limits the financial and managerial viability of irrigation systems. Representation of women in the governance of the WUAs remains very low, and this is an issue of growing concern. Only in some cases do WUA statutes provide enough safeguards to ensure that small farmers are adequately represented.

Financing irrigation improvements

The deterioration of existing infrastructure needs to be addressed in a sustainable manner. This can be done in two ways. First, where deterioration is severe, rehabilitation and/or modernization may be required before farmers will support IMT (but shortage of government funds is often a strong limitation to this alternative). Second, new arrangements should be found for farmer involvement in prioritizing works and in designing creative investment that will prepare farmers to share more responsibility for financing rehabilitation works in the future. There are successful examples of incremental improvements where financial responsibilities have been shared between government and farmers according to their financial capacity to contribute to the works.

Coping with irrigation agency reform

The large loss of jobs in the public irrigation sector that was feared by irrigation agencies as a consequence of IMT has not occurred in most countries. Where it has occurred, it has not been to the extent expected. While results vary from country to country, mechanisms have been developed to offset these effects including: absorption of staff by the WUAs; transfers to other working areas of the government; or uptake of jobs in the private sector. In general, the impact has been important on the irrigation agencies but not on the irrigation sector.

Irrigation agencies have continued to play a relevant role after transfer. The most common tasks are to make policies, laws, strategies and plans for the irrigation sector and WUAs. This includes: establishing training; inspecting; advising; and resolving conflicts in WUAs. They also continue to manage higher hydraulic systems.

Capacity building of WUAs

With few exceptions, the process of capacity building of the staff of WUAs and leading farmers has been unsatisfactory. This has had detrimental effects on the performance of WUAs during the initial years, which are the most critical ones. The reasons for this deficiency are associated to the insufficient funds allocated to the IMT programmes, but also to a lack of understanding of the training needs of the WUAs.

THE PROCESS OF IMPLEMENTING IMT

Matching IMT with the conditions of the country

As the IMT process gained momentum across the world, several international bodies tried to develop an ideal IMT model that could be easily implemented anywhere in order to facilitate and promote the implementation efforts. What is now perceived from the evidence is that it is not possible to design a model that can cater to different physical, institutional, socio-economical and cultural conditions that are evident not only across regions and countries but often also within countries themselves. Notwithstanding the above, there are common elements and steps in most of the IMT programmes.

The pace of implementation is largely related to the degree of political support that the programme receives. However, in any case, the implementation times are long and rarely less than 10 years. Even in countries where implementation has been rapid, one can observe an initial period where the transfer has been very intensive followed by a slower one where the number of systems transferred per year has decreased substantially, indicating the difficulty of incorporating irrigation systems that are marginally sustainable from an economic and technical point of view.

Thus, there is a need for a much greater focus worldwide to design and implement IMT programmes in a more comprehensive manner in order to enable the sustainable financing of irrigation systems.

Mobilizing support and awareness

Irrigation management transfer programmes require the support of stakeholders, such as local governments, the private sector and civil society, in order to be able to reach their intended goals. For example, the survey presented a case where a town council resisted the establishment of WUAs because they were perceived as a competitor for power. This led to a situation where implementation became hampered because of mutual distrust among important actors. Support can be obtained by actively involving all parts from the early stages of the programme development.

Awareness campaigns were essential elements of IMT programmes in several countries, and there is a certain correlation between the pace of implementation and the intensity and coverage of the campaigns. Resistance by irrigation agencies and local governments has often changed to support after a period of raising awareness and negotiations.

Addressing financial and capacity-building constraints

Financial support from governments has often fallen short of IMT needs. Many of the cases in this survey have been underfunded. This has led to insufficient support for important issues such as:

- a promotion campaign to facilitate the implementation process;
- building the capacities of WUAs and irrigation agencies;
- addressing land and water rights;
- adjustments in agricultural support services.

Training of staff from irrigation agencies responsible for the implementation of the IMT is of great importance for an effective implementation of the programme and the establishment of WUAs.

The need for monitoring and evaluation

Most of the IMT programmes have been characterized by a lack of M&E systems that would have permitted lessons to be learned from the implementation process. In the few cases where such M&E systems have been implemented, the scope has been limited to financial and other programmatic aspects. This has been a missed opportunity that remains important for the future.

RECOMMENDATIONS FOR FUTURE IMT PROGRAMMES

From the section above, it is possible to draw some lessons both from the survey and from other experiences concerning the transfer of management that should be taken into consideration by those governments or entities that are engaging in this type of reform. A few issues to consider are introduced below, divided into two main groups: (i) recommendations that will strengthen interventions already planned as part of the IMT process; and (ii) those that have emerged but were not initially contemplated.

In relation to existing interventions:

- High-level political commitment is essential, but it is often lacking or short-lived. In order to be successful, IMT programmes require strong political commitment at the highest possible level for a sustained period of time. Where it is weak, efforts should be made to strengthen it. To this end, sharing information from the M&E component of the programme may provide new impetus. Study tours to countries where IMT has been implemented successfully have proved useful in encouraging political support.
- The process of IMT should be adaptive and flexible. There is a tendency for international financing institutions to promote IMT programmes and to adopt fixed institutional arrangements and implementation schedules. When complexities and issues arise during implementation, they may cause governments to ignore negotiated settlements or establish WUAs rapidly and undemocratically. International financing institutions and governments should allow IMT programmes to be learning opportunities and to be flexible so that essential tasks can be done effectively and with full farmer support.
- Irrigation management transfer programmes generally need systematic public awareness campaigns, consultations, and involvement of all key stakeholders. Once the decision to activate an IMT programme has been made, there is a need to generate public awareness and support for IMT and to help farmers see that IMT is a programme with broad recognition, legitimacy and support. Where irrigation-related disputes exist, consultations with stakeholders may be needed in order to arrive at acceptable solutions. All key stakeholders of irrigation systems should be involved in the planning and implementation of IMT. This is essential not only to generating commitment but also to designing a better, more appropriate IMT programme.

- Irrigation management transfer programmes should address the financial capacity of WUAs and their strategies for financing irrigation management. This should include honest assessments of farmers' financial capacity in the context of the changing productivity of irrigated agriculture. It should include helping WUAs to design needs-based budgeting and water charges, and new arrangements for joint investment by WUAs and agencies in rehabilitation, perhaps including incremental rehabilitation.
- Irrigation management transfer programmes should include the important need to reorient the irrigation agency and plan how to support agency staff to adapt to the new situation. Without this, agencies tend to resist IMT and may sabotage its implementation. As a minimum, agencies need to redeploy staff from transferred canals and build their capacity to train, establish and strengthen WUAs. They may also need to intensify their roles in the management of main canals in large schemes, sector regulation and river basin management.

In relation to emerging interventions:

- WUAs and irrigation agencies need substantial and prolonged capacity development. Commonly, IMT programmes provide training and other complementary activities to WUAs only during their establishment, but many survey respondents say that all these activities should be part of a long-term programme that eventually evolves into a consultative, problem-solving process. Many irrigation agencies lack knowledge and experience in assisting WUAs to organize and manage their new responsibilities. Moreover, many irrigation agencies also have difficulties in directly providing capacity building related to technical aspects to the newly created WUAs. Consequently, training irrigation agency staff is essential to providing these services. Survey results show that this training is often either underestimated or wholly lacking.
- Checks and balances should be created to ensure that WUAs act according to members' interests. This may include a variety of measures, such as requirements for approval by WUA members of irrigation management plans, budgets and fees and irrigation management audits.
- The possibility for WUAs to make profits and engage in agribusiness should be explored. Most governments resist this and do not allow WUAs to engage in activities other than irrigation system management. However where permitted, WUAs have often developed cooperative purchases of inputs, agribusiness activities and group marketing that have proved viable particularly in Asia. These activities build on the social capital created by the WUAs and can build stronger loyalty to the WUA if managed properly. Recognizing the importance and potential of this, but also the limited capacity of newly created WUAs, a two-step approach has been used in some countries. Namely, the new WUAs concentrate on activities related only to irrigation system management for a certain period in order to ensure the necessary organizational capacity is present before the WUA is allowed to enter into other areas such as those described above.
- The IMT process has brought the issue of system rehabilitation to the fore either as a precondition for IMT or as an urgent element of the process. There are many unresolved questions pertaining to who will be responsible for future improvements and what the role of the government can be. Moreover, policies and legal frameworks must be clear about this issue in order to prevent relapses into deferred maintenance.
- Irrigation management transfer should clearly address the disposition of equipment and the authority over irrigation infrastructure. Many IMT programmes do not make clear the extent to which farmers are responsible for maintaining the irrigation system and have the authority to repair irrigation structures (which may belong to the government even after transfer). Irrigation management transfer

should have “transfer agreements” between the WUA and irrigation agency that make these matters clear, especially that farmers have sufficient authority to make rational decisions about maintenance and repairs.

- The IMT process should not translate into a negative impact through the decrease in data collection for statistical analysis of irrigation system performance. A job once done by the agencies has less appeal to WUAs, who still see no special incentive to invest in regular data collection. With time, this will have a deteriorating effect on the M&E of the schemes.
- Irrigation management transfer programmes need to be accompanied by M&E systems that will permit a progressive learning through the implementation process. However, in countries where IMT has already been established for some time, an evaluation of the results obtained and the impact produced in the agriculture sector will be a source of important lessons.

This study indicates that IMT is an approach for irrigation sector reform with the potential to improve the sustainability of irrigation systems. However, in order to reap its benefits, IMT should involve a wider array of changes, including both “soft” and “hard” interventions. The process requires *inter alia* strong political commitment, negotiations among stakeholders, and long-term capacity development. Irrigation management transfer should not be seen as a process that has a clear “beginning” and “end”. While the former can be more easily identified, the latter is much more difficult to determine. In fact, IMT can be the initial stage of a long reform process that will evolve as IMT progresses. For example, IMT can lead to a full restructuring of how agricultural services are provided in a region or country, or to an in-depth irrigation modernization process that was not even considered in terms of both its nature and extent at the outset. Irrigation management transfer could well lead to the reorganization of the entire institutional setup for the agriculture sector and to wide changes in economic policies in support of irrigated agriculture. However, what is certain is that irrigation sector reform is now necessary and that few countries can afford to disregard the potential benefits that it offers.

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All Irrigation Management Transfer country profiles, case studies and WUA legislation country profiles are included in the CD-ROM attached to this publication and described in page vii.

Annex 1

Types of IMT programmes in country profiles

Country/State	Administrative level at which transfer applied	Schemes for which management is transferred to WUA	Highest hydraulic level transferred*	Amount of O&M authority transferred
Albania	National	All govt. schemes	Headworks	Full
Argentina: Mendoza	State	All govt. schemes	Headworks	Full
Armenia	National	All govt. schemes	Distributary	Full
Australia: Victoria	State	All govt. schemes	Headworks	Full
Bangladesh	National	Nearly all govt. schemes	Distributary	Partial
Bulgaria	National	All govt. schemes	Distributary	Full
China: Guanzhong (Shaanxi)	Pilot system	Pilot scheme	Distributary	Full
China: Hebei	Pilot system	Pilot schemes	Distributary	Partial
China: Hubei	Pilot system	All govt. schemes	Main	Full
China: Hunan	Pilot system	All govt. schemes	Distributary	Partial
China: Liaoning	Pilot system	Pilot schemes	Distributary	Partial
China: Ningxia	Two pilot systems	Two pilot schemes	Distributary	Partial
Colombia	National	All govt. schemes	Headworks	Full
Costa Rica	National	Undetermined	Headworks	Full
Dominican Republic	Pilot system	All govt. schemes > 1 000 ha	Distributary	Partial
Ecuador	National	All govt. schemes	Distributary	Full
Ghana: Volta Basin	River basin	Small-scale govt. schemes < 100 ha	Distributary	Partial
India: Andhra Pradesh	State	All govt. schemes	Distributary**	Full
India: Karnataka	State	All govt. schemes	Distributary	Partial
India: Madhya Pradesh	State	All govt. schemes	Headworks	Full
India: Orissa	State	All govt. schemes	Headworks	Full
India: Rajasthan	State	All govt. schemes	Distributary	Partial
Indonesia (SSI)	National	All govt. schemes < 500 ha	Headworks	Full
Indonesia (Watsal)	National	All govt. schemes	Distributary**	Full
Kyrgyz Republic	National	All govt. & collective farms	Distributary	Full
Mali (Office du Niger)	System	Pilot scheme	Main	Partial
Mexico	National	All govt. irrigation districts	Phase I Main Phase II Headworks	Full
Morocco	National	All govt. medium & small schemes	Distributary	Full
Nepal	National	All govt. schemes < 500 ha in hills & < 2 000 ha in plains	Headworks	Full
New Zealand	National	All govt. schemes	Headworks	Full
Niger	National	All govt. schemes	Headworks	Full
Pakistan	Sindh & Punjab	All govt. schemes	Distributary	Full
Peru	National	All govt. schemes	Main canal	Full
Philippines	National	All govt. schemes	Distributary	Partial
Romania	National	All govt. schemes	Distributary	Full
Senegal	National	All govt. schemes	Main/branch	Full
Sri Lanka	National	All govt. schemes	Distributary	Partial
Sudan (Gezira)	Pilot system	One large govt. scheme	Distributary	Full
Tunisia	National	All govt. schemes	Distributary	Partial
Turkey	National	All govt. schemes	Distributary	Full
United States of America (CBP)	System	All govt. schemes	Subsystem	Full
Uzbekistan	National	All govt. schemes	Distributary	Partial
Zimbabwe	National	All govt. schemes < 80 ha	Schemes < 800 ha, Distributary	Partial

* In descending scope of transfer: headworks, subsystem, main/branch, distributary.

** Full and partial transfer by contract included.

Annex 2

Rates of implementation of IMT programmes

Country	Location	Start year	Target area	Area transferred	percent of target transferred	Average area transferred per year
			(ha)	(ha)	(%)	(ha)
Albania	Nationwide	1996	180 000	110 000	61	15 714
Argentina	Mendoza Province	1985	360 000	360 000	100	20 000
Armenia	Nationwide	1995	200 000	90 000	45	11 250
Australia	Victoria State	1994	-	243 557	-	27 061
Bangladesh	Nationwide	1960	160 000	-	-	-
Bulgaria	Nationwide	1995	-	-	-	-
China	Shaanxi Province	1998	456 485	323 710	71	64 742
China	Liaoning Province	2001	8 542.4	5 034.5	59	1 678
China	Hebei Province	2000	4 121	3 910	95	1 303
China	Hubei Province	1995	38 800	70 300	181	8 787
China	Ningxia Province	1998	275	120	44	24
China	Hunan Province	1994	60 000	27 000	45	3 000
Colombia	Nationwide	1990	337 283	238 000	71	18 308
Costa Rica	Selected schemes	-	-	-	-	-
Dominican Republic	Selected schemes	1987	270 000	107 000	40	6 687
Ecuador	Nationwide	1995	67 637	70 830	105	8 854
Ghana	Volga River Basin	1999	-	200	-	50
India	Andhra Pradesh	1997	4 840 000	4 840 000	100	806 666
India	Karnataka	1987	-	15 000	-	938
India	Madhya Pradesh	2000	2 000 000	1 500 000	75	500 000
India	Orissa	1996	2.700 000	702 000	26	100 286
India	Rajasthan	1990	2 000 000	50 000	.25	3 846
Indonesia	Nationwide (WATSAL, large & medium schemes)	1997	1 470 000	235 000	16	39 167
Indonesia	Nationwide (SSI, small schemes)	1987	854 214	446 000	52	27 875
Kyrgyz Republic	Nationwide	1997	1 000 000	550 000	55	91 667
Mali	Office du Niger	1993	60 000	60 000	100	6 000
Mexico	Nationwide	1989	3 400 000	3 236 000	95	231 143
Morocco	Nationwide	1990	-	333 630	-	25 664
Nepal	Nationwide	1995	50 000	30 000	60	3 750
New Zealand	Nationwide (lift schemes)	1989	118 858	118 858	100	8 490
Niger	Nationwide	1982	12 500	12 500	100	595
Pakistan	Punjab & Sindh Provinces	2000	-	87 166	-	29 055
Peru	Nationwide	1995	400 000	200 000	50	25 000
Philippines	Nationwide	1984	678 549	534 389	79	28 126
Romania	Nationwide	1999	-	200 000	-	50 000
Senegal	Senegal River Basin	1987	12 928	80 903	626	5 056
Sri Lanka	Nationwide	1996	350 000	205 000	59	29 286
Sudan	Gezira Scheme	2001	54 000	3 000	6	1 500
Tunisia	Nationwide	1987	215 000	130 000	60	8 128
Turkey	Nationwide	1994	2 000 000	1 600 000	80	177 778
United States of America	Columbia Basin	1969	230 000	230 000	100	46 000
Uzbekistan	Ferghana Valley	2000	2 000 000	?	?	?
Zimbabwe	Nationwide	1997	12 000	4 000	33	667

Annex 3

Contents of basic documents for WUAs and IMT

CONTENTS OF A WUA CONSTITUTION (OR ARTICLES OF ASSOCIATION)

1. Basis of authority for the WUA
2. WUA mission statement
3. Basic roles and structure of the WUA
4. Legal status and basis of authority
5. Area of jurisdiction
6. Criteria for membership (including for non-agricultural water users)
7. Basic rights, powers and obligations of the WUA and its members
8. Structure of leadership
9. Method for amending constitution

COMMON CONTENTS OF WUA BY-LAWS

1. Procedure for admitting and expelling members
2. Leadership positions and functions
3. Procedure for selecting and removing leaders
4. Tenure of leaders in office
5. Description of water delivery and maintenance objectives and rules
6. Rules and sanctions about irrigation service payments
7. Decision-making procedure for policy and tactical decisions
8. Procedure for entering into contracts
9. Protocol for forming federations and having external relations
10. Procedure for amending by-laws

COMMON CONTENTS OF IMT AGREEMENTS

1. Inventory of infrastructure and equipment transferred to the WUA
2. Service area and membership of the WUA
3. Role and jurisdiction of the WUA
4. Basic rights, authority and obligations of the WUA
5. Terms and conditions for transfer to occur or be revoked
6. Protocol for interaction between the WUA and government or other third parties
7. Rights, authority and obligations of the government towards the WUA
8. Procedure for dispute resolution
9. Purpose and procedure for irrigation management service agreements and audit

Annex 4

Summary tables of impacts and outcomes by continent

The legend for interpreting the tables in this annex is:

Legend	↑	Increased	↔	Remained about the same
	↓	Decreased	↕	Variable within systems
	?	Information not available	■	Not applicable

TABLE A4.1
IMT outcomes and impacts – cases from Africa

	O&M costs to farmers	O&M costs to government	Efficiency of fee collection	Quality of maintenance	Timeliness of water delivery	Equity of water delivery	Area irrigated	Crop yields	Farm income	Soil salinity	Water logging
Africa											
Ghana	↑	↑	↑	↓	↔	↔	↓	↓	↓	■	↔
Mali	↑	↓	↑	↑	↑	↑	↑	↑	↑	■	↓
Morocco	?	?	↑	↓	↓	↔	↑	↑	↑	■	■
Niger	↑	?	↑	?	↑	↑	↑	?	?	■	■
Nigeria, Hadejia Valley	?	↓	↑	↑	↑	↑	?	?	?	■	■
Senegal	↑	↓	↔	↓	↓	↔	↔	↔	?	?	↑
Sudan	↓	↓	↑	↑	↑	↑	↑	↑	↑	■	■
Tunisia	↓	↓	↔	↔	↑	↑	?	?	?	↔	↔
Zimbabwe	?	↓	↑	↓	↑	↓	↓	↔	↔	■	■

Source: IMT country profiles.

TABLE A4.2
IMT outcomes and impacts – cases from the Americas

	O&M costs to farmers	O&M costs to government	Efficiency of fee collection	Quality of maintenance	Timeliness of water delivery	Equity of water delivery	Area irrigated	Crop yields	Farm income	Soil salinity	Water logging
America											
Argentina, Mendoza	↑	↔	↑	↑	↑	↑	↑	↓	↓	■	↓
Colombia	↑	↓	↓	↑	?	↔	↑	↔	↔	↔	↔
Costa Rica	↓	↑	↑	↑	↑	↔	↑	↔	↑	■	■
Dominican Republic	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↔
Ecuador	↓	↓	↑	↑	↑	↑	↑	↑	↑	↔	↔
Mexico	↑	↓	↑	↑	↑	↔	↓	↔	↑	■	■
Peru	?	↓	↔	↑	↑	↓	↔	↑	↔	■	■
USA, Columbia River Basin	↓	↓	↔	↔	↔	↔	↑	↔	↑	■	■

Source: IMT country profiles.

TABLE A4.3
IMT outcomes and impacts – cases from Asia

	O&M costs to farmers	O&M costs to government	Efficiency of fee collection	Quality of maintenance	Timeliness of water delivery	Equity of water delivery	Area irrigated	Crop yields	Farm income	Soil salinity	Water logging
Asia											
Armenia	↑	↑	↑	↔	↑	↑	↑	↑	?	■	■
Bangladesh	↔	↓	↔	↑	↑	↑	↑	?	?	■	■
China, Hebei	↓	↓	↑	↑	↑	↑	↔	↑	↑	?	■
China, Hubei	↓	↓	↑	↑	↓	↓	↔	↑	↑	■	↓
China, Hunan	↓	↓	↑	↑	↑	↑	↑	↑	↑	■	↓
China, Ningxia	↔	?	↑	↔	↑	↑	↔	↓	↔	↔	■
China, Shaanxi	↔	↔	↓	↑	↑	↑	↑	↑	↑	■	↓
China, Shenyang	↓	↓	↑	↑	↑	↑	↔	↑	↑	?	↓
India, Andhra Pradesh	↓	↑	↑	↑	↑	↑	↑	↑	↑	■	■
India, Karnataka	↓	↓	↑	↑	↑	↑	↑	↑	↑	■	■
India, Madhya Pradesh	↓	↓	↑	↑	↑	↑	↑	↑	↑	■	↓
Indonesia, large schemes	↑	↓	↑	↔	↔	↑	↔	↔	↔	■	?
Indonesia, small schemes	↔	↓	↔	↔	↔	↑	↔	↔	↔	■	?
Kyrgyz Republic	↑	↔	↑	↑	↔	↑	↑	↑	↑	?	?
Nepal	↑	↓	↑	↑	↑	↑	↑	↑	↑	■	■
Pakistan	↔	↓	↑	↑	↑	↑	↑	?	?	?	?
Philippines	↔	↓	↑	↔	↔	↔	↔	↔	↔	■	■
Sri Lanka	↑	↓	↔	↑	↑	↑	↔	↔	↔	■	■
Turkey	↑	↓	↑	?	↑	↔	?	?	?	■	■

Source: IMT country profiles.

TABLE A4.4
IMT outcomes and impacts – cases from Europe

	O&M costs to farmers	O&M costs to government	Efficiency of fee collection	Quality of maintenance	Timeliness of water delivery	Equity of water delivery	Area irrigated	Crop yields	Farm income	Soil salinity	Water logging
Europe											
Albania	↓	↓	↑	↑	↑	↑	↑	↑	↑	■	■
Bulgaria	↓	↓	↓	↑	↑	↑	↓	↑	↑	■	↔
Romania	↑	↑	↑	↑	↑	↔	↑	↑	↑	■	■

Source: IMT country profiles.

TABLE A4.5
IMT outcomes and impacts – cases from Oceania

	O&M costs to farmers	O&M costs to government	Efficiency of fee collection	Quality of maintenance	Timeliness of water delivery	Equity of water delivery	Area irrigated	Crop yields	Farm income	Soil salinity	Water logging
Oceania											
Australia	↑	↓	↑	↑	↑	↔	↑	↔	↔	↔	↔
New Zealand	↓	↓	↑	↑	?	↑	↑	?	↑	■	■

Source: IMT country profiles.

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Irrigation management transfer

Worldwide efforts and results

Towards the end of the twentieth century, many developing countries were moving in the direction of major change in their economic policies, including reductions in the size and budgets of government. Pressure was mounting on the agriculture sector to become more efficient. Many governments made efforts to collect irrigation service fees but few were successful. The time for more basic change in the irrigation subsector was ripe. The perception that increased ownership, decision-making authority and active participation in the operation and maintenance of irrigation systems would create a binding commitment from water users to be more effective and responsible towards their obligations inspired the process of irrigation management transfer (IMT). Therefore, IMT is the process of devolvement of authority and responsibility from government agencies managing irrigation systems to farmers' organizations and has been utilized as a tool for irrigation sector reform in more than 60 countries.

The present water report is the final product emanating from efforts by FAO, IWMI and others to document and understand the implications of the irrigation sector embarking on a wide reform process. It is intended to be a knowledge synthesis document that captures the global experiences emerging from a wide-reaching process targeting the reform of the irrigation sector.

This study indicates that IMT is an approach for irrigation sector reform with the potential to improve the sustainability of irrigation systems. However, in order to reap its benefits, IMT should involve a wider array of changes, including both "soft" and "hard" interventions. The process requires *inter alia* strong political commitment, negotiations among stakeholders, and long-term capacity development. Irrigation management transfer should not be seen as a process that has a clear "beginning" and "end". While the former can be more easily identified, the latter is much more difficult to determine. In fact, IMT can be the initial stage of an evolving long reform process.

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