IRRIGATION MANAGEMENT TRANSFER: WORLDWIDE EFFORTS AND RESULTS

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INTRODUCTION

This paper summarises information collected from a range of countries worldwide. A database with all the information collected as well as other related documents led to the creation of a specialized webpage on the subject managed by FAO, found at: http://www.fao.org/landandwater/aglw/waterinstitutions/. The paper is structured into five sections. This first section provides a brief introduction to set the stage of why irrigation sector reform has emerged. In section 2, the policy and legal framework for IMT are presented. With respect to policy, the section addresses the requirements to support IMT programmes as well as to establish Water Users Associations, the cornerstone of the transfer process. The elements present in the implementation of IMT programmes is the subject of section 3. In sequential order, the document addresses IMT strategies such as the scale of transfer, the scope of activities included and the speed of implementation. In section 4 the paper brings together the outcomes and impacts derived or expected from the reform. Section 5 summarizes key conclusions and recommendations.

1.1. BRIEF HISTORICAL BACKGROUND OF IMT AND DEFINITION OF CONCEPTS

Serving the external debt has been the main driver for Bretton Woods institutions to pursue general structural adjustment strategies all throughout the indebted world (Sen, 2000). Governments have therefore devised ways to decrease public spending in most sectors. This disengagement has not spared agriculture and the irrigation sector in particular. This is not surprising as the World Bank estimates that since the 1950's it has lent some 35 billion dollars for irrigation development or an equivalent seven percent of all its lending (Plusquellec, 1999).

For the development of public irrigation schemes, governments had set up irrigation agencies that not only identified, designed and built irrigation schemes, but were also engaged in their management afterwards. It was therefore common in many countries that the irrigation agency would receive one of the largest budgets dedicated to the

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agricultural sector. In many countries the irrigation agency became a powerful enclave with large bureaucracies and considerable territorial presence. In several countries this has also implied strong political power and influence not only on local and regional levels but also on central governments. National Irrigation Agencies running irrigation schemes were often not successful in keeping pace with infrastructure deterioration as low fee collection rates and decreasing budget allocations from central governments allegedly hamper their maintenance capabilities. Likewise, operation activities often were not up to farmers' expectations and this decreased their motivation to promptly pay the dues to the scheme managers. This created a deterioration cycle that led to the idea of transferring the management of the scheme directly to the water users with the underlying principle that farmers would be able to operate and maintain the irrigation scheme properly and would be able to collect the water service fees from a satisfied group of peer users.

In dealing with IMT issues a second interrelated concept is often encountered, and referred to as Participatory Irrigation Management or PIM. Normally this refers to the increased involvement of water users in irrigation management, along with the government; and thus consists more of a behavioural or attitudinal change than a reform process per se. Thus, while the IMT concept intends to replace the role of the government, PIM seeks to strengthen the water user-government relationship, by adding farmer participation to government management. The concepts intersect at the "co-management" stage of IMT where before a final transfer takes place the government agency and the recipient organization agree to share responsibilities. Thus, the point is made herein that while having intersecting elements, the two concepts are not exactly the same and therefore are not interchangeable.

To further capture the meaning of IMT, it is convenient to define other concepts that are found in the realm of institutional reform and that often touch irrigation. **Decentralization** is the movement of decision-making authority to regional or local levels from a central authority, but still within the same organization. **Privatization** refers to the transfer of ownership of assets from the government to the private sector. In the case of irrigation, the assets would be represented by the systems themselves — irrigation and drainage network— and by equipment.

1.2. EXTENT OF IMT WORLDWIDE

Irrigation Management Transfer is a true worldwide event; it is taking place in countries in all five continents. While the IMT "boom" can be place in the 90s, this type of reform can be traced as far back as the 60s in Bangladesh and USA, the 70s in Mali, New Zealand and Colombia and the 80s like in the Philippines, Tunisia and Dominican Republic. The careful reader should not fail to note the diversity of the geographical and economic regions represented above. The new century already shows examples with interventions taking place in Sudan and Pakistan (2000), India (2001), China (2002) and more recently in some of the Central Asian countries, experiencing a process of different intensities. Today, more than 60 countries have embarked in some type of irrigation sector reform. These countries constitute around 75% of the world population and represent some 80% of the irrigated area of the world of 277 million ha (FAOSTAT, 2003). These countries include the 42 shown in Figure 1 plus: Guatemala, Laos, Vietnam, Ethiopia, Jordan, Madagascar, Mauritania, Cyprus, Georgia, Kazakhstan, Macedonia, Moldova, Ukraine and Poland. Since then, other countries where reforms are ongoing are Russia, Slovenia and the Chez Republic.

1.3. FAO AND IWMI'S BREADTH OF IMT-RELATED ACTIVITIES

This paper presents the synthesis of a programme on the subject of irrigation sector reform initiated by FAO and its partners in the year 2000. With the generous support of the Ford Foundation and in collaboration with the International Water Management Institute, a rather broad set of activities were designed. Other organizations, such as the World Bank and the International Network for Participatory Irrigation Management (INPIM), joined from time to time in making specific contributions. The main activities carried out included: an **International E-mail Conference** which was held in 2001 counting over 400 participants from 80 countries; preparation of thirteen **IMT in-depth case studies** in countries which have gone through a major process of IMT were prepared covering 11 countries; preparation of 43 **IMT Country Profiles** representing 33 countries and that can be seen as a brief description of the IMT process that has taken place; finally, 30 **WUA Legislation Profiles** representing 29 countries, were prepared by the FAO Development Law Service and include legal and supporting regulatory framework for WUAs. All these documents are available at the website mentioned above.

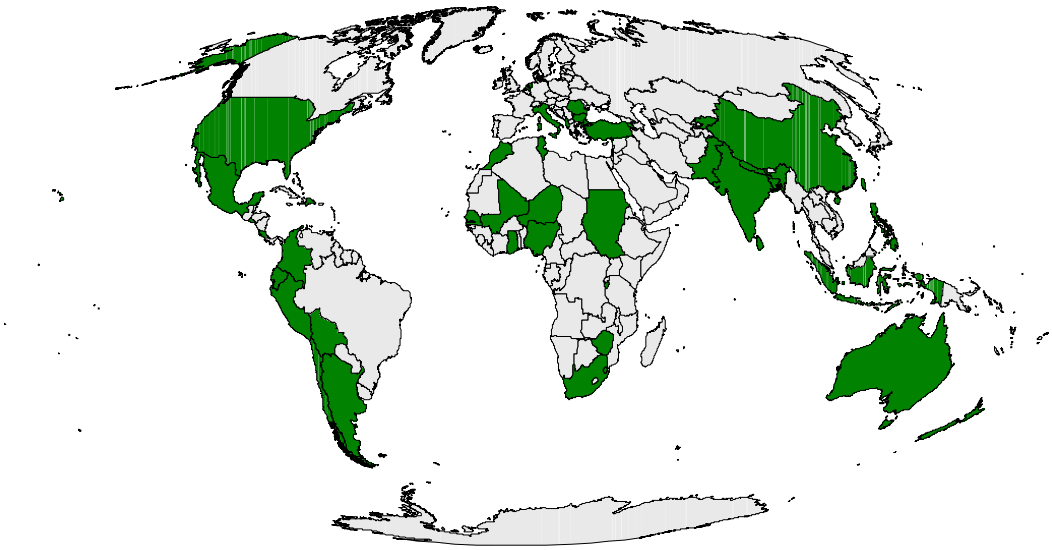

Figure 1. Map of countries represented in the study

2. POLICY AND LEGAL FRAMEWORK FOR IRRIGATION MANAGEMENT TRANSFER

2.1. RATIONALE FOR ADOPTING IMT

One of the most remarkable things about IMT is its relative similarity across different parts of the world. This is partly due to the basic need for sustainable irrigation management under declining levels of government investment. It is also due to the similar ways whereby the technical, agricultural, organizational and economic aspects of irrigation systems must interact with each other to ensure productive and mostly self-sustainable management. The FAO/IWMI database of IMT Profiles provides data on key factors that motivated adoption of IMT in 43 locations around the world (see Table 1).

Table 1. Factors motivating adoption of IMT

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

2.2. POLICY AND LEGAL BASIS FOR IRRIGATION MANAGEMENT TRANSFER

Where irrigation agencies are strong and/or transfer policies are modest, IMT policies can be adopted by the sectoral line agency, as was the case in 26 of the 45 cases of IMT from the survey. However, in 20 cases the policy was adopted by the head of state and in 19 cases it was adopted by an act of parliament or the legislature. In 15 cases the policy was issued by a cross-sectoral department such as the finance or planning ministry. Table 2 shows the extend of authority transferred to farmers' organizations.

Table 2. Authority transferred

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

IMT occurs at different hydraulic levels of irrigation systems. In most cases (25) IMT is implemented up to the distributary or secondary canal level. In ten cases IMT included main and branch canals and in another ten cases it includes the entire system, including the headworks (i.e., dam or weir). In some cases, where IMT was, in the beginning, officially declared to be implemented up to the main system level, subsequent experience has shown a reluctance to do this for large-scale systems. Political resistance (mainly from irrigation agencies) and technical/financial challenges for farmer organizations can make this level of transfer more problematic.

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

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

2.3. POLICY AND LEGAL BASIS FOR WATER USERS ASSOCIATIONS

In most cases the institutional framework is only partial at the time of policy adoption and is elaborated further over time. The study shows that the most common key policy and institutional features of WUAs that have been adopted are: the right of WUAs to use and obligation to maintain irrigation infrastructure, the legal authority to set and enforce sanctions against errant members, arrangements for settling disputes, policies and means to reorient the mandate of the irrigation agency and redeploy its staff, an arrangement to extend technical advisory services to WUA, water rights for individual water users, and a right for WUA to develop businesses (such as for input provision and agri-business) and make profits (although this is restricted in many countries due to the requirements that WUA maintain a tax exempt status). The most common of the legal rights that have been granted by governments to WUAs include the rights to enter into contracts with third parties (including the government) and hold bank accounts (18 cases), the right to levy fines against members (17 cases), and the holding of a water right or water use right (15 cases). In 11 cases WUAs have a legal provision to own property. For public irrigation systems transferred to WUAs, those which obtain ownership of irrigation system infrastructure were only three cases in Latin America (Argentina, Chile and Costa Rica), two cases in Europe (Bulgaria and Romania), and one case in Africa (South Africa).

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

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

2.4. IMT AND FINANCING IRRIGATION

Regarding the issue of how IMT programs themselves are financed, the survey indicated that in 19 countries financing for IMT programs came primarily from international investment or IFIs' funds. In 15 countries IMT was financed primarily from national funds. In 5 cases IMT was financed roughly equally between international and national sources of funding. In most cases where international assistance is involved some grant funds are also provided by bi-lateral public or NGO sources. This is particularly done in the early stages of reform to conduct pilot testing and derivation of a methodology appropriate for national dissemination.

2.5. REFORM OF IRRIGATION AGENCIES

Irrigation departments tend to resist IMT when they perceive it to be a danger for their jobs, budgets or decision making powers. Irrigation agencies may be able to reassign their staff to higher hydraulic levels (above the level of transfer), to relocate staff to

systems where IMT is not taking place, to assign them to other functions than irrigation O&M, or to have staff deputed to work for WUA (as has happened in Andhra Pradesh and Madya Pradesh, in India). Table 3 displays the main roles that government irrigation sector agencies continue to play during and after IMT has occurred.

Table 3. Roles of government relative to WUAs and water users

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

In cases where the government retains a close role in irrigation management, the irrigation agency may arrange maintenance contracts for WUAs and review and approve WUAs' O&M plans and budgets. In countries where governments prefer to retain a common level for water charges between different irrigation systems it may continue to set water charges.

2.6. IMPROVEMENTS NEEDED IN THE INSTITUTIONAL FRAMEWORK

Experts who provided the IMT profiles were asked what policy and institutional problems and issues arose during IMT or remained thereafter. The most commonly mentioned problem was the lack of clarity about what financial and technical assistance the government would provide to WUAs after management transfer (28 cases reported this). This is related to three other concerns about financing, which were, "Who would pay for rehabilitation or modernization after transfer?" (22 cases) and "Would farmers be unable to pay for O&M?" (8 cases). Water use rights and rights over system infrastructure were noted as unresolved issues in 17 and 14 cases, respectively. Thirteen cases reported that policy or legislation about IMT was still lacking. Eleven cases reported that there was lack of clarity about the future role and authority of the irrigation agency after transfer. These were all key issues needing further consultation, negotiation

and agreement with the stakeholders involved. They give an indication as to the extent of complex issues that accompany an IMT reform process. They suggest how important it is to provide extensive negotiations and opportunity to build the institutional framework and common support for IMT.

3. IMPLEMENTING IRRIGATION MANAGEMENT TRANSFER

3.1. MOBILIZING SUPPORT AND PUBLIC AWARENESS

Normally, an IMT programme is supported and developed initially by a small group of proponents, being government officials, NGO's, technical experts and IFIs. The most common main source of support for IMT is central government at the national or provincial level (32 cases). There is a larger number of sources of support than might be expected and surprisingly, perhaps, the irrigation agency was identified as a main source of support in 25 cases. Farmer organizations (19 cases), IFIs and international technical agencies (16), legislatures or parliaments (14) and local governments (9) were also significant sources of support for IMT programs. Support was also generated by pilot projects and the media.

3.2. IMPLEMENTING MANAGEMENT TRANSFER

From data obtained through the present study, it can be seen that the most universal steps taken during IMT implementation are creation of WUA, democratic selection of WUA leaders (though this is problematic in practice), technical training in O&M both for WUA leaders and their staff, farmer participation in identifying and contributing to repairs or rehabilitation, training of WUA leaders and staff in administration and finance, and training of agency staff in how to create WUAs, build their capacity and provide them with technical advice.

The resistance of the irrigation agency to IMT is the most commonly reported problem when implementing IMT as it was reported by 31 of 44 cases. This was done either in terms of slowing it down, making it more modest in scope or stopping it. This was the case in the majority of countries in Asia, Latin America, Africa and Eastern Europe. However initial resistance often switches to support later on, after negotiations and adjustments are made to protect some of the interests of agency staff.

Other problems or issues that arose during implementation of IMT included disagreements over whether WUAs should be profit making or not (*Colombia, Morocco, Romania*), late or poor disbursement of funds for IMT activities (*Ecuador, Andhra Pradesh in India, Indonesia*), lack of markets for private sector providers of support services for WUAs (*Niger, Tunisia, Argentina*), difficulties getting WUAs registered as legal entities (*Rajasthan in India, Indonesia*), problems caused by WUAs not being based on hydraulic boundaries (*Armenia, Indonesia*), and cumbersome government procedures to implement IMT (*Orissa in India, Sri Lanka, Indonesia*).

Table 4 below summarizes the key lessons learned from implementing irrigation management transfer. In addition to these points, respondents also mentioned the following: there is a need for a market of O&M service providers that can be acquired by contract or hiring of staff (*Argentina and Niger*), farmers need to have free crop

choice in order to be able to support IMT (*Indonesia, Sudan and Uzbekistan*), and different forms of support services are needed for large commercial farms and small subsistence farms (*South Africa*).

Table 4. Key lessons learned about irrigation management transfer

Key lessons learned	Asia (21)	Latin America (7)	Africa (10)	Eastern Europe (3)	USA, Oceania (3)	World-wide (44)
Need clarity on roles, responsibilities, authority of WUA, agency & towns	14	5	4	1	1	25
WUA & agencies need substantial training	17	3	5	0	0	25
Need to reorient agency & handle staff disposition	14	4	3	1	3	25
Need clear legal framework	14	3	3	1	3	24
Address financial capacity of WUA along with IMT	14	3	3	2	1	23
High-level political commitment essential	13	3	3	0	2	21
Need clearer water rights & infrastructure rights	11	3	3	0	2	19
Multi-stakeholder involvement important	14	1	3	0	2	20

3.3. PERFORMANCE OF WUA AFTER MANAGEMENT TRANSFER

It is not yet clear what proportion of WUA worldwide is established democratically, functions effectively and becomes sustainable. The study offers a glimpse at the extent to which WUA are active in performing basic water delivery and canal maintenance functions after management transfer. According to the data collected, 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. And in 17 cases out of 23 reported, WUA 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 all WUA were performing their basic water delivery and canal maintenance functions. This indicates that, in general, WUA have the potential to perform their basic functions but they need sustained training, consultation, support services and a proper legal basis.

In relation to the sources of financing for WUA after IMT programs, for a sample of 27 cases, in 26 cases water charges and dues were collected by WUA from members. In most of these cases this was probably the main source of revenue for the WUA. Fines were used worldwide but were probably not a major source of revenue. Somewhat surprisingly, in 15 cases, subsidies and contracts awarded by governments and loans from public and private sources each provided revenue to WUA. In 12 cases private sector business and sales also provided revenue for WUA. Private business has not penetrated the financial management of WUA in Africa and Eastern Europe to the extent that it has in Asia, Latin America and the more developed countries.

3.4. SUPPORT SERVICES

Table 5 shows the main support services that are needed by WUA after IMT. Significantly, the top six identified were all about training and consultation.

Table 5. Support services needed by WUAs after IMT

Support services needed	Asia (21)	Latin America (7)	Africa (10)	Eastern Europe (3)	USA, Oceania (3)	World-wide (44)
Train WUA in technical aspects	19	7	8	1	1	36
Train WUA in financial aspects	20	6	6	0	1	33
Train WUA in administration	17	6	6	0	1	30
Technical consultation	16	6	3	0	2	27
Extension, agri-business, marketing	8	5	6	0	3	22
Train & motivate agency for IMT	16	0	1	0	0	17
Rehabilitation & modernization	11	1	3	1	0	16
Credit for WUA & farmers	4	2	5	0	1	12
Legal support/dispute resolution	5	3	0	0	1	9
M & E of management performance	7	0	1	0	0	8

Additional needed support services that were identified included environmental monitoring and regulation (*Colombia, Shaanxi-China, Indonesia*), crop price supports (*Nigeria, Uzbekistan*), technical/managerial auditing (*Andhra Pradesh & Madya Pradesh in India, Indonesia*), assistance to develop a capital replacement fund (*Australia, Indonesia*).

3.5. REFORM OF PUBLIC SECTOR ORGANIZATIONS

One of the changes that should go along with IMT that often does not happen is the reform of public sector organizations, especially the irrigation agency. The informants were asked, in what ways does the irrigation agency need to change, in relation to IMT. Their responses are summarized in Table 6.

Table 6. Reorientation of the irrigation agency

Ways agency reorientation is needed	Asia (21)	Latin America (7)	Africa (10)	Eastern Europe (3)	USA, Oceania (3)	World-wide (44)
Withdraw from O&M at lower hydraulic levels	19	5	6	1	3	34
Restructure/decentralize	11	3	8	2	3	27
Increased role in capacity building	15	5	4	1	1	26
Downsize/reassign staff	11	4	6	1	2	24
Increased role in providing technical & financial guidance	16	0	0	0	2	18
Increase regulation of irrigation sector	5	4	2	2	2	15
Increase management at main system & river basin levels	6	2	2	1	2	13

In addition to the above points respondents also suggested the following needs to reform or reorient the irrigation agency: increase the role of the agency in producing and communicating information to WUAs and to others in the sector (*Australia, Madya Pradesh-India, Uzbekistan*), increased role in water and agricultural extension (*Senegal, Andhra Pradesh-India*), and restricting the role of the agency to higher level maintenance and rehabilitation (*Indonesia and Bulgaria*).

4. IRRIGATION MANAGEMENT TRANSFER RESULTS

4.1 OUTCOMES

4.1.1 Operation and Maintenance Costs

The rate of collection of users' fees to cover O&M costs is often used as an indicator of the financial sustainability of a transferred scheme. A thorough assessment of the effect of transfer on the financial health of the scheme would need to consider the change in the amount of resources allocated for O&M costs before and after the transfer. In our set country profiles however, 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 when it refers to the change in costs to the farmers. The results are similarly distributed among those cases in which costs to farmers have increased (43% of the cases) and those in which costs have decreased (37% of the cases). Moreover, in 20% of the cases the costs to farmers have remained the same (see Figure 2). It is worth noting that it is well documented (Aw and Diemer, 2005) that even under favourable conditions often decades may pass by before farmers are in an economical position to take full responsibility over the operation and maintenance costs of the schemes.

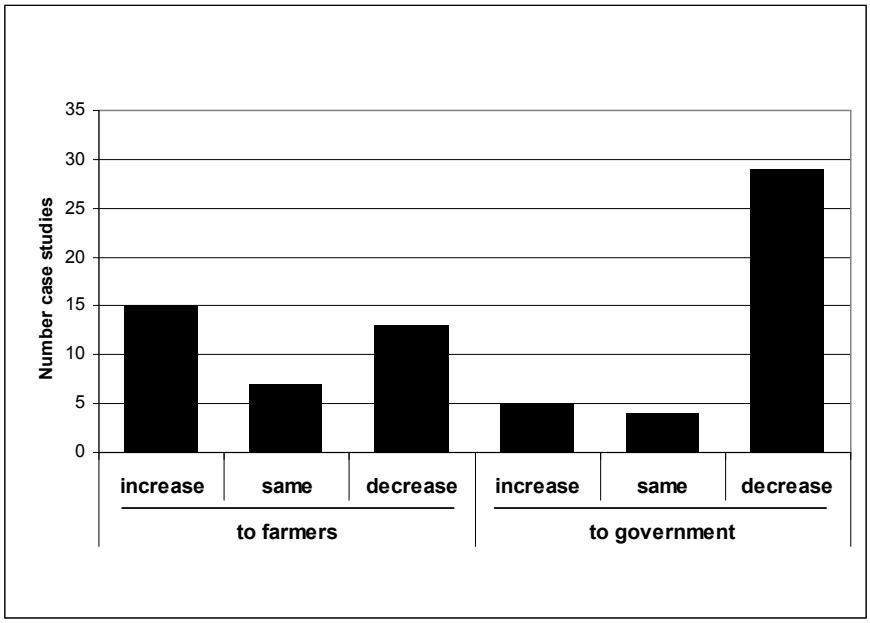

Figure 2. Changes in O&M costs after IMT

From the data collected in this study, it cannot be argued that the IMT process will necessarily result in a decrease or increase in costs to farmers. On the other hand, in the majority of cases (76%) the costs of O&M to the governments were perceived as decreasing and in 11% of the cases has remaining unchanged.

These mixed results may just reflect the fact that irrigation schemes are quite different from one another in respect to their O&M costs and in the intensity and complexity of the management they require to operate and be maintained properly.

4.1.2 Quality of Maintenance

Out of the 43 countries surveyed, only four reported that the quality of maintenance had decreased after IMT implementation. It is significant to mention however, that all four cases are in Africa. The situation that emerges from some of the African countries included in the survey is that governments have drastically decreased their contribution towards O&M 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. 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 the seasonal maintenance. Another positive case comes from Mali, where the Office du Niger irrigation scheme has undergone a profound change through a comprehensive process of reform.

4.1.3 Rate of fee collection

In 75% of the cases studied the rate of fee collection increased. This result is particularly remarkable as it has occurred despite higher water fees in some cases.

There were only three cases out of 43 in which a decrease in the rate of fee collection was recorded. From these results, it can be argued that in most cases farmer organizations taking over the management of their schemes have been able to improve the 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 not only related to the quality of the service provided but also to the existence of control mechanisms and transparent water-pricing methodologies.

4.1.4 Timeliness and Equity of Water Delivery

Timeliness of water delivery is one of the indicators that reached high consensus in the countries studied (See Figure 3). The results indicate that farmers are receiving water closer to the moment they need it and have asked for it. As mentioned above, this is partly due to better maintenance but especially to simpler operational practices and improved communications. It is worth noting that the positive change in timeliness is reported from all regions surveyed. A similar situation emerges in relation to the equity of the service provided to farmers, meaning that users located towards the tail-end of canals were receiving a better share of the water resources available. It could be argued that such a clear improvement in these two indicators is, per se, a good enough reason to advocate for the direct involvement of farmers in the governance of irrigation schemes.

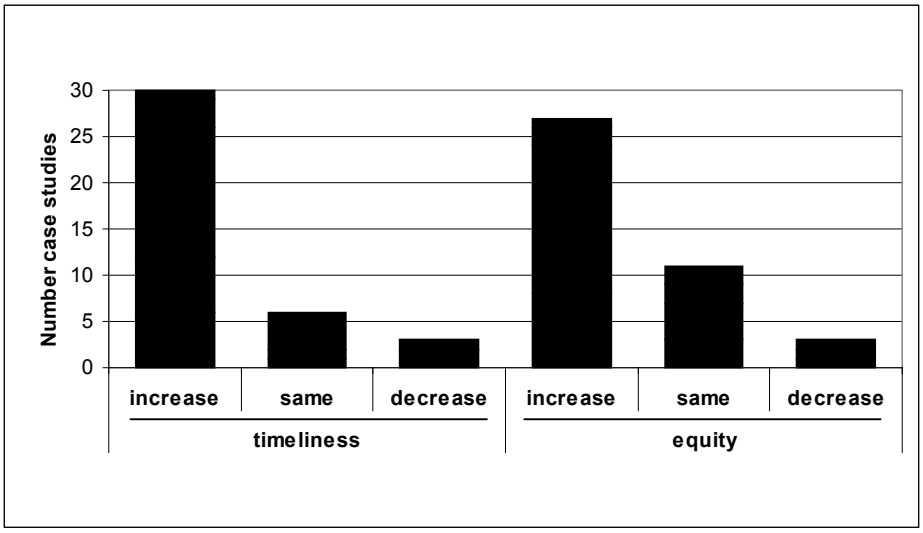

Figure 3. Timeliness and Equity of Water Delivery

4.2 IMPACTS

4.2.1 Irrigated Area

In the majority of cases studied (25 out of 39 cases) an increase in the area irrigated has been reported. 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 irrigated area during the last 15 years has taken place in several of the countries of the Commonwealth of Independent States, largely associated with their difficulty to continue funding the energy costs to operate the irrigation schemes and due to their

deterioration for lack of maintenance. The incipient reforms taking place in the region have already shown potential to increase area under irrigation, as the Kyrgyz Country Profile reports. Due to the high heterogeneity of irrigation practices in the region this potential is still to be proven under different circumstances.

4.2.2 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 among other reasons from major technological changes (positive or negative) or from political decisions not related to water use (i.e. 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, like the release and adoption of improved varieties, the up taking of improved agricultural practices and overall improved management. Notwithstanding, 21 out of 34 replies of the survey reported an increase in crop yields, while another 11 informants saw no change. Most of the cases showing an improvement in crop yield are from Asia. Arguably, improvements in crop yield may be due to the normal positive trend in crop yield changes registered in Asia during the last four decades not related to IMT. However, 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 farmer organizations.

4.2.3 Farm Income

Farm income is not a good performance indicator for IMT processes as it summarises the effects of issues such as the ability to produce the adequate crops, access to inputs, access to markets, access to transport facilities, farmer's managerial skills, etc. Policies and management decision have an important bearing on farmers' economic performance, but to single out the causes for its fluctuations is rather difficult and would require much more detailed data than what was collected through the questionnaire developed for this survey.

During the process of IMT farm income may increase due to a number of reasons. If things were to evolve according to the common features included in an IMT process, fee collection will improve and more money would be available for operation and maintenance activities, which would result in better water delivery service. Under an improved situation, having water timely and in the adequate quantities would mean, other factors being equal, that yields could be increased or the quality of the produce improved. If there are 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 afore-mentioned statement. Most countries reported higher irrigated areas; increased crop yields and increase in farm income (see Figure 4).

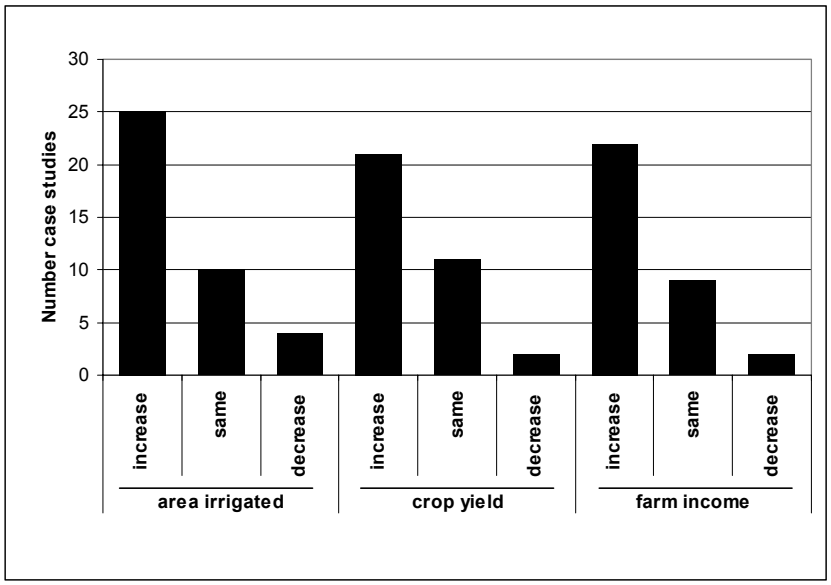

Figure 4. Changes in area irrigated, crop yield and farm income

4.2.4 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 these situations exist or are recognised as an issue. However, out of the 15 countries which reported waterlogging as an issue, seven reported it has decreased after the introduction of IMT and only one country reported it has increased. The remaining seven countries reported no change.

5. CONCLUSIONS

This section summarises the findings of this survey and provides insights into the areas that pose risks, approaches that have proven valuable and negative experiences as well.

1. **Emerging types of IMT models and programs**: As the IMT process gains 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 and socio-economical conditions that are evident not only across regions and countries but often also within countries themselves. Notwithstanding the above, there are certain common elements of IMT programmes that can be found in a broad number of situations. The following statements are a case in point:

   - IMT programs need to be clear about the roles, responsibilities and authority of WUA and irrigation agencies after transfer. The information collected shows that there is a tendency to grant WUA responsibilities without sufficient, legally-recognized authority. Governments should develop clear and comprehensive policy and legal frameworks that sufficiently empower WUA to accomplish their purposes.

- IMT programs 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 management of main canals in large schemes, sector regulation and river basin management.

2. **Main IMT constraints and how to overcome them:** 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. Following are some considerations emanating from the results of the survey:

   - There is a widespread need for clearer water rights to be given to WUAs. 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.

   - Oftentimes, government financial support fell short of IMT needs. Many of the cases in this survey were clearly under-funded which 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 and adjustments in agricultural support services.

3. **IMT as a mechanism towards an improved integrated water management approach:** This reform has provided an opportunity to bring together a range of actors at various levels that did not use to communicate often about the problems faced by irrigated agriculture. Because of the inclusive nature of the transfer process that cuts across policy, legal, institutional, technical and socio-economic matters, it provides a venue for discussion on how to tackle water resources management in a broad context. Some issues to consider follow:

   - IMT programs require the support of stakeholders such as local governments, the private sector and civil society to be able to reach its intended goals.

   - There is no strong evidence that the IMT process leads to an automatic improvement in water distribution at any particular level of the system. However, there is ample indication that communication between system management and end-users has increased which creates a better understanding of the water distribution process and its requirement which translates into enhanced satisfaction of the service provided and received by each party.

4. **Concept of IMT - Revised objectives and expectations:** As it could be expected from any complex reform process, there are implementation aspects that lead to partial or non-achievement of original objectives. The aspects mentioned below summarise the main issues in relation to achievement of IMT objectives coming from this survey:

   - Overall, the results of the IMT process undertaken across the globe can be perceived as a mix of successes and failures. Now that the process is better

understood and its implementation has taken hold, efforts should concentrate now on the Monitoring & Evaluation component of the process.

- IMT has partially achieved government objectives. Even though some of the main objectives of governments at the onset of the process have been achieved, in some cases this has been coupled with the government's disengagement from irrigated agriculture, hampering the provision of some support services basic to the agricultural sector. The expectation that the private sector was going to become involved in the provisions of some of these basic support services has not been fulfilled.

- The performance of water services fee collection has been erratic. Initially, in a good number of cases IMT has led to significant increases in the fee collection ratio but it 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.

- Democratic selection of WUA leaders is problematic and is often not achieved. Not in all cases internal WUA statutes provide enough safeguards for small farmers to be adequately represented.

5. **Recommendations towards future IMT programs:** From the previous paragraphs in this section, it is possible to draw some lessons emanating both from the survey and other experiences gathered from other efforts concerning the transfer of management that should be taken into consideration by those governments or entities that are engaging or about to engage in this type of reform:

- WUAs and irrigation agencies need substantial and prolonged capacity development. Commonly, IMT programs 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.

- IMT programs generally need systematic public awareness campaigns, consultations and involvement of all key stakeholders. This helps farmers to see that IMT is a programme with broad recognition, legitimacy and support. Where irrigation-related disputes exist, consultations with stakeholders may be needed to work out acceptable solutions.

- IMT should be tailor made and flexible. There is a tendency for IFIs-promoted IMT programs to adopt fixed institutional arrangements and implementation schedules. When complexities and issues arise during implementation they may cause governments to skip over negotiated settlements or establish WUAs rapidly and undemocratically.

- 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; WUA officer recall provisions in WUA by-laws; and irrigation management audits.

- 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 prior to IMT.

6. REFERENCES

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