Participatory Action Research to Improve the Performance of Jointly Managed Irrigation Systems

H. A. Karunasena

INTRODUCTION

GENERALLY, RESEARCH PROGRAMS in the irrigation sector have been implemented in isolation or with limited participation of irrigation professionals and farmers. Therefore, the research findings and the newly developed methodologies have, often, been confined to very few people, reducing their impact. In the recent past, increased emphasis has been placed on improved performance of the irrigation sector due to the growing competition for scarce water resources. During the last few years, the International Irrigation Management Institute (IIMI) has been pioneering to improve the performance of the irrigation sector by carrying out innovative modes of research work in a collaborative manner. The first effort in this new style was implemented in the Kirindi Oya and Uda Walawe projects in Southern Sri Lanka under the name of Irrigation Management and Crop Diversification with the assistance of the Asian Development Bank (ADB). This program was implemented in two phases where Phase 1 focused on the diagnosis of irrigation, agriculture and institutional issues in irrigation management. Phase 2 mainly focused on the implementation of the recommendations of Phase 1. This paper discusses the impacts of the Participatory Action Research (PAR) Program with special reference to the Kirindi Oya Project.

Based on the findings and recommendations of the Phase 1 study, it was felt both by the researchers and by the implementors that it was absolutely necessary to implement the recommendations to realize project objectives. The donor (ADB) strongly felt that the realization of project objectives was not unrealistic if certain management, social and technical innovations could be introduced. After serious thinking, the implementing agencies, IIMI and the ADB decided to extend the research activities to another phase with the view to introducing a series of innovations to improve overall performance of this heavily invested project.

Unlike in Phase 1, the Phase 2 studies were carried with the full participation of the agency staff. The preparation of the inception report, implementation of research activities, provision of training for the research participants, preparation of seasonal reports, etc., were carried out with the active participation of the agency staff. PAR facilitated the internalization and institutionalization of the management innovations tested. Irrigation Management Transfer (IMT) is a solution to many institutional, social, financial and technical problems faced by the irrigation sector. Most of the irrigation projects in the developing world are managed by governments or they are jointly managed. Therefore, the implementation of IMT is a process which needs a considerable period of time to introduce the change. This innovation needs to be implemented with the participation of the agencies and the farmers. The experiences in PAR are quite relevant to IMT implementation because the former has overriding advantages such as built-in internalizing nature, ability to correct and change the process, implementation through awareness, etc.

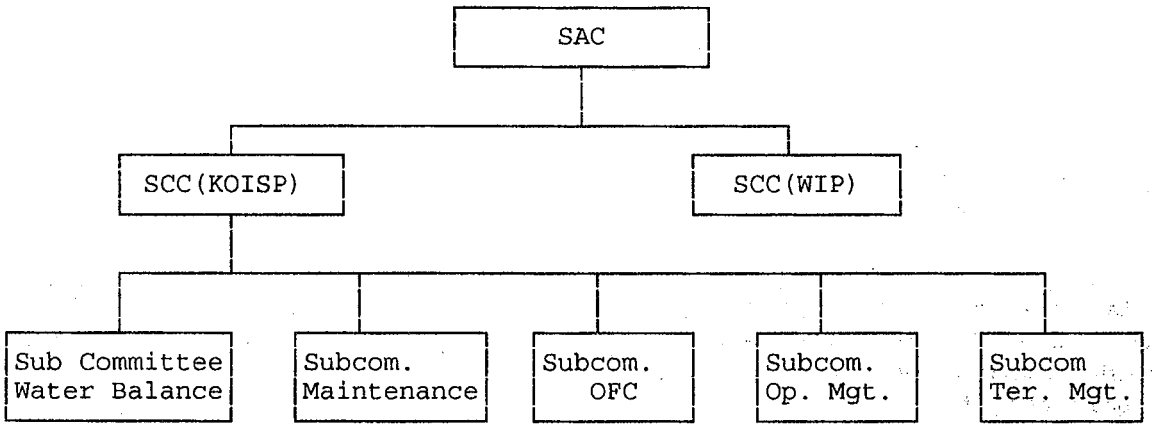
This paper discusses the PAR approach in the Kirindi Oya Project with special reference to organizational changes required and technical and social innovations carried out to improve the performance under joint management by the farmers and the officials.

IMPLEMENTATION STRATEGY AND RESEARCH MANAGEMENT STRUCTURE

Structure of Research Management

In general, the Phase 2 study followed the same management structure as the Phase 1 study except for the formation of study subcommittees at the project level on the basis of the subcomponents of the main activities. The structure is shown in Figure 1.

Figure 1. Organogram of the Participatory Action Research Project.



Notes: SAC = Study Advisory Committee.
SCC = Study Coordinating Committee.
KOISP = Kirindi Oya Irrigation System Project.
Op. Mgt. = Operation management.
Ter. Mgt. = Tertiary management.
OFC =
WIP =

Study Advisory Committee (SAC). The committee is chaired by the Director, Irrigation Management Division (IMD). Participants include Heads of agencies or their representatives, ADB representatives, project-level senior managers and IIMI international staff members and senior researchers. Generally, this committee meets once every six months to discuss the progress of the research work and takes decisions in support of research activities.

Study Coordinating Committee (SCC). This committee is headed by a system-level of the agency and its members are selected from the active participants of related line agencies. In addition to IIMI international staff, a few senior officers from the line agencies attend these meetings which are held once every two months at the project level. More detailed technical analysis and related research management issues are discussed at this forum. In addition, this meeting is used for the purpose of disseminating the findings of the research subcomponents among the members. It also provides an opportunity for interdisciplinary interactions which contribute to improving the research activities.

Study Subcommittee. This committee is a new addition to the Phase 1 structure. During the initial stages, the IIMI staff felt that the active participation and a genuine commitment of the agency were required in PAR-type of research. This committee functions as the grass-roots level planning and implementation body for each subcomponent of the research. Most of the chairpersons of these subcommittees are leading persons involved in the day-to-day activities of the respective divisions. This subcommittee meets as often as required. It is rather informal in nature.

Strategy Used in Research Activities

With the help of the terms of reference (TOR) and the memorandum of understanding (MOU) with the ADB, the IIMI research staff identified the research activities to cover a wide spectrum of management activities. The recommendations submitted after the Phase 1 study formed the basis for the design of the Phase 2 research. After a fair amount of home work had been done by the IIMI staff a list of innovations was proposed to the relevant agency officials. The IIMI research team comprised a social scientist, an agricultural engineer, an irrigation engineer and an agricultural economist. Under the guidance of the international staff, the field staff of IIMI initiated dialogues with the respective agency officials. These discussions went on for a substantially longer period of time than was anticipated in view of the enormous amount of work involved in formulating the draft proposals for the research. The response from agency staff on certain concepts indicated that the proposals were not fully acceptable to them. They questioned some of the innovations as not being practicable and acceptable to them and the beneficiary farmers. Nevertheless, the IIMI staff went on promoting the newly developed concepts in private and public

discussions. It was also proposed to write short notes on various selected innovations. At the start, IIMI field staff prepared the initial reports on subjects such as Water Balance, Operation Management, Maintenance Management and Tertiary Management. These reports were written exclusively by IIMI researchers but they were designated joint papers with the relevant agency staff member. Quite often, more interested persons, particularly from the Irrigation Department (ID), corrected and amended these reports. It is worth noting that their contributions and suggestions improved the IIMI staff reports. In getting them to participate in this way, it became somewhat easier to motivate them to become involved in the research activities. After the first few months, the program gathered momentum and generated sufficient interest among the officers to implement it. In some cases, an analysis of certain management activities was done and reported on, with the view to highlighting drawbacks as well as potential areas for further improvements.

Preparation of the Inception Report

The ideas generated by the draft reports were exchanged and shared with a wide cross section of irrigation officials to evaluate their validity under actual working conditions. Later, all these draft reports were filed together to form the first draft of the Inception Report (IIMI 1991). The objectives of the research were designed to:

1) Test and assist in the implementation of organizational and management innovations which would improve the performance and sustainability of irrigation systems.

2) Strengthen irrigation management institutions including farmer organizations to effectively participate in system management.

3) Assist in implementing design and rehabilitation innovations and alternative system management practices.

4) Assist in testing and implementing appropriate on-farm water management practices for diversified crop cultivation and farm income maximization.

In August 1991, a workshop was held to discuss the draft Inception Report before implementation of the research activities. This was a well-attended workshop with about 90 percent participation of agency staff from the project and headquarters. All the proposals of the research components were presented by the respective subcommittee chairpersons (all from the line agencies) and this can be considered as a very important milestone in the field of action research. Participation of these officials was exceptionally good and it could be observed that there was a great potential for further improvements of their skills in presenting papers and participating in discussions.

INSTITUTIONAL IMPACTS OF THE RESEARCH

The Phase 2 objective was to improve the performance of the irrigation system rather than to implement a traditional type of research for the sake of research. The prime objective of improving overall efficiency could only be achieved through the innovations suggested in this type of research mode. It is also required to internalize such innovations to guarantee sustainability. It is human nature to resist new ideas because of the natural convenience to follow existing procedures and methodologies and also because of the more laborious and time consuming nature in the implementation of such innovations. On the other hand, who cares for the performance of the irrigation sector? Top management needs only to avoid crop failures. So it is very important to get the irrigation actors to participate in the innovation processes, so that they get accustomed to the change in a less turbulent manner. This section of the report analyzes the different changes which occurred in the working environment, including interdisciplinary cooperation, professional development, attitudinal changes and other related improvements in management.

Working Environment

Any development or management activity needs a healthy working environment to be able to deliver an acceptable quality and a satisfactory quantity of goods and services to the beneficiaries in an efficient manner. If the environment is not conducive to change due to turbulence, friction, or interdisciplinary rivalries, the quality of the goods and services may not be realized as desired. As it is defined and understood today, the development and management of any project require contributions from a broad spectrum of disciplines. In view of the need for mobilizing resources from different directions to a focused activity, it is essential to generate mutual understanding

and respect among the multidisciplinary teams. It is also vital to note that participation and contribution become more effective and productive in a friendly environment than in an official or hostile situation.

The subcommittees and the project level SCC have provided a good platform for agency officials and the IIMI staff to discuss problems and related issues more openly. It cannot be firmly stated that these discussions disclosed everything without any reservation. Despite such reservations, however, it was possible to surface some of the issues which are very useful in improving management. Small group discussions have become more productive because of the understanding generated among the members. Consequently, these members have started to think more positively by realizing their weaknesses. This environment has facilitated others to comment and suggest various alternative ways and means for achieving better and better results. It would have been much more interesting if we could have included a few farmer representatives at these subcommittees and SCC meetings, but it was not considered because of language problems and the technical nature of the proceedings. However, better awareness among them will certainly strengthen the innovations and related activities.

At the inception of this research and even before, the critical comments made by others (IIMI or other line agencies) on irrigation management issues, were not positively taken up by the managers. Generally, these comments were answered in a defensive style and did not make the agency concerned realize the need for improvement. When officials started the dialogue at subcommittee level, they became more friendly and began to have an understanding of each other which has helped the group work towards a common goal by correcting and adjusting their traditional methods. Finally, it may be concluded that agency officials have changed their attitude and have begun to address the project-level issues in an integrated manner rather than working in isolation.

Transparency and Credibility

Departments which have existed for a long time and other government institutions, generally, do not welcome foreign or outside interventions in their area of responsibility. They have been trained to be uni-disciplinary and always there is a tendency to conserve and preserve long-lived traditions, procedures and methodologies. They firmly believe that their way of working is the one and only way to solve their problems because their procedures and methodologies have been tested by time. This is true to a great extent, and would remain true if the world had not changed. The dynamics of environment always necessitates changes in procedures and methodologies. The classical example is the introduction of farmer participation in irrigation development.

It is quite useful to note that most of the irrigation-related agencies have resisted these changes because of the feeling that changes may undermine their authority and endanger their existence. Therefore, this resistance is natural. When discussions on the subject were initiated at grass-roots level, it was noticed that the members of the committees became more aware of the nature of the changes required to improve the performances of the irrigation sector and resistance decreased.

It is natural that people do not like to be humiliated in public and also they like to share their problems, difficulties and weaknesses with some one who is on intimate terms with them. The advantage of small group discussions is that one is so intimate with the other group members that one can share one's problems and even one's weaknesses. This is the early stage of a transparency which can later be developed in the higher levels of the hierarchy. When one is frank and genuine, the others would try to behave so too. If one is transparent it is relatively easy to find solutions to the problems. It was observed that officers who were transparent certainly improved the working relationships among the group members and also with the beneficiary farmers. This helped improve the credibility of the institutions among clients and counterparts.

Professional Developments

The SCC and the subcommittees were formed, as explained above, to improve the participation by agency staff and also to internalize the innovations tested in this research. As described in IIMI's mission statement, enhancing the national capacities in irrigation management is one of IIMI's prime objectives. Although professional development is not the prime objective of the research program, it can be considered a very valuable byproduct of this activity.

As explained previously, the committees which were formed and which functioned throughout the program provided ample opportunities for agency officials to discuss their issues and problems. It is a well-known fact that most engineers usually keep silent in most forums and limit their discussions to their own colleagues. At the beginning, engineers were a bit hesitant to speak in English because of stage fright and language problems. Eventually, most of these engineers (and even other officials) actively participated in the discussions during subcommittees and SCC meetings. Their stage fright and the language barrier disappeared gradually through participation in small group discussions initially and later at higher-level meetings. During the process, they learned how to present their views at these technical meetings and also learned how to manage meetings as chairpersons.

It is noteworthy that the workshop papers on the inception report were presented by the subcommittee chairpersons. It was somewhat doubtful whether these chairpersons could make presentations to a much wider cross section of national and international intellectuals. This doubt was cleared as it was proved that they were capable and that they could rise to the occasion. It can be stated that the August 1991 workshop was the turning point in our efforts to promote professional development. Also it is with pride that one notes that most officials who participated in these research programs have become very effective speakers and research partners, whose services could be used in the project area and even elsewhere in improving the overall performance of the agencies. In addition, they got the opportunity to write short reports, analyze irrigation-related data using computer packages and received training on recently developed computer packages.

Changes in Attitudes

IIMI started its activity in Sri Lanka and in the KOISP, when the relationship between farmers, the IMD and the ID was at crossroads. The Phase 2 study period was somewhat better than the Phase 1 period due to the longer period of association of the ID staff with the IMD and the farmer groups. The ID staff (particularly the senior members) had already been exposed to this environment and they like to share their problems, difficulties and weaknesses with some one who is on intimate terms with them. The acceptance of this interaction shows the changes in the ID which was prepared to adopt a more positive way of thinking. The receptive quality in key officials certainly helped in the implementation of the newly suggested methods and procedures in irrigation management. There are advantages and disadvantages in any method, procedure or innovation. If it helps improve the program, positive points should be picked up for implementation. Pessimistic attitudes would certainly become barriers in improving the performance. During this long period of association, the ID staff involved began to listen to and to tolerate certain innovations proposed by outside organizations like IIMI. When they saw the positive impacts of the first few innovations, it became easy to fine-tune further and to implement more detailed and complex activities.

RESULTS AND LESSONS LEARNED

Participatory Action Research (PAR) Method

During Phase 1, IIMI conducted the research program with the assistance of the ID and other agencies in a few selected areas. The research outputs were shared with a limited number of agency officials. The PAR was conducted in association with agency officials and to some extent with farmer participation. "Normal" research was carried out by the researchers with little participation from the system managers and other related officers. Therefore, the findings and recommendations of such research need to be internalized in another phase. In the PAR process, ideas and concepts are generated and implemented side by side. The PAR mode of research is most appropriate for the implementation of a series of innovations to improve the system performances. This is the first time in our irrigation history that such an innovative research approach has been used. As already discussed, PAR takes care of the following aspects: identification of research areas, mobilizing of project-level, human and material resources, professional development of irrigation officers and improving the capacity of farmers for management, creating an awareness of innovation and educating on new findings, and generating commitment in agency officials.

Although PAR has been identified as a research method it can correctly be considered a strategy to improve performance. Unlike in other development projects implemented with the assistance of consultants, PAR provides the opportunity to incorporate the opinion of participants and to evaluate findings while the activities are in progress. Certainly, this evaluation is useful to test whether the research work is proceeding in the right direction rather than holding post mortems.

As stated earlier, PAR provides a broad spectrum of participants to involve in the innovation activities. More importantly the farmers, who have become partners in the process of management, will be provided with a golden opportunity to understand the future trends in the management and the innovations required to improve the performance. Management transfer from the agency to the users or the private sector will have to undergo a process. It is not an event and needs to follow a smooth path with less turbulence and friction. Therefore, an approach of a well-designed process is required. To begin with, one could use a theoretical framework and then the process can be defined conceptually with the incorporation of experience of all the actors concerned. Despite these steps, there can be many other unknown factors which need to be considered for the successful implementation fully. Our experience in PAR has proved that all such ideas and other requirements could be incorporated during the process with very little disturbances. So it can be concluded, that PAR is a results-oriented research and development program which has a distinct advantage over other modes of research in participatory irrigation management.

Cultivation Planning

At the inception of the project, it was envisaged to develop a policy on the water rights of each subsystem in the project. Also, a need was felt to develop a workable plan for cultivation on a long-term basis. From the beginning of the research program, IIMI staff have suggested different strategies in cultivation planning and have discussed these with project-level and headquarters-level staff. Before the development of this plan, KOISP was using the recently observed inflow data when planning for forthcoming seasons. They used the criteria of rice crop equity for each tract and the rice crop opportunity was rotated seasonally.

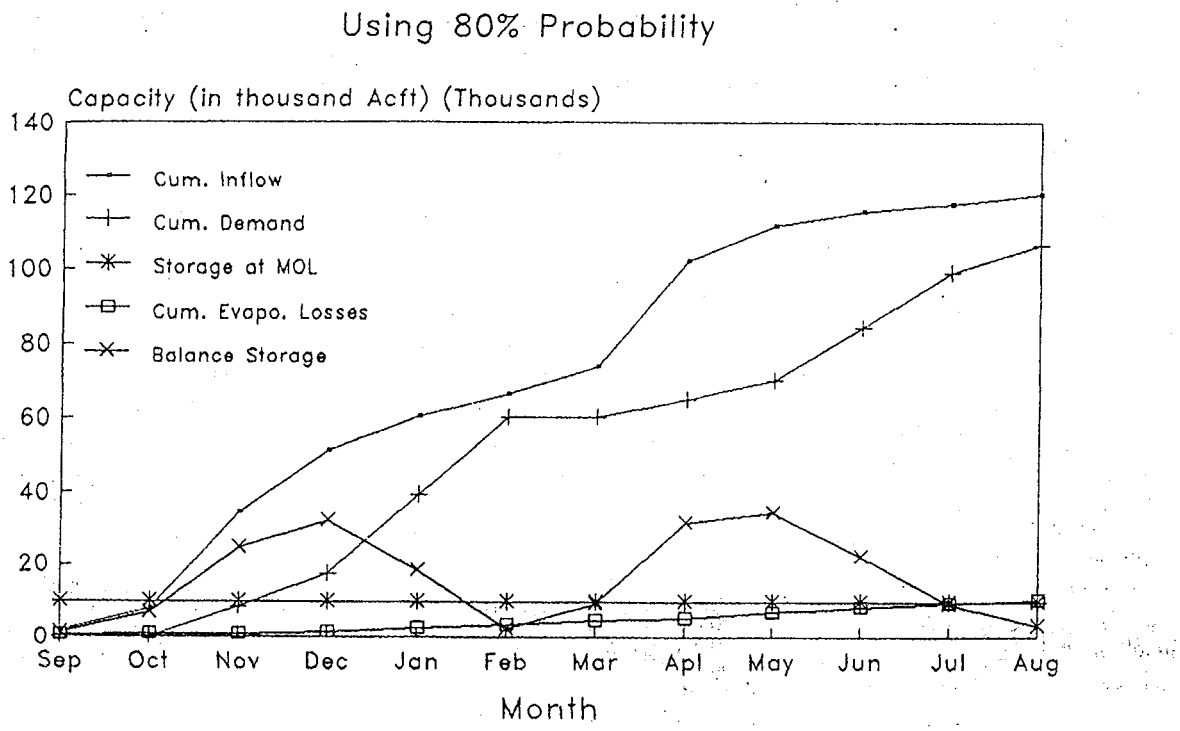
Management decisions for the project are taken at a project-level committee (namely the Project Management Committee [PMC]) which comprised the farmer representatives of four sub-projects and agency officials. The Technical Committee comprised irrigation and agriculture officials who prepared the initial proposal for seasonal cultivation activities with due consideration to agronomic, climatic, social and water availability. These draft proposals were usually submitted to the monthly PMC meeting where farmer representatives could express their concern over the proposal before arriving at final decisions. Our experience is that in most occasions the original proposals are changed to accommodate the needs of the farmers and officials. This process of decision making looks into the management aspects of the project in a holistic manner than dealing with a particular problem in isolation. The farmers' role in PMC has certainly improved the quality and acceptability of the decisions.

With inputs from the top and the bottom, project-level staff have formed a committee for cultivation planing which is represented by all the agencies at project level (IIMI 1993). Using available inflow data from 1944 to 1978 and the recent inflow data after the commissioning of the project, IIMI researchers conducted a statistical analysis to establish a most reliable inflow value at different risk levels such as 20, 25 and 30 percent [(Table 1)] which was later used to develop the cultivation plan. A comparison of water availability and demand for different crop combinations was done and time series reservoir balancing was done to select the date of commencement of cultivation and to verify the behavior of the reservoir water level under three different water availability conditions [(Figure 2)]. In preparing this plan the committee has given thought to the soil characteristics, traditional rights, climatological conditions, social and cultural values, crop preferences, agronomic issues, etc. The primary objectives of the cultivation plan were to maintain 170 percent cropping intensity in the Ellegala Irrigation System (EIS),

Table 1. Probable Inflows at Lunugamvehera.

Probability	50%	70%	75%	80%	90%
Month					
September	5467	2916	2349	1944	1188
October	14985	10206	7557	5832	4050
November	46778	34344	33210	26568	19494
December	32400	23166	20436	17010	9747
Januarty	21060	14094	11259	9234	6129
February	13851	7695	6990	5832	3105
Sub Total	**134541**	**92421**	**81801**	**66420**	**43713**
March	19116	10530	8691	7614	4779
April	40500	32235	32910	28188	18711
May	23652	16200	12798	9396	4536
June	7371	5427	4374	3888	2403
July	5265	4050	2997	2349	729
August	4374	2997	2810	2511	1053
Sub Total	**100278**	**71439**	**64580**	**53946**	**32211**
Total	**234819**	**163860**	**146321**	**120366**	**75924**

Figure 2. Water balance of KOISP.



cultivate at least one rice crop in the newly developed area during the wet season, supply a maximum of 5,000 acre-feet (61.67 MCM) of supplementary irrigation to the Bandagiriya System and promote the cultivation of nonrice crops in the entire project area. Based on available water and other factors mentioned above, the plan suggested water allocations for different categories of crops in subsystems on a percentage basis for both dry and wet seasons. The wet season was subdivided into dry and wet based on 80 percent exceedance of probable inflow. The 80 percent probable inflow corresponds to 85,000 acre-feet (1,048 MCM) of water which allow nearly 3,239 ha of new lands, EIS (405 ha) and Bandagiriya to be brought under the plow. This creates a situation where the third zone will have to start a nonrice crop with the onset of monsoonal rains and if the exceedance is about 432 MCM, the farmers will be provided with another rice crop after harvesting the nonrice crop.

Once the plan was finalized at the Technical Committee it was submitted to a wide range of officials involved in the project management and their views were incorporated before it was submitted to the farmer representatives at a workshop. The intention of the workshop was to prepare the final plan using the committee report as the guideline. It was not an easy task to prepare the final plan at this workshop since most of the leaders were concerned with their area and they tried to get as many benefits as possible to their subsystem. Quite a number of discussions took place and finally it was possible to compromise on the amended plan. It was their request to present this plan to all farmers in all four subsystems. After this workshop, the farmers themselves prepared a few plans which were quite similar to the agreed plan but those plans showed favoritism to their respective subsystems. Considering all the information the Technical Committee finalized and approved the cultivation plan at the PMC. Finally, the project-level cultivation plan was submitted to the respective head offices of thé line agencies and also to the relevant Ministries to obtain their concurrence with the view to minimize political interference. The distinct advantage of this plan is that it predicts the most reliable quantity of water for a given season with minimum risk and plans for that quantity. The procedure minimizes the risk of crop failures. Should the inflow exceed the minimum probable flow, then staggered cultivation is used based on climatological conditions and agronomic recommendations, to extend rice-cropped areas to fallow areas.

Despite the failures in the first attempt in the implementation of the plan in the 1992/1993 wet season, with the start of the 1993/1994 season the plan was implemented with the blessing of the PMC, the head office and the Ministry-level officials. Most politicians of the area and the Minister in charge of irrigation were aware of the implementation of the plan. A certain group of farmers who were politically motivated and belonged to the third zone launched a protest against the plan and requested all the authorities to issue water for rice while nonrice crops were at the early stage of growth. The reason for this request was unusually high inflow to the reservoir. Despite all

these protests and reactions of the local politicians, the PMC was firm in not issuing water until the nonrice crop was harvested. During this process, most politicians realized that every decision should go through the PMC and it is the supreme decision-making body of the project. Therefore, it can be concluded that the experience gained from this activity is very useful in planing cultivation in water-short systems when under political pressure. The cultivation plan is now accepted by most of the project-level agency officials, farmer representatives and farmers.

Minimum Operating Level (MOL) and Water Management in EIS

The Ellegala Irrigation System which consists of five small reservoirs constructed in 1870, are fed by Kirindi Oya water through a barrage located downstream of the newly constructed Lunugamvehera Dam. There are two feeder canals on both banks of the river to supply water to EIS reservoirs. These reservoirs are interconnected by spill-tail canals. The newly developed area is located in the catchments of these reservoirs and since 1987 the drainage from the new area has increased the surface-subsurface inflow into EIS.

In the past, due to pressure from farmers, irrigation managers were compelled to store water in the small tanks in EIS to start wet-season cultivation around mid-September to mid-October. This is a rather drier period compared to late October. When these tanks are full, they cannot absorb local catchment runoff during the rainy periods and, therefore, they spill over into the sea. This was highlighted in the Water Balance Study. The study recommended keeping tanks at MOL which would provide ample capacity to absorb rainfall contribution. At the beginning, this recommendation was highly criticized by some engineers and EIS farmers. They pointed out that by doing so they would lose the water rights enjoyed by them over the new settlers. The study also suggested a time table for release of water to EIS with due consideration to maximizing the use of drainage water from the newly developed area and local runoff. The major recommendations emerging from this study are as follows: to keep the tanks at MOL, to start the cultivation when the tanks reach MOL by its own catchment inflow, to use pre-planned water release schedules for the distribution of water from the main reservoir, and to monitor the water condition daily with the view of minimizing wastage.

There were certain problems created by the implementation of the recommendation: increased salinity in tank water, shortage of water for domestic purposes and for cattle, weed growth in tanks, cultivation of upstream areas of the tank when the water levels are low, reduction in the scenic beauty of the tanks located near the tourist areas, and adverse effects on fish culture. These side-effects need further studies to suggest remedial measures. By using the study recommendations, substantial quantities of water were saved during the past couple of seasons [(Table 2)] and this proved very useful under water-short conditions.

Table 2. Water Issues to EIS and Rain Fall.

Year	1990		1991		1992		1993	
Season	Water Released Acft	Rainfall mm	Water Released Acft	Rainfall mm	Water Released Acft	Rainfall mm	Water Released Acft	Rainfall mm
YALA Apr/Aug	55050	318.85	22954	385.92	22597 *	232.2	28632 **	310.8
MAHA Sep/Mar	20995	869.43	12094	696.2	17527	529.6	10843	1166.4
Total	76045	1188.28	35048	1082.12	40124	761.8	39475	1477.2

* - Crop failed

** - 50% Rice & 20% O.F.C.

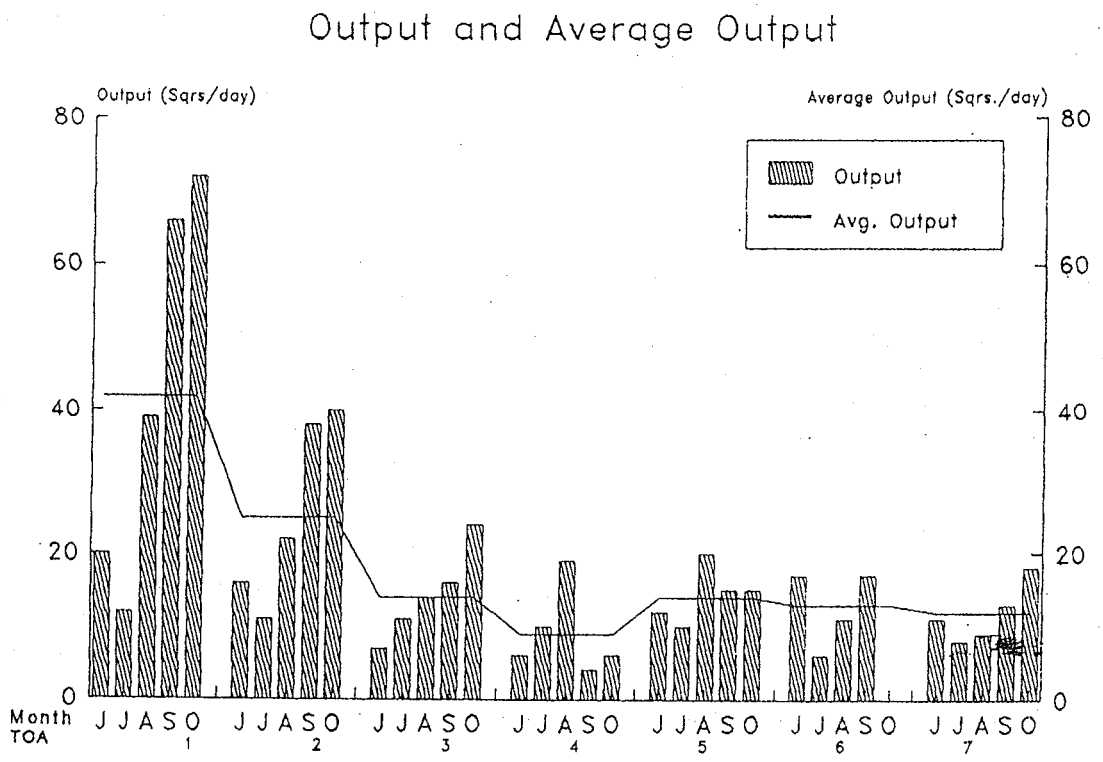
Maintenance Procedures

Maintenance is an area most system managers pay little attention to due to its lower priority. The maintenance management program implemented in the KOISP pilot area aimed at improving performance by: identification and planning of maintenance work, improving maintenance implementation, and improving the financial management of O&M funds.

The procedure pilot-tested for identifying and planning maintenance work and preparing cost estimates proved that the available limited financial resources could be more effectively used if maintenance work was first identified and prioritized. The early stages of the maintenance process provided an opportunity for the farmer organizations and the IMD (third umpire) to participate in planning activities. Once the estimates had been prepared, they were discussed at ratification meetings at subsystem level. These discussions helped system managers to overcome problems by selecting the most needy items (hydraulically) for maintenance and also by helping mobilize farmers' resources. The methodological and procedural rules improved the quality of work, ensured effective use of the limited financial resources and encouraged farmer participation. Also, participation by the IMD staff is a real breakthrough in maintenance management and has made them aware of the activities carried out by the ID. The changes which were implemented have also opened the doors to the ID and has enhanced the department's transparency.

The most outstanding finding is the establishment of maintenance norms for Turnout Attendants (TOAs) as given in [Figure 3]. The research findings disclosed that TOAs could be used in maintenance work by deploying them systematically along selected sections of the canal with specific norms. The ID norms for certain items are rather average under general conditions. In practice, the technical officers of the ID could perform simple work-studies to check the validity of existing norms and ensure that the TOAs provide a more realistic quantity of work on a daily basis both during cultivation seasons and off seasons. Now these norms are being used across the project and will be further refined in due course to obtain project-level norms for routine maintenance work. Under normal circumstances, the ID allocates maintenance funds to administrative ranges and divisions based on command area. This research has suggested that the following year's maintenance program be prepared during the latter part of the present year based on the needs of the system. IIMI has provided a time frame so that the ID headquarters will be aware of actual requests before money is allocated. This will also provide a good basis for discussing the under-investment in maintenance with the financial authorities of the government.

Figure 3. Progress of maintenance.



The study on maintenance expenditures during the past few years has revealed that most of the allocated funds were used to cover administrative costs. Very little physical work was carried out, and that in a sporadic manner with no proper implementation plan. This study worked out a reasonable amount of administrative costs required by an irrigation division and suggested a demarcation of administrative boundaries to adjust service areas to a financially viable size. This matter should be taken up at head-office level where reorganizing the administrative boundaries to cut down unnecessary overhead costs and making the best use of the available human and other resources could be effected more effectively and efficiently.

DRAWBACKS IN PAR

There may be drawbacks and weaknesses in the PAR-type of research from the point of view of the researchers, operators and beneficiaries. It is not intended in this section to analyze the PAR technique against the traditional research modes. However, it is our experience that PAR has done more to improve performance than any other method of research for the overall performance of the irrigation sector. Nevertheless, it is quite appropriate to review the procedure and process that we have followed during this short period of three years. The following section discusses a few drawbacks and weaknesses which could certainly have been overcome during the research program. Some of them were rectified then and there to suit the circumstances. Since this is the first time such a mode was implemented in Sri Lanka, a learning process approach had to be followed.

Preparation of TOR and Inception Report

The gap in time between Phase 1 and 2 is almost negligible and therefore the recommendations from Phase 1 match the then existing conditions in the project. It is understood that the TOR was prepared by IIMI alone. This paper suggests that it would have been more applicable and acceptable to prepare the TOR with the participation of agency officials to mobilize and motivate them in research activities with increased commitment.

The inception report was prepared by IIMI staff with substantial participation of the agency officials. In the case of certain research components, the participation and contribution of the staff of the ID and the department of Agriculture were exceptionally good. Certain officers of a few departments just participated because of the commitment of their heads of department. The draft inception report was rewritten several times to suit the thinking of several international staff members. The content remained the same but it was presented in many different forms which later created confusion among the agency officials as well as IIMI national and international staff. Some of the international staff members were employed on a part-time basis to improve the report after the workshop. This was too late because by this time all had agreed upon the areas to be researched. We should have done this at the beginning at an in-house workshop with field-level and head office-level staff members which would have minimized the time wasted in rewriting. Also, due to delays in getting the final version of the draft Inception Report, the respective officers did not have sufficient time to prepare for the workshop. Timely submission of reports of all categories of officers is very useful in obtaining their contributions.

Awareness on Research Activities

Since this program is participatory in nature, awareness among the agency staff (both at project- and head office-levels) and the farmers is an essential ingredient. Almost all the foreseen activities were identified and implemented from the inception onwards. The need to create an awareness among the lower-level staff of the agencies and the farmers was identified somewhat later. This situation created a suspicion concerning the various activities. Implementing awareness programs on research activities and their responsibility in advance would certainly help in the implementation of the activities themselves. This was an area we did not deal with appropriately. What really happened was that we identified the needs in a haphazard manner and attended to these needs. Nevertheless, we did achieve better results during the latter part of the research program.

Training Needs and Budget

The original budget did not allow monetary provisions for training and related awareness-creating programs and meetings. In addition, no provision was made for SCC, SAC and subcommittee meetings to be held. Since we had a substantial amount of contingency funds, this mistake could be rectified. In preparing budgets for PAR research programs, training components and meeting expenses should be included, since this involves quite a large sum of money. All this was not foreseen at the inception. Yet "Meetings" were the driving force in our research work.

At some stage, it was noticed that the training skills of agency officials had to be enhanced because they acted as trainers to lower-level staff, as well as to farmers. So a group of agency officials was selected as trainers and given a short course on training skill development. This is another important area which should receive more attention in future.

CONSTRAINTS

It is no wonder that a few constraints had to be faced which retarded the momentum of research work in the Kirindi Oya Project. Most of the constraints such as the water-short situation, heavy work loads and the instability of the irrigation environment were beyond the control of all the parties. A few of the constraints that existed were overcome by hard-working agency officials and IIMI staff. These constraints are: water-short situation, unstable social condition, heavy construction program, and misunderstandings of the agency personnel and farmers on IIMI's mission.

CONCLUSIONS

The PAR Program was successfully implemented to the satisfaction of all partners in the irrigation sector. Even though the program began somewhat slowly, it eventually gathered momentum. Many mistakes were rectified during the implementation with minimum deviations from the original objectives. The KOISP is a classic example of constraints, problems and complicity. Despite efforts of opposing forces, the PAR was implemented to our satisfaction. In fact, this is the type of research which should be implemented where troubled and turbulent situations prevail. The concept of PAR is a better method than the basic or fundamental research to improve the overall performance of irrigation.

Secondly, PAR is a very good way of bringing the project-level staff together to create a good working environment. As is well known, inter-departmental rivalries are a big hindrance in any development activity. Project-level group discussions, SCC, etc., provided golden opportunities for officers from different agencies to interact very frequently and to discuss their problems frankly. These activities generated interdisciplinary cooperation and improved the integrity of the agency officials. The plans and proposals prepared by them became their own work and it improved their commitment to the work plan. Ultimately, the beneficiary farmers received a better service. This mode of working (as one group) exhibits the integrity of the officers which in turn increased the confidence of the farmers. Accordingly, the credibility of agencies was dramatically improved and the farmers too became more disciplined. Farmers tend to think as partners and they participated in project-level activities as equal partners (not as the demanding trade union type).

With the implementation of all the activities under each component it was observed that tangible results were visible. These results are in the areas of operation (water duty, equity, minimum wastage) and maintenance (cost effectiveness, sustainability, effective use of limited resources, farmer participation). Therefore, PAR is a good methodology for enhancing the performance of O&M of irrigation projects, which is the objective of all the partners such as managers, researchers, farmers and policymakers.

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