

Managing Irrigation Jointly with Farmers: History, Present Status and Future - Review of Participatory Irrigation Management in Sri Lanka

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Abstract

Agriculture development has been the main strategy for the socioeconomic development in the country since time immemorial, even though its contribution to GDP has been declining recently. Successive governments of Sri Lanka since independence have invested heavily in the irrigated agriculture sector to address the food security concerns of the country. The continuous investment in irrigation was required to address problems such as spatial and temporal variations in monsoonal rainfall in the country, which has a serious negative impact on food production and livelihoods of people. The need for pursuing irrigation development and management has become more important in the country in the face of rapid population growth and increasing food prices in the world market.

In this context, managing irrigation schemes for productivity increase is becoming increasingly important and different irrigation management models have also emerged through attempts made in this direction by countries including Sri Lanka, where irrigation plays a leading role in food production and nation development. Farmers' active involvement in irrigation management, especially operation and maintenance (O&M) and decision-making as well, has been identified as a key requirement to attain productivity goals and the sustainability of irrigation systems.

This paper aims at reviewing participatory irrigation management approaches adopted in medium and major irrigation systems in Sri Lanka with a view to identifying their past and present trends and future directions. The review will contribute to an improved understanding by policymakers, managers of irrigation schemes and farmers of the role of participatory irrigation management, its past and present including institutional structures, responsibilities and performance and the directions it should take to meet future challenges as a dynamic institutional mechanism. As all the medium and major irrigation schemes in the country are

jointly managed by farmers and government agencies, the inferences drawn from the review would be important for the agencies and farmers alike to introduce necessary changes in their programs to address future needs and requirements.

Introduction

Objectives and Organization of the Paper

The objective of this paper is to analyze the adoption of the Participatory Irrigation Management (PIM) approach in the country, and suggest some strategic directions for this institutional mechanism for the further improvement of its effectiveness to face the ongoing and future challenges in irrigation management.

In achieving the main objective of the paper, three aspects of PIM will be addressed. As a first step of the analyses, the evolution of PIM is briefly reviewed. The current progress of the PIM approaches in managing irrigation schemes is summarized in step two. Step three involves the analysis of likelihood challenges for the PIM approach to be further progressed and sustained in the long run.

In this context the paper is organized into five sections: In the second section (followed by the introductory section) titled 'The Methodology' describes the evolution of PIM in Sri Lanka. The third section titled 'Performance of PIM in Sample Irrigation Schemes Studied' provides key information on the progress/outcomes of the PIM approach in managing irrigation schemes. The challenges being faced and also to be faced in the future are discussed in section 4 titled 'Assessment of Irrigation Management under PIM'. The final section, section 5 titled 'Conclusions and Recommendations' suggests some strategic directions to make PIM approaches sustainable and more progressive.

The Methodology

Sample Irrigation Schemes and Sample FOs

The analysis of this paper is mainly based on information obtained from IWMI/HARTI conducted research. The International Water Management Institute (IWMI) and the Hector Kobbakaduwe Agrarian Research and Training Institute (HARTI) carried out a 3-year monitoring and evaluation study during 1992 to 1994 covering a significant number of irrigation schemes that are managed with PIM approaches. The irrigation schemes managed by the Irrigation Department (ID) (medium and large irrigation schemes) and the Mahaweli Authority managed schemes were selected for the study. The PIM approach in large irrigation schemes is known as the Integrated Management of Major Irrigation Settlement Schemes (INMAS) program and the medium schemes are managed by a program called Management of Irrigation Systems (MANIS). This study adopted several methods for data collection from several irrigation schemes in these three programs, while six irrigation schemes from the three programs were selected for documenting the process of irrigation management during the entire study period. Process documentation in each scheme was carried out by a full time stationed research assistant in the specific irrigation scheme. Research officers of IWMI and HARTI carried out

recurrent surveys in 18 schemes covering 30 farmer organizations (FOs). Finally, a large-scale questionnaire survey was carried out in 49 irrigation schemes from the three programs covering 172 FOs.

Evaluation Criteria used for the Analysis

The key components of PIM were assessed based on certain criteria and indicators. These indicators were used to assess the progress, outcomes and impacts of irrigation schemes that are managed through PIM. Since there are no common or universally accepted criteria and indicators to measure the performance of PIM, these indicators would provide objectively verifiable values for the readers interested to know the progress of the PIM approach used for managing irrigation schemes. Three different indicator values were developed to measure the conceptual base, performance and outcome of different components of PIM. Different aspects are used to develop conceptual base, performance and outcome indicators under six different criteria as summarized in Table 1. The detail scoring system used for measuring the values of each indicator is shown in Annex 1.

Table 1. Criteria and different aspects used for developing indicators.

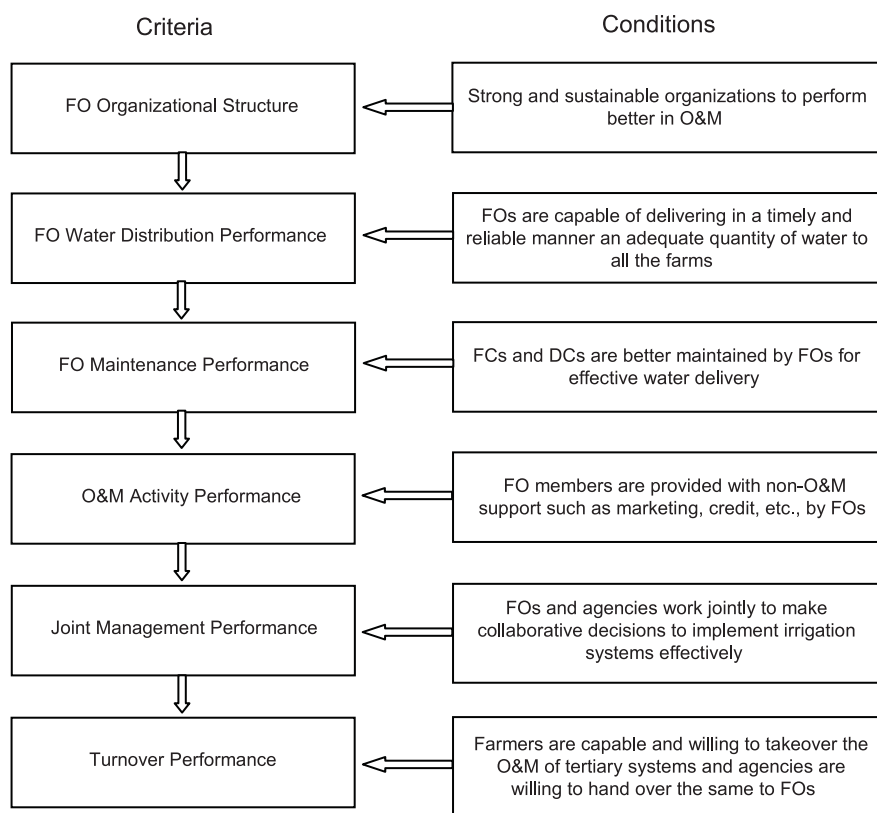
FO organizational strengths	FO water distribution performance	FO maintenance performance	FO non-O&M activity performance	Joint-management performance	Turnover performance
Structure	Schedule preparation within Field Canal (FCs) and Distributory Canals (DCs)	FC cleaning / de-silting and structure repairs	Input coordination and supply	Seasonal planning	Turnover of operations (FCs, DCs, Branch Canals (BCs) and Main Canals (MCs))
Membership	Operations within FCs and DCs	DC cleaning / de-silting and structure repairs	Crop storage and trading	Maintenance planning	Turnover of maintenance (FCs, DCs, BCs and MCs)
Leadership	Problem resolution	Preventive measures	Credit providing	Monitoring of system performance	-
Funding	-	-	Other income generation activities	Problem solving	-
Financial Management	-	-	Sponsoring community rituals and activities		-
Use of Funds	-	-	Provide community facilities		-
Internal Communication	-	-	Sponsoring activities for special groups (women, youth etc.)		-

Relevance of the Criteria and Indicators Developed for Assessing PIM

The main purpose of the criteria and indicators developed was to apply them in assessing the degree of achievement in the objectives of PIM. The government expected the achievement of two primary objectives from PIM policy when it was formally passed in 1988 in a cabinet paper. These primary objectives were to improve the productivity of irrigation systems and the reduction of government costs of the routine O&M of irrigation system management. The government expected to achieve these two objectives by enhancing farmer involvement/contribution in irrigation system management and also implementing strategies for both farmers and irrigation managers to work together in the planning and implementation of irrigation management functions in the systems.

The indicators under each criterion have a logical sequence to measure the effectiveness of different components of the PIM model in achieving enhanced performance of irrigation system management. The usefulness of the six criteria applied for the assessment is depicted in Figure 1.

Figure 1. Criteria and indicators used to assess the combined impact of PIM.



Historical Development Process of Participatory Irrigation Management

Participatory irrigation management (PIM) that was formally accepted as a policy in 1988 has a long history. The small irrigation systems (small tanks and anicut systems) were originally constructed by communities as a reliable source of water for their agricultural land as they are completely dependant on rainfall. Therefore, small irrigation systems can be regarded as farmer-managed systems historically. Even the major irrigation systems constructed by ancient kings had some farmer involved management systems. This is because water distribution in canals cannot be done without the participation of farmers.

The Government of Sri Lanka after independence attempted to intervene in irrigated agriculture system to enhance its productivity. The series of government interventions later became the participatory irrigation management policy accepted by the government by a cabinet paper in 1988. All the major historical events had a basis for their government-sponsored implementation, whether such a basis was due to political or economical reasons. The major events leading to changing irrigation management are summarized below.

The Historical Events from 1958 to Date

The Paddy Land Act, No. 1 of 1958 established cultivation committees replacing the traditional 'Velvidane System'. This committee consisted of elected farmer representatives and was responsible for the resolution of land disputes, coordination of rice cultivation activities and distribution of water. Irrigation committees were established in irrigation schemes. The 'Velvidane' (normally a land owner) was elected in each village tank system by cultivators. The village headman arranged a meeting with cultivators to elect the Velvidane. He was mainly responsible for water distribution, maintenance and conflict resolution. The role of the Velvidane existed from ancient times and was abolished in 1958. However, after 1958 up to recent times farmers unofficially accepted this position for water management in small irrigation systems.

The Agricultural Productivity Act of 1972 abolished cultivation committees and established agricultural productivity committees.

The Agrarian Services Act of 1979 established agrarian services committees with the Cultivation Officer to be responsible in cultivation matters at the village level. These committees comprised farmer representatives and government officials. Velvidanes at the local level assisted Cultivation Officers to perform water management tasks in small irrigation systems.

The Gal Oya Left Bank Rehabilitation Project was implemented during 1979-1982 to rehabilitate the physical system, but it recognized the need for farmer participation. The Cornell University and Agrarian Research and Training Institute (ARTI) developed a model for a federation of farmers' organizations at district hydrological areas. Institutional Organizers (IOs) were employed to help farmers to form FC groups, DC organizations and project management committees.

Mr. N. G. R. De Silva, the Deputy Director of Irrigation in charge of the region of Kandy rehabilitated the irrigation system in Minipe, and also set up water management committees to increase farmer participation in decision-making. Farmer representatives were selected for these committees. Also a non-governmental organization, National Heritage Program (NHP) and influential local persons were used to educate farmers about the importance of farmer participation.

Mr. A. M. S. S. Gunadasa, Technical Assistant of the Kimbulawana Oya Scheme, employed farmers to engage in rehabilitation activities. He also prepared a rotation system to save water and implemented it with farmer participation. A Water Issue Board was set up to prepare water allocation schedules and farmer representatives were active members in this committee.

During 1983 to 1986, several rehabilitation projects were implemented in the country, which encouraged farmer participation in rehabilitation work and then in post rehabilitation O&M work. Two significant rehabilitation projects included the Major Irrigation Rehabilitation Project (1983) and the Irrigation System Management Project (1986). The Mahaweli Agriculture and Rural Development Project (MARD) was also commenced in System B of the Mahaweli Project and catalysts designated as Irrigation Community Organizers (ICOs) were employed to develop farmer organizations.

In April 1984 the Irrigation Management Division (IMD) was established for the implementation of the Integrated Management of Major Agricultural System (INMAS) in 25 major irrigation systems. A batch of Project Managers was trained and stationed in each system to form farmer organizations and project management committees. In 1987, management of Irrigation System (MAINS) similar to INMAS in terms of objectives was implemented by the ID to establish farmer organizations and project management committees in about 175 medium systems. Technical Assistants were appointed as Project Managers.

The Government of Sri Lanka formally approved and accepted the policy for participatory irrigation management by a Cabinet Paper in 1988. The turnover of O&M responsibilities and transfer of ownership of irrigation canals and structures to farmer organization were accepted as major objectives.

In 1990, the Irrigation Management Policy Support Activity (IMPSA) was initiated by the Ministry of Land and Land Development in association with the Ministry of Agriculture and International Irrigation Management Institute (IIMI as IWMI was known as at that time) to prepare strategies and guidelines for the implementation of the PIM policy approved by the government. In 1991 the Agrarian Services Act was amended to grant legal recognition to farmer organizations. In 1992 under the National Irrigation Rehabilitation Project, the management of irrigation systems was handed over to farmer organizations after physical rehabilitation. Farmers were also involved in planning and implementing O&M activities in addition to their labor contributions. The Irrigation Ordinance was amended in 1994 to grant more power and responsibilities to registered farmer organizations including the management of distributory canal areas in major schemes and collection of O&M fees.

Performance of PIM in Sample Irrigation Schemes Studied

Pre and Post Irrigation Management under Participatory Approach

PIM has brought significant changes to irrigation management and some changes have been institutionalized with the effect that the need for farmers to participate in irrigation management has become a 'must' in irrigation management. Most of the essential functions in irrigation management are managed differently in the participatory system. The changes occurred as a result of PIM are in Table 2.

Table 2. Comparison of pre-participatory management and participatory management systems.

Management Function	Pre-participatory Management	Participatory Management
1. Seasonal planning	Done by agencies and ratified at 'Kanna' meetings	Done by Project Management Committees
2. Operations planning	Done by agencies, basic plans ratified by 'Kanna' meetings	Done by agencies, basic plans ratified by PMCs
3. Head works, main canal, branch canal operation	Carried out by irrigation agencies	Carried out by irrigation agencies. Operation schedules are shared with joint-management committees
4. Distributory canal operation	Carried out by irrigation agencies	Carried out by FOs after turnover
5. Field canal operations	Carried out by irrigation agencies	Carried out by FOs
6. Head works, main canal, branch canal maintenance	Planned and carried out by irrigation agencies	Carried out by irrigation agencies in priority order determined by PMCs
7. Distributory canal maintenance	Planned and carried out by irrigation agencies	Planned and carried out by FOs after turnover
8. Field canal maintenance	Done by individual farmers under the direction of the irrigation agencies	Done by FOs

Government Initiated Programs for Achieving Participatory Management

Three different management systems have been introduced to manage irrigation schemes under the participatory approach, these include:

- The integrated management of major agricultural systems (INMAS), which was introduced in 1984 to manage major irrigation systems (irrigation schemes that have a command area greater than 400 ha) under the Irrigation Department. The Irrigation Management Division (IMD) created by the Ministry of Irrigation is responsible for the INMAS system in implementing about 35 irrigation schemes in the country.
- MANIS (Management of Irrigation System) introduced in 1986 by the Irrigation Department to manage the medium (schemes that have less than 400 ha of command) irrigation schemes of the country.
- The Mahaweli Participatory Management Program was established in different years in different schemes (for example, 1980 in system 'H', 1985 in Udawalawa, 1987 in system 'B'). There are four large irrigation schemes under the Mahaweli System (121,000 ha in total under four systems).

The objectives of PIM tested in all these three systems are more or less similar. The short- term and long-term objectives of the PIM are summarized in Table 3.

Table 3. Objectives of participatory irrigation management.

Short-term	Long-term
Increase agricultural production per unit of irrigation water	Integrated development of the farms to commercial holdings
Increase agricultural production per unit of land	Crop diversification and rotation
Distribute irrigation water to farmers adequately and equitably	Social and economic development of the farming community
Arrange for the timely supply of agricultural inputs and sale of products	Improved marketing of agricultural produce and by-products
Organize and develop farmer organizations to facilitate farmer participation in management	Local processing of agricultural produce to semi-finished or finished products
Recover O&M costs from farmers in major irrigation schemes	Handing over to farmer organizations some management and operational functions of the system
Maintain irrigation systems at an optimum level of performance	
Identify major systems needing urgent rehabilitation	

Assessment of Irrigation Management under PIM

The performance of the major components of PIM is used as the basis for assessment. These components include farmer organizations, joint management committee systems and turnover of irrigation management to farmer organizations. It was assumed that greater performance of these components would be needed to contribute to the overall performance of the irrigation schemes and achieving the objective of the PIM system.

Performance of the Farmer Organizations

In almost all the sample irrigation schemes studied by IWMI and HARTI it was found that the farmers have been mobilized into Farmer Organizations. The structure prescribed by PIM (FC groups, DC groups, System-level FOs) has not been followed exactly in some of the irrigation schemes of MANIS. This was mainly due to the lack of inputs needed for MANIS schemes to help farmers organize in to FOs. The INMAS and Mahaweli irrigation schemes have separate organization units to deal with farmer organization whereas MANIS schemes are managed by technical assistants of the ID without other additional assistance. Even in the Mahaweli scheme, system-level farmer organizations have not been established, perhaps because such higher level organization don't require farmer organization given that the system level needs of farmers are handled by the system level joint committees. This may be the reason for INMAS irrigation schemes also neglected to organize farmers into system level organizations (system-level farmer organization (SLFO) were formed in 58 % of the schemes in INMAS and 20 % of the MANIS schemes).

Farmer Organization (FOs) Strength

A FO as an organization was established to support implementing irrigation management activities, and is assessed under farmer organization strength. Most of the FOs have been established under constitutions provided by the irrigation management agencies. The strength of FOs is measured through:

- Membership of farmers in FOs
- Leadership
- Income for FOs
- Financial management
- Internal communication

The participation of individual farmers as members and their active involvement of the farmer organization are essential factors for FOs to survive and function as effective organizations. Table 4 indicates the total number of farmers of the command area under each irrigation scheme of the three systems assessed in the study, the percentage of members, and the active members in the organizations. These data show the essential elements of these organizations if they are to be sustained as community-based organizations.

Table 4. Overall membership percentages.

Program	Farmers	Members	Percentage members %	Active members	Active members as	
					% of farmers	% of members
INMAS	10,483	7,709	74	4,399	42	57
MANIS AB	3,101	1,648	53	823	27	50
MANIS C	2,784	1,471	53	764	27	52
Mahaweli	7,230	5,118	71	3,146	44	61
Overall	23,598	15,946	68	9,132	39	57

Source: IIMI and ARTI (1995)

FO Leadership

Finding leaders committed and also acceptable to most of the farmer members is a difficult task according to the qualitative information collected in the study. Therefore, the farmer members tend to be satisfied with the available leaders who are prepared to work on a voluntary basis. Although most of the farmers have certain personal opinions in the survey they have expressed that they are satisfied with the voluntary leaders of FOs. For example, 82 % farmers interviewed in INMAS schemes, 75 % in MANIS, and 80 % in the Mahaweli scheme stated that they are satisfied with their leaders.

FO Financial Management

Most of the FOs except a few organizations in the Mahaweli scheme had small FO funds. It was discovered that in all the schemes, there was always a considerable percentage of FOs that had no funds in their bank accounts. For example 80 % of the FOs in the INMAS, 90 % in MANIS and 95 % in the Mahaweli scheme were reported as organizations having some funds in their bank accounts. The average funds available in the FOs of irrigation schemes in the three programs ranged from Rs. 5,000 to Rs. 40,000.

Nearly 80 % or more of the FOs collected membership fees. But only less than 50 % of the FOs earned money from the construction contracts that were undertaken. Majority of general farmers expressed in the survey that they are satisfied with the method applied for managing funds. This high-level of satisfaction is due to two reasons: the money that each individual farmer contributes for the FO fund is small, and they appreciate the volunteer work done by their fellow farmers. More than 80 % of the individual farmers mentioned that their organizations keep books and follow other rules of financial management.

Internal Communication

In the INMAS and Mahaweli systems more than 75 % of the farmer organizations held monthly meetings with their committee members, while 47 % did so in the MANIS system. Most of the farmer leaders reported that they have a lower number of general farmer meetings. The general farmer meetings are held when there is a conflict between farmers. Only about 10 % to 32 % of farmer leaders mentioned that they hold general meetings. In the MANIS system, only about 15 % or less hold their general meetings.

FO Performance in Water Distribution

Farmer organizations play a critical role in water distribution at the DC level of all the irrigation schemes. The results of the study indicate that farmer involvement is much more relevant and essential in irrigation schemes where water is a scarce resource. The water distribution problems are due to five different reasons according to the study. These reasons and their magnitude in sample schemes studied are shown in Table 5.

Farmer organizations as an institution established by irrigation managers with the willingness of the farmers have become an essential element for water distribution. Nearly 74 % of irrigation officers who were interviewed in sample irrigation schemes categorically mentioned that farmer organizations are essential to manage water in irrigation schemes. However, there are some problems with the water distribution performance of the farmer organizations. This is due to the varying levels of performance of the FOs. The level of satisfaction of individual farmers with the performance of FOs in water distribution was measured by asking whether farmers are satisfied on the FO performance, and Table 6 includes the percentage of farmers who replied “yes” to several indicators of water delivery.

Table 5. Major causes of water distribution problems.

Program	Causes (See list below for Key)*					
	A	B	C	D	E	Other
INMAS	8 %	50 %	8 %	75 %	17 %	17 %
MANIS AB	45 %	82 %	27 %	91 %	36 %	27 %
MANIS C	29 %	71 %	14 %	43 %	21 %	50 %
Mahaweli	25 %	25 %	25 %	25 %	75 %	50 %

Source: IIMI and ARTI (1995)

Note: *Multiple answers mean that the numbers add up to more than 100 %. Numbers of sample schemes are: INMAS-12, MANIS AB-11, MANIS C-14, and Mahaweli-4

Key:

A- Inadequate water supply

B- Physical deficiencies in the system

C- Poor agency water distribution performance

D-Inadequate O&M funds

E- Poor farmer – officer cooperation

Table 6. Farmer organization water distribution performance - percentage of farmers answering “yes.”

Location within FO Area	Stage of Season	Indicator	INMAS	Mahaweli	MANIS AB	MANIS C	
Head	Crop Growth	Adequacy	85	92	78	36	
		Timeliness	84	92	78	36	
		Reliability	84	90	78	36	
	Land Preparation	Adequacy	77	89	74	36	
		Timeliness	74	89	74	36	
		Reliability	75	92	74	36	
	Tail	Crop Growth	Adequacy	70	54	65	24
			Timeliness	61	65	65	24
			Reliability	62	70	65	24
Land Preparation		Adequacy	64	51	57	28	
		Timeliness	56	60	57	28	
		Reliability	56	68	57	28	

Source: IIMI and ARTI (1995)

FO Irrigation Infrastructure Maintenance Performance

The FO performance of irrigation infrastructure maintenance in general is poor according to the information generated by the study. Maintenance is difficult to organize with the voluntary participation of the farmers. If the canal becomes really constrained to take water to the agriculture fields, farmers are tempted to attend to the maintenance. Where such a critical stage has not been reached, it needs repeated attempts to mobilize farmers at least to

clean the distributory canals (DCs). In INMAS schemes, only 33 % of the irrigation officials and, in MANIS, 20 % of the officials were satisfied with the FO performance in the maintenance of the canals that the FOs were supposed to oversee. Mahaweli officers indicated that they were satisfied with farmer participation in DC maintenance, but this may have been mainly due to Mahaweli Authority involvement in such maintenance. The officers' views on the impact of participatory management on tertiary canal maintenance are shown in Table 7.

Table 7. Impact of participatory management on system maintenance (officers' views).

Impacts	INMAS	MANIS AB	MANIS C	Mahaweli
Improved maintenance	42 %	75 %	50 %	25 %
Worsened maintenance	17 %	8 %	-	-
No change	33 %	17 %	29 %	25 %
No response	8 %	-	21 %	50 %

Source: IIMI and ARTI (1995)

Note: Irrigation department officers are of the opinion that 54–60 % of INMAS and MANIS irrigation schemes need additional funds for maintenance. In the other schemes, 40–46 % needs rehabilitation to improve the physical performance

Lack of farmer participation is a common phenomenon observed in DC maintenance. It is difficult to get 100 % farmer involvement in any event organized by the farmer organizations for DC maintenance activities. This is evident in the data collected from farmer leaders on the involvement of farmers in DC maintenance as shown in Table 8.

Table 8. Percentage of active participation of farmers in DC maintenance.

Participation percentage	Percentage of DCOs			
	INMAS	Mahaweli	MANIS AB	MANIS C
0 – 25	30 %	22 %	34 %	24 %
26 – 50	24 %	39 %	26 %	24 %
51 – 75	15 %	24 %	9 %	24 %
Over 75	31 %	14 %	30 %	28 %

Source: IIMI and ARTI (1995)

It was observed that jungle cleaning and de-silting of distributory canals are performed by FOs with the participation of the individual farmers, but minor repairs of the DCs are done by the FOs with the annual operation and maintenance funds provided by the government to each FO. There are some performance differences in de-silting and jungle cleaning, but it is at a satisfactory level according to the survey.

FO Performance in Non-O&M Activities

It was observed that FO performance in business activities to earn funds for FOs is at a poor level. Most of the FOs are involved in agriculture input sales to their members and also undertake operation and maintenance contracts from the government. Table 9 includes the results of the survey on the performance of FOs in undertaking non-O&M fund earning activities. Table 10 includes the information on percentages of FOs undertaking different contracts from the irrigation management agencies on DC maintenance and rehabilitation.

Table 9. Farmer organizations involvement in business activities.

Program	Total FOs responded	Yes		No	
		#	%	#	%
INMAS	60	27	45	33	55
MANIS AB	21	1	5	20	95
MANIS C	19	3	16	16	84
Mahaweli	63	14	22	49	78

Source: IIMI and ARTI (1995)

Table 10. Farmer organizations taking contracts from irrigation agencies.

Program	# of Sample FOs	FOs taking maintenance contracts (%)	FO taking rehabilitation contracts (%)	FOs taking both contracts (%)
INMAS	61	56	2	10
MANIS AB	24	29	8	8
MANIS C	24	42	0	8
Mahaweli	63	60	5	10

Source: IIMI and ARTI (1995)

Providing credit to farmers has been observed as an insignificant assistance provided by the FOs to the individual farmer members. Some FOs provide direct credit to their members and others act as guarantors for the farmers to obtain credit from banks and other organizations. The data in Table 11 indicate its insignificant nature in the sample farmer organizations.

Table 11. Farmer organizations providing credit assistance to farmers.

Arrangement	INMAS (N = 61)	Mahaweli (N = 63)	MANIS AB (N = 24)	MANIS C (N = 24)
Through FO	7 (11 %)	7 (11 %)	1 (4 %)	2 (8 %)
Guarantor of Bank loan	3 (5 %)	8 (12 %)	5 (20 %)	0
Guarantor of other loan	4 (7 %)	1 (1 %)	1 (4 %)	1 (4 %)

Source: IIMI and ARTI (1995)

Performance of Joint Management Committees

In all the irrigation schemes under the three programs, joint management committees or at least some arrangements for joint meetings have been established to provide a forum for different stakeholders and also to farmer leaders to meet together to discuss significant activities of cultivation programs in the particular irrigation scheme. These committees, especially project management committees, play a critically important role in the planning of cultivation seasons (seasonal planning) and also in the monitoring and evaluation of the cultivation program and also some other functions of irrigation management. Each irrigation scheme of the INMAS system has a 'Project Management Committee' comprising key stakeholder agencies and representatives of farmer organizations. This committee is organized by the project manager in IMD. The same structure can be observed in MANIS schemes although IMD is not involved in the management functions of the MANIS system, and technical assistants of the Irrigation Department act as the project managers in this system. Mahaweli has a three-tier Joint Management Committee (JMC) system. The JMCs have been established based on the Mahaweli management structure. The lowest level of the Mahaweli management structure is the unit and, therefore, unit management committees have been organized at the unit level. The second tier is block management committees established at administrative blocks of the Mahaweli management structure. A project management committee is the highest JMC that is based at the Resident Project Manger Level (Scheme Level).

The consultative seasonal planning procedure established by the joint management committees has led to two benefits to the farmers and also agency officers. The farmers benefited by voicing their concerns about the seasonal plans. The agencies benefited by learning from farmer experience for improved seasonal planning. The monthly meetings of JMCs have helped to give effect to the basic principals of participatory management such as frequent dialogue between stakeholders, learning from each other and seeking solutions jointly and effectively.

The JMC is not a management unit responsible for the performance of the system. JMCs can design plans and discuss various problems existing in irrigation systems, but the success in implementing these plans is heavily dependent on the performance of functional agencies and their officials. For example, the PMCs in INMAS can design various plans, but unless the Department of Agriculture, the Irrigation Department, the Land Commissioners Department and the Irrigation Management Division play their relevant roles, these plans cannot be realized. On the other hand, farmer organizations also play a key role in implementing the decisions of JMCs. Some FOs become ineffective due to their inability to implement decisions in the field through the farmers. It can, therefore, be stated that the success of the JMCs in implementing plans is heavily dependent also on the strength of the FOs.

Turnover

Under the participatory management policy of the government, it is intended to turnover some of the system management responsibilities at and below the DC level to farmers. Before this became government policy, some attempts had been made to implement this policy informally in certain schemes such as Kimbulwanaoaya and Minipe, through the efforts of a few enthusiastic irrigation officials. Turnover was later initiated in other schemes under the three programs that we studied, namely INMAS, MANIS and Mahaweli. The cabinet paper adopting this policy

specially stated that those farmers who accept responsibility for the turnover under O&M for DCs will be exempted from paying of irrigation fees. The amended Irrigation Ordinance authorizes FOs to takeover the O&M of their areas and in return they are exempted from paying irrigation fees.

Turnover has occurred in the three study programs at various levels and in different forms. In the sample irrigation schemes that were studied, several categories of turnover have taken place under operation and maintenance. Operation of FC and DC gates and other main system level canals have taken place under operations and DC jungle clearing, de-silting, minor repairs, greasing and painting of structures and main canal level cleaning and de-silting have taken place under the maintenance category.

Slow progress is reported on turnover in the three programs we studied. Table 12 includes the information on sample FOs reported as turned-over and responsibilities turned over in the FOs.

Table 12. Responsibilities turned-over in LSS sample farmer organizations.

Program	Sample FOs	Turnover Cases	Responsibilities Turned-over (Cases)					
			A	B	C	AC	ABC	Other
INMAS	61	49	4	1	2	21	21	-
MANIS AB	24	9	2	1	2	-	2	2
MANIS C	24	5	-	-	3	-	2	-
Mahaweli	63	23	3	-	6	20	4	-

Source: IIMI and ARTI (1995)

Notes: Key A - Distributing water within the DC (FC gate operation)
B - Operating DC gates
C - DC jungle clearing and de-silting

At present the operation of FC gated and jungle clearing and the de-silting of DCs are the major activities taken over by FOs. Whether paid or not, farmers now clearly know that certain operating and maintenance responsibilities will be handed over to them. What is now necessary to decide on is how turnover can be continued so that both agencies and farmers will know what the goal of the program is.

The study found that water distribution has improved due to turnover and that DC and FC maintenance has not suffered from turnover. The study also found that farmers can affect turnover as long as the profitability of irrigated agriculture does not fall. Full turnover would mean that FOs are given the full responsibility for O&M below the DC head or an equivalent point in systems without DCs. Full responsibility would include paying all of the cost, and there would be no subsidies beyond those provided in the O&M of the main system. The arguments in favor of full turnover include:

- Making farmers completely responsible for the maintenance of distributory canals and below, clarifies and simplifies responsibilities. At the moment, some FOs perform only the maintenance work they are paid for and others do not undertake repairs even if

they are well within the farmers capability, and instead try to get the government to make the repairs. Once responsibilities are clarified, this would not happen.

- Complete turnover will make it possible for the agencies to focus their attention on the maintenance of the main system and may improve the sustainability of the systems as a whole.
- Complete turnover means that financing the maintenance of distributaries and below will not be subject to problems of public finance.

The current situation is unsatisfactory because some farmers continue to expect government assistance that is only intended to be partially provided. It has been found that full turnover in operation responsibilities for DCs and below to FOs would be possible, and even now it is taking place successfully in many irrigation schemes. The problem is maintenance. This evaluation suggests alternatives mentioned below to convey full turnover of responsibilities to FOs.

- Alternative 1 (low technical financial burden on farmers)
 - o FOs would take complete responsibility for jungle cleaning and de-silting (except when the silt is exceptionally heavy) for both FC and DC. As pointed out, FOs are already doing this and farmers have come to accept it.
- Alternative 2 (low technical moderate financial burden on farmers)
 - o FOs would take complete responsibility for jungle clearing and de-silting (except when the silt is exceptionally heavy) for both FOs and DCs
 - o FOs would take responsibility for painting, greasing, etc.
 - o FOs would take responsibility for small earth work repairs.
 - o All other work, including heavy de-silting and major earth work would be the responsibility of the ID.
- Alternative 3 (moderate technical financial burden of farmers)
 - o FOs would take complete responsibility for jungle clearing and de-silting (except when the silt is exceptionally heavy) for both FCs and DCs
 - o FOs would take responsibility for painting, greasing etc
 - o FOs would take responsibility for small earth repairs
 - o FOs would take responsibility for simple structural repairs
 - o All other work, including heavy de-silting, major earth work, and large or complicated structure repairs, would be the responsibility of the irrigation agency.

Participatory management policy has clearly succeeded in getting farmers much more involved in system management than they were in the past, apart from some of the MANIS systems that were studied that had been neglected by the irrigation agencies. However, turnover has not progressed as expected in two different ways:

- On the one hand, fewer than expected agreements have been reached in all the programs. Only the INMAS program has made much progress in achieving some form of turnover, although the MEA is now seriously trying to make turnover work. There has been very little progress in the MANIS schemes, although the NIRP mandated turnover in its post rehabilitation phase.
- On the other hand, full turnover has not occurred in any of the three systems and progress has stopped at a joint management stage. In particular, there is reluctance on the part of both agencies and farmers to have the full responsibilities for maintenance turned over to the FOs. Payments continue to be made by agencies for O&M activities to FOs that have taken over responsibilities, either informally or formally.

Evaluation of Key Indicators used for Measuring PIM Performance

As explained in the methodology, the performance of six aspects of PIM was measured using the scoring system that was developed. The details of the scoring system used for the assessment are shown in Annex 1. The intensive data collected using recurrent surveys and process documentation methods was used to calculate the scores obtained by sample FOs in different irrigation schemes under the three programs. The potential scores for each indicator area and the average scores, and also the range actually obtained by different programs studied, are summarized in Table 13. The scores obtained by each sample FO studied using recurrent survey and process documentations in the three programs are shown in Annex 2.

Table 13. Average indicator scores by program for RS/PD sites.

Indicator	Max Score	INMAS		MANIS		Mahaweli	
		Av.	Range	Av.	Range	Av.	Range
FO Strength	36	29.4	23-35	20.0	7-35	15.9	5-24
FO Water Distribution	20	15.3	9-18	8.3	4-13	12.8	5-15
FO Maintenance	19	10.2	7-13	9.3	5-14	9.0	5-10
FO Non O&M Activities	28	8.5	5-11	3.2	0-11	6.8	0-13
JMC Performance	15	10.4	8-12	4.8	3-9	12.5	12-13
Degree of Turnover	48	13.8	12-17	13.6	1-17	18.5	15-21

Source: IIMI and ARTI (1995)

Conclusions and Recommendations

The major conclusion is that, despite its partial failure to achieve some of the main goals, participatory management has clear benefits and should be continued and supported. Also, basic participatory management of formal multifunctional farmer organizations and joint management committees should be continued. At the end of the IMII/HARTI study a national workshop was held to discuss the study results and recommendations were made for

strengthening PIM policy. It is found that most of these main recommendations are still realistically valid to improve the PIM in the present context.

Recommendation No.1

The IMII/HARTI team recommended that steps be taken to make government agencies dealing with agriculture more responsive and more supportive of farmer organizations and joint management committees. These steps include:

- Each agency should redefine the job descriptions of its officers to reflect the tasks and attitudes needed to provide explicit support for farmer organizations and joint management committees. This redefinition should make certain activities mandatory, including attendance at JMC meetings and providing technical assistance and advice to FOs and JMCs. In particular, the job descriptions of Technical Assistants/ Project Managers (TAs/PMs) in MANIS schemes should be redefined to ensure that the TAs/PMs have the time and motivation to play their roles as 'Project Managers' effectively. (Workshop) An Inter-agency committee may be set up to redefine job descriptions.
- Intensive training should be provided to government officers in all relevant agencies about their roles and functions with respect to farmer organizations and joint management committees, and about the rights and responsibilities of the FOs and JMCs.
- In order to ensure that officers act in supportive ways, their performance in supporting farmer organizations and joint management committees may be made an explicit part of their performance evaluations.
- The government may make it a policy to support farmer organization and JMC decisions. This may mean delegating greater authority to local agencies so that they can respond effectively to JMC decisions. It also means that government officers should support farmer organization decisions against complaints from individual members.
- (Workshop) The Secretaries of Irrigation and Agriculture may issue a joint declaration of the participatory management policy. The policy should be widely publicized through various media.
- A major effort may be made to publicize among the farmers the rights and responsibilities of farmer organizations and joint management committees as defined in by-laws to the amended Agrarian Services Act and in the amended Irrigation Ordinance.
- (Workshop) Farmers should be consulted about any future amendments to the relevant legal acts.
- (Workshop) Regular monitoring and evaluation of the progress of the policy should be undertaken. An annual workshop may be held as a routine task to review the performance of the irrigation management policy activities.

Recommendation No.2

We recommend that catalyst efforts, farmer training, and other direct support activities for FOs and JMCs be continued. These efforts are needed for the following:

- Catalyst efforts are needed to facilitate the organization of farmers in schemes where no farmer organizations exist. Catalysts are also needed to assist agencies and farmer representatives in the creation of joint management committees in schemes where they do not exist (relevant to MANIS schemes).
- Catalyst efforts, training, and publicity should focus on educating all farmers, not just farmer organization leaders, about participatory management. Specific efforts should be made to educate farmers about organizational management, including handling finances, selecting leaders, etc.
- (Workshop) Training should be provided to the farmers at the appropriate time on the functions and responsibilities of the farmer organization during each stage (initial, joint management, and turnover) of farmer organizational development.
- (Workshop) When needs arise, farmer organizations should be encouraged to hire trained persons (e.g., bookkeepers and auditors) to carry out specific organizational management tasks.
- Widespread training about the technical aspects of irrigation should be continued.
- (Workshop) The relevant government agencies should make technical information on the irrigation schemes available to the farmer organizations.
- Where special problems exist, e.g., land tenure problems, support efforts should focus on finding solutions to those problems.
- Special efforts should be made to offer opportunities to farmer organizations to take up new businesses. One business that should be fully supported by the government agencies is paddy marketing. Government agencies should assist in establishing linkages to other relevant markets.
- Efforts should be made to prevent the development of dependency of the farmers on the catalyst agents as has been reported from some INMAS schemes. This can be done by constant monitoring of catalyst activities; catalyst should not provide direct services but only instruction, advice, and guidance. Catalyst assistance should be time-bound.
- (Workshop) Efforts should be made to mobilize other community members, such as teachers, *Grama Niladharies* and religious leaders in support of participatory management.

Recommendation No.3

We recommended that alternative organizational forms be developed for the various types of schemes for which the INMAS model is not appropriate.

- (Workshop) Farmer organizations should be organized on the basis of hydrological units whenever possible (mostly relevant to MANIS schemes).

Recommendation No.4

We recommend that the government clarifies the policy on turnover, including defining what powers and responsibilities will be turned over and how the government will continue to support irrigation services. We suggest that the following should be part of this clarification:

- Turnover should be publicly declared to be a fixed policy that applies to all FOs in all schemes. If necessary, it can be explained that this is an alternative to imposing the irrigation service fee mandated by law.
- (Workshop) To ensure an effective and united policy, both agriculture and irrigation should be placed under one ministry. Alternatively, the policy can be implemented and supervised by a unified secretariat under a board drawn from both ministries. These measures will ensure a unified policy.
- (Workshop) Funding for farmer organizations and turnover activities should be provided on a program basis to deal with the whole sector rather than on a project basis that deals with only a few schemes at a time.
- (Workshop) For turnover, farmer organizations must be formally recognized by the government; for this many farmer organizations need to be strengthened.
- (Workshop) The irrigation agency personnel in a turned-over scheme will be answerable to the Project Management Committee for that scheme.
- Operations of distributory canals and below, or equivalent portions of systems without distributory canals, should be turned over to farmer organizations as soon as the canals are repaired to make them operable.
- Operations of distributory canal head gates, branch canals, main canals and headworks should be turned over to appropriate level farmer organizations or joint management committees upon the request of the farmer organizations or joint management committees with the proviso that the farmer organizations or joint management committees take full responsibility for hiring, paying and supervising the necessary operating personnel. The exact details can be negotiated following a request from the relevant group of farmers to the Project Management Committee in each scheme.
- (Workshop) For operation of distributory canal head gates, it is suggested that they be jointly operated for a period of less than 5 years, following which operations should be handed over to farmer organizations.

- (Workshop) Farmer organizations should be made responsible for the safety of structures and protecting reservations from encroachments and damage.
- Jungle clearing and regular de-silting of DCs and FCs or their equivalents should be made the unambiguous sole responsibility of farmer organizations; no funds should be provided to farmers for this activity.
- The government should come to a decision about how much it is willing to subsidize other aspects of distributory canal and FC maintenance, including painting and greasing of metal controls, major and minor earthworks such as the repairs of scours and washouts, and repair of concrete and masonry structures.
- (Workshop) Once the basic decision about the obligations of farmer organizations and government are worked out at the national level, specific subsidies and subsidy levels should be worked out at the scheme level based on an assessment of needs. These subsidies can include salaries, equipment, operation funds and others.
- The mechanism for providing subsidies should be defined. There are several alternatives ranging from giving the irrigation agency full responsibility and the necessary funds to making the FOs responsible but giving them a simple annual cash grant may not be advisable
- The government should define a period of time by the end of which the transfer of responsibilities must be accomplished. No more than 5 years should be required, following the completion of needed repairs, to complete the transfer to FOs. During this period, a time of 'joint management' should be defined during which the agency officers supervise and assist the farmer organizations in undertaking responsibilities.

Suggestions for Monitoring the Policy in the Future

As a part of the study, the IWMI/HARTI team documented the monitoring and evaluation systems being used by the implementing agencies, interviewed managers about their information needs, developed indicators of key characteristics of farmer organization and joint management committee performance, and tested these in the field in an experiment in improved monitoring.

At present, the IMD uses the Monitoring, Evaluation and Feedback (ME&F) System. A major problem is that many FO office-bearers do not prepare the required monthly reports. The ME&F system has now been introduced in INMAS schemes. In the ID managed MANIS schemes various formal and informal initiatives are underway, the most important of which may be the establishment of Irrigation Management Cells (IMACs) in each range office; one of whose functions is monitoring institutional development activities. MEAs Institutional Development Unit (IDU) collects data and reports on various aspects of participatory management.

To help provide quantifiable measures for the purpose of monitoring and evaluating participatory management, the IIMI/ARTI team developed and tested a set of indicators for:

- FO (Farmer Organization) Strength
- FO Water Distribution Performance

- FO Maintenance Performance
- FO Performance In Non-irrigation Management Activities
- JMC (Joint-management Committee) Performance

These are given in Annex 1. Properly used, the indicators provide a reasonably accurate way to measure FO and JMC progress. To provide an objective way to evaluate the strength and performance of FOs before considering them for turnover, the study team suggested a first approximation of minimum acceptable percentage scores for turnover. These numbers can be refined over time as more experience is gained in rating FOs and JMCs.

The study team believed that the government should have an effective way of keeping track of the progress of FOs, JMCs and turnover. Based on these experiences and findings, they recommended:

1. The IMD could consider the idea that FOs will be interested in collecting data for themselves and for the IMD.
2. That the ID considers developing a recurrent survey-type monitoring program for MANIS schemes based in the IMACs.

Annex 1 - Detailed Criteria and Indicators for Measuring PIM

Table 1. Farmer organization strength indicator.

Feature	Conceptual Base	Performance	Outcome
Structure	0 = FO has no constitution or no clear structure 1 = FO has a constitution and a formal structure 2 = FO has both a constitution and a formal structure	0 = FO has no farmer approval for a constitution 1 = FO has farmer approval for a constitution	0 = Required characteristics of FO structure are not met 1 = Required characteristics are partially met 2 = Required characteristics are fully met
Membership	0 = No clear definition for eligibility 1 = There is a clear definition for membership		0 = Less than 50 % of potential farmers are active members 1 = Between 50 % - 75 % are active 2 = More than 75 % are active
Leadership	0 = No procedure or criteria for selecting a leader 1 = There is a procedure but no criteria 2 = There are both procedures and criteria	0 = Neither procedure nor criteria are followed 1 = Only procedure is followed 2 = Both procedure and criteria are followed	0 = Leaders are not selected by farmers 1 = Leaders are selected by farmers but not by majority of farmers 2 = Leaders are selected by majority of farmers
Funding	0 = No planned ways to raise funds 1 = Funds are raised in an adhoc manner 2 = Funds are raised mostly from agency allocations 3 = Funds are raised through a sustainable procedure	0 = FO has a poor funding position 1 = FO has a satisfactory funding position	0 = No funds 1 = Funds are primarily obtained from agency O&M allocations and contributions 2 = Funds are primarily obtained from membership levies 3 = Funds are obtained from contracts and other FO business activities
Financial management	0 = FO has no financial reporting or disbursement procedures 1 = FO has reporting procedures but no disbursement procedures 2 = FO has all needed procedures	0 = FO does not follow financial reporting and disbursement procedures 1 = FO follows financial reporting and disbursement procedures	0 = Funds management not reported to membership 1 = Funds management acceptable to some farmers 2 = Funds management and disbursements acceptable to most farmers
Use of funds	0 = No plans prepared to use funds 1 = Plans are prepared to use funds	0 = Funds are not used 1 = Funds are used for FO activities	0 = Use of funds brought no benefit to FO 1 = FO activities are diversified with the use of funds 2 = Stronger financial position through diversified activities

(Continued)

Table 1. Farmer organization strength indicator (*Continued*).

Feature	Conceptual Base	Performance	Outcome
Internal communication	0 = No defined channel of communication 1 = Information passed through informal channels 2 = Regular channel is established through meetings	0 = No FO meetings held 1 = Meetings held irregularly 2 = Regular meetings are held	0 = No systematic information flow between farmers and FRs 1 = Information is passed mainly between FRs and DCO officers 2 = Systematic information flow between farmers and FRs

Note: For purposes of judging membership, 'potential members' is defined as all farmers (including renters and squatters) served by the distributory canal. The number of 'active members' is defined by asking the DCO officers to identify the member of 'active members' in their organizations

Table 2. Farmer organization water distribution performance indicator.

Activity	Responsibility	Performance
Preparation of schedules within DCs	0 = No schedules or scheduling done by agency 1 = Scheduling done by agency and FO 2 = Scheduling done by FO	0 = Scheduling done only after problems arise 1 = Scheduling done in time or as appropriate 2 = Scheduling done in time and as appropriate
Within FCs	0 = No schedules or scheduling done by agency 1 = Scheduling done by agency and FO 2 = Scheduling done by FO	0 = Scheduling done only after problems arise 1 = Scheduling done in time and as appropriate 2 = Scheduling done in time and as appropriate
Operations within DCs	0 = Schedules implemented by agency 1 = Schedules implemented by agency and FO 2 = Schedules implemented by FO	0 = There is disparity between head and tail in both adequacy and timeliness 1 = There is disparity only in timeliness 2 = No disparity in either adequacy or timeliness
Within FCs (for FCs, performance is scored only if water supply to FC is adequate and timely)	0 = Schedules implemented by agency 1 = Schedules implemented by agency and FO 2 = Schedules implemented by FO	0 = There is disparity between head and tail in both adequacy and timeliness 1 = There is disparity only in timeliness 2 = No disparity in either adequacy or timeliness
Problem resolution	0 = FO does not monitor and resolve problems 1 = FO resolves problems in an adhoc manner 2 = FO resolves problems through an established mechanism	0 = Less than 50 % of problems solved 1 = Between 50 % and 75 % of problems solved 2 = Over 75 % of problems are solved

Table 3. Farmer organization maintenance performance indicator.

Activity	Responsibility	Adequacy
FC maintenance cleaning/de-silting	0 = Done by agency 1 = Done jointly 2 = Done by FO	0 = Done poorly 1 = Done adequately 2 = Done adequately and on time
Structure repairs/ Preventive maintenance	0 = Done by agency 1 = Done jointly 2 = Done by FO	0 = Done poorly 1 = Done adequately 2 = Done adequately and on time
DC maintenance cleaning/de-silting	0 = Done by agency 1 = Done jointly 2 = Done by FO	0 = Done poorly 1 = Done adequately 2 = Done adequately and on time
Structure repairs/ Preventive maintenance	0 = Done by agency 1 = Done jointly 2 = Done by FO	0 = Done poorly 1 = Done adequately 2 = Done adequately and on time
Preventive measures	0 = FO has no rules for preventing cattle or other damage 1 = FO has rules but no enforcement means (relies on agencies) 2 = FO has both rules and enforcement means	0 = Rules not enforced properly 1 = Rules well enforced

Table 4. Farmer organization non-O&M activities indicator.

Income Generating and Financial Activities		
Activity	Level of Activity	Benefit
Input coordination and supply	0 = Not undertaken	0 = No income generated
	1 = Coordination of information on needs	1 = Mostly to those who undertake the activity
	2 = Retail supply undertaken	2 = Income accrues mostly to the FO funds
Crop storage and trading	0 = No activity	0 = No income generated
	1 = Provide common storage facility	1 = Mostly to those who undertake the activity
	2 = Trade in crops	2 = Income accrues mostly to the FO funds
Providing credit	0 = No activity	0 = No income generated
	1 = Facilitate institutional credit	1 = Mostly to those who undertake the activity
	2 = Operate credit facility and facilitate institutional credit	2 = Income accrues mostly to the FO funds
Other income generating activities	0 = No activity(s)	0 = No income generated
	1 = Facilitate individual farmers to undertake activities	1 = Mostly to those who undertake the activity
	2 = Operate additional business(es)	2 = Income accrues mostly to the FO funds
Non-income Generating Activities		
Sponsor community rituals and activities	0 = No activity	0 = None
	1 = FO activities only	1 = To FO only
	2 = Other community activities as well	2 = To wider community
Provide community facilities	0 = No activity	0 = None
	1 = Provided community hall only	1 = To FO only
	2 = Provided several facilities	2 = To wider community
Sponsor activities for special groups (women, youth etc.)	0 = No activity	0 = None
	1 = Activities for one group	1 = To local community only
	2 = Activities for two or more groups	2 = To wider community

Table 5. Joint management committee performance indicator.

Activity	Performance	Decision-making	Outcome
Seasonal planning	0 = JMC does not undertake seasonal planning 1 = JMC undertakes seasonal planning	0 = One-sided (officer or FR) decisions are taken 1 = Participatory decisions are taken	0 = JMC plans ignored 1 = JMC plans partially implemented 2 = JMC plans implemented without change
Maintenance planning	0 = JMC does not undertake maintenance planning 1 = JMC undertakes maintenance planning	0 = One-sided (officer or FR) decisions are taken 1 = Participatory decisions are taken	0 = JMC plans ignored 1 = JMC plans partially implemented 2 = JMC plans implemented without change
Monitoring of system performance	0 = Progress/performance occasionally discussed at JMC meetings 1 = Progress/performance always discussed at JMC meetings	0 = One-sided (officer or FR) decisions are taken 1 = Participatory decisions are taken	0 = No actions are taken in response to discussion 1 = Actions taken in response to discussions
Problem solving	0 = JMC does not try to solve problems 1 = JMC tries to solve selected problems; others are forwarded to agencies 2 = JMC tries to deal with all problems	0 = Only one party, agency or FRs, tries to solve problems at JMC meeting 1 = Both parties jointly attempt to solve problems	0 = No actions are taken in response to discussion 1 = Actions taken in response to discussions

Table 6. Degree of turnover indicator.

Activity	Planning (decision making)	Implementation
Operations		
On FC	0 = Operation decisions taken by agency 1 = Operation decisions taken jointly 2 = Operation decisions taken by FCGs (FO)	0 = Implemented by agency 1 = Implemented jointly 2 = Implemented by FO
Among FCs	Same scoring as above	Same scoring as above
On BC (DC gates)	Same scoring as above	Same scoring as above
On MC/headwork	Same scoring as above	Same scoring as above
FC Maintenance		
• FC cleaning	0 = Maintenance decisions are taken by agency 1 = Maintenance decisions are taken jointly 2 = Maintenance decisions are taken by FO	0 = Implemented by agency 1 = Implemented jointly 2 = Implemented by FO
• FC de-silting	Same scoring as above	Same scoring as above
• FC structure repairs	Same scoring as above	Same scoring as above
• FC earthwork	Same scoring as above	Same scoring as above
DC Maintenance		
• DC cleaning	Scoring same as for FC maintenance	Scoring same as for FC maintenance
• DC de-silting		
• DC structure repairs		
• DC earthwork		
BC Maintenance		
• BC cleaning	0 = Maintenance decisions are taken by agency 2 = Maintenance decisions are taken jointly 4 = Maintenance decisions are taken by FO	0 = Implemented by agency 2 = Implemented jointly 4 = Implemented by FO
• BC de-silting	Same scoring as above	Same scoring as above
• BC structure repairs	Same scoring as above	Same scoring as above
• BC earthwork	Same scoring as above	Same scoring as above
MC Maintenance		
• MC cleaning	Scoring same as for BC maintenance	Scoring same as for BC maintenance
• MC de-silting		
• MC structure repairs		
• MC earthwork		

Annex 2

Table 1. Indicator values of evaluated FOs.

Programme	Scheme	FO	A	B	C	D	E	F
Maximum possible scores			36	20	19	28	15	48
INMAS	Devahuwe	Peramuna	32	16	12	11	11	15.5
	Devahuwe	Ekamuthu	32	16	12	11	0	15.5
	Kaudulla	CP Pura Perakum	33	18	12	11	11	17.0
	Kaudulla	Eksath	33	18	12	11	0	16.8
	Meeoya	Perakum	24	17	11	6	12	17.0
	Muthukandiya	Village 3	27	10	8	8	9	12.8
	Muthukandiya	Village 6	25	10	8	8	0	12.8
	Muruthawela	Pahala Perakum	23	9	7	6	8	13.2
	Muruthawela	Thisara	23	9	7	6	0	13.2
	Rajangana	Ranketha	35	18	13	11	12	17.2
	Rajangana	Navajeewana	35	18	13	11	0	17.2
	Thabbowa	Perakum	31	15	9	5	10	11.8
	Thabbowa	Thenuwara	31	15	9	5	0	11.8
MANIS	Ambewela	Thennakoonwela	22	10	11	2	6	13.2
	Buththala	Medagamaela	24	9	11	3	6	13.2
	Gampola Rajaela	Kurukude Ekamuthu	8	7	8	0	4	12.8
	Komarikaela	Kanugolla	35	13	14	11	3	17.2
	Maela	Ekamuthu	20	4	7	2	6	13.5
	Mahanneriya	Mahananneriya	16	8	9	0	3	12.5
	Mannankattiya	Siri Parakum	7	6	5	4	6	16.5
	Mediyawa	Mahasen	18	7	8	2	3	11.0
	Murapola	Girambe Kolabissa	19	8	8	2	6	13.8
	Radagalpotha	Radagalpotha	21	8	8	2	0	12.5
	Wennoruwa	Wilgoda	31	11	13	7	9	13.2
Mahaweli	System C	Hungamalagama	24	15	9	13	13	19.0
	System C	Diyaviddagama	21	15	9	13	0	19.0
	System C	Serupitiya	8	13	10	2	0	17.5
	System C	Pahalarathkinda	17	15	10	10	0	18.5
	System H	D3/D4/421	24	13	10	10	12	21.0
	System H	D4/ 204	5	5	5	0	0	15.0
	System H	D1/313	13	13	10	5	0	20.0
	System H	D2/101	15	12	10	1	0	19.0
System H	D3/305	16	14	8	7	0	17.5	

Note: Key – A = FO strength, B = FO water distribution, C = FO maintenance, D = FO non-O&M activities, E = Joint management committee performance, F = Degree of turnover