Completion Report on the Training Program on Rapid Appraisal of Irrigation Systems for Rehabilitation and Modernization

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Cover photographs by Azharul Haq showing i) participants learning techniques of group interviews, ii) participants interviewing farmers, and iii) farmers listening to the findings of the Rapid Appraisal.

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INTRODUCTION

The National Irrigation Rehabilitation Project (NIRP) plans to rehabilitate and modernize 1,000 minor and 60 medium/major irrigation schemes spread throughout the Island. The Irrigation Research Management Unit (IRMU) has been established as a component of the NIRP, one of whose main objectives is to provide input to improve quality of planning and implementation of the schemes under the NIRP. Preliminary studies of these schemes prior to actual rehabilitation need a large volume of assessment work in respect of technical, social and institutional aspects. Conventional methods used for the purpose such as the use of formal and, often, lengthy questionnaires, sampling surveys and multivariate statistical analyses may not always be effective when the demand is for discerning, rapid and flexible but cost-effective information.

There is a need to introduce to the staff associated with NIRP (including the IRMU) these new methods of information-gathering which are more appropriate than survey sampling methods commonly employed in project appraisals. The flexible nature of Rapid Rural Appraisal (RRA) can stimulate dialogue between farmers and management which should help make rehabilitation more effective and lasting. Through RRA, the IRMU personnel will also be able to obtain preliminary data for the identification of researchable issues.

OBJECTIVES

The general objective of the 2-week training course was to sensitize irrigation officials interested in research and diagnostic activities to the advantages of using the RRA technique for collecting the required information. Other objectives are to:

i. Provide course participants with a thorough understanding of the purposes, principles and methods of RRA,

ii. Help course participants plan RRA in irrigation schemes (preferably minor schemes), and

iii. Guide course participants in implementing, discussing and reporting the RRA results.

PARTICIPANTS

The Project Director of the NIRP nominated 26 participants from the Irrigation Department, the NIRP, the Provincial Councils, the Department of Agrarian Services and the IRMU of whom 17 actually attended the course. A list of the participants with their designations and departmental affiliations is presented in Appendix I. All the participants were engineers associated in one way or another with the rehabilitation program being implemented by the NIRP. Women comprised 30 percent of the participants.

COURSE STRUCTURE

The course was a blend of classroom lectures, group discussions and extensive field exercises.

During the classroom part of the training course, certain basic ideas were conveyed about why RRA has become important in recent years, what it should and should not be used for, and how it can be integrated with the needs of policymakers and implementing staff. The RRA principles conveyed included: the importance of indigenous knowledge; flexibility and interdisciplinary learning which is rapid, iterative and progressive; and the effective combination of multiple methods. It was emphasized that RRA is location-specific and that the methods and indicators used should be used by persons having extensive knowledge about local conditions.

Training included discussions with the participants about aspects such as deciding when an RRA is appropriate and when it is not, what conditions make RRA successful, how to organize and prepare for an RRA, methods of implementation and how to ensure that the results of RRA are used effectively by relevant agencies. Methods of implementation received the most attention. The orientation was towards introducing participants to practical RRA methods which could be applied by staff of both the implementing and research units.

Trainers used lectures to introduce the main ideas and methods. Participants were frequently invited to comment about hypothetical or actual problems and case studies of RRA. This approach was mixed with role-playing exercises, where participants demonstrated interview techniques and all participants discussed the exercise. Readings were assigned and participants were asked to present short reviews of the readings and relate them to the previous day's lectures.

Field exercises were conducted at the Mahasiyambalangamuwa Irrigation Scheme located in the Galgamuwa Irrigation District which is being rehabilitated under the ADB-assisted North Western Province Water Resources Development Project (NWPWRDP). Constructed in 1956, the scheme has a command area of slightly over about 400 acres with a cropping intensity of about 100 percent (details about the project are included in the participants' appraisal report).

Participants were divided into three groups; two groups had 6 members each and the third had 5. Each group was assigned to appraise one of the following topics: *Engineering and Drainage; Agricultural Production Systems* and *Socioeconomic and Institutional Aspects*. The groups prepared work plans for their RRA field exercises. They then conducted the RRA and presented their results to a larger group and prepared a report based on their findings. The appraisal report is included as a separate report.

During the first week of training, each day was divided into four periods. The first week was mainly devoted to lectures and discussions about what RRA is, why and when to use it and methods for preparing for it, implementing it and using its results effectively. This included ideas about effective graphic or illustrative materials for presentation to management- or policy-level officials.

During the end of the week, participants planned together for the following week's RRA field exercise. Here the entire group discussed the nature of information to be collected, indicators and working hypotheses about determinants of management performance and impacts. During the second week, as indicated earlier, participants were divided into three groups to prepare plans for

their respective RRA exercises. This included the final selection of types and sources of information to be collected, planning field activities and preparation of guides and forms for collecting, recording and reporting of information. The RRA work plans were presented by each group to the other participants at the beginning of the second week, to permit a response from the entire group in time for the final revision prior to implementing the RRA.

Each of the RRA teams implemented its trial RRAs in the field for two days in the second week. This was followed by analyses, preparation and presentation of the findings which included the preparation of a short written report, use of graphic or illustrative materials and a verbal presentation to the group (as a mock example of how they might present RRA findings to agency heads).

COURSE OUTLINE

The course outline included the following major topics:

* Definitions, concepts, principles and applications;
* Techniques including PRA techniques;
* Methodology;
* Surveys and data collection;
* Case studies and field work;
* Data analyses and reporting; and
* Group discussion, integration and synthesis.

COURSE DURATION

The program of the course conducted for 10 working days was as follows:

* Concepts, principles and theory - four (4) days;
* Focused topics and case studies - one (1) day;
* Field work - two (2) days;
* Review of the field exercise and preparation of draft report - one (1) day;
* Discussion of the draft report with farmers - half (0.5) day; and
* Preparation and presentation of the final report - one and a half (1.5) days.

The detailed breakdown of the time allocation by topic is presented in Appendix II.

RESOURCE PERSONS

The following resource persons participated in the training program:

i.	Trainers	:	K.S.R. de Silva, B.M.S. Samarasekera (ID), H.M. Jayathilaka (SLITI), C.M.Wijayaratna, R. Sakthivadivel, C.R. Panabokke, J. Brewer, D. Vermillion, P. Gosselink, P. Aluwihare and K.A. Haq (IIMI).
ii.	Organizer	:	IRMU, SLITI and IIMI.
iii.	Facilitators	:	H.M. Jayathilaka (SLITI), P. Muthumumarana (IIMI).
iv.	Course Directors	:	K.A. Haq and B.M.S. Samarasekera.

EVALUATION OF THE TRAINING PROGRAM

The participants were invited to evaluate the process of learning and interaction which took place during the program. They were also invited to assess the training organization, planning and implementation of the training program (including methods, techniques, experts' and facilitators' performances, instructional materials and training facilities). The format used for course evaluation is presented in Appendix III.

The scale of evaluation was from 1 to 5, 1 denoting lowest, i.e., objective not achieved and 5 denoting highest, i.e., the objective fully achieved.

Evaluation of Important Topics

	Topic	Average Score
1.	Ability to describe RRA techniques and principles	4.1
2.	Ability to decide the needs of RRA for NIRP schemes	4.0
3.	Using RRA as a tool for identifying research methods	3.7
4.	Applying appraisal methods for irrigation supplies and drainage	4.1
5.	Ability to use appraisal methods for social and institutional aspects	4.2
6.	Ability to interview farmers and farmers' groups	4.3

7.	Applying RRA analyses and presentation techniques	3.6
8.	Using appraisal methods for agricultural productivity	3.5
9.	Ability to organize a rapid appraisal	3.9
10.	Ability to conduct participatory rural appraisals	3.8
11.	Using appraisal methods for farm management aspects	3.1
12.	Preparing and submitting reports on RRA	3.3

Opinion and Feedback

		Very low	Low	Average	High	Very high	Average
1.	Orientation	1	2	3	4	5	3.9
2.	Group atmosphere	1	2	3	4	5	4.4
3.	Interest and motivation	1	2	3	4	5	4.4
4.	Participation	1	2	3	4	5	4.2
5.	Productiveness	1	2	3	4	5	3.9
6.	Physical arrangements	1	2	3	4	5	4.2

How would you rate the training program?

Not good	Mediocre	Alright	Good	Excellent
0	1	2	10	1

(Three participants did not respond.)

Course Strengths

* The program was arranged and conducted in a professional manner.
* Discussions among participants and lecturers were frank.
* Data collection formats/procedures were simple but exhaustive.
* Participants have gained an adequate knowledge of appraising the irrigation scheme by using RRA and PRA techniques.
* The participants recognized the need for conducting RRA for rehabilitation projects.
* The RRA helped the participants in identifying what farmers really wanted from rehabilitation and how those can be incorporated.

* The program including the sequential arrangement of the lectures and their presentations and field exercises was meticulously executed.
* Lectures were conducted by highly competent and experienced resource persons.
* Lectures were adequately supported by handouts, charts, graphs, etc.
* Extensive field works with frank and intimate interactions with the farmers enabled the participants gain much needed insight to social problems that can adversely affect implementation of rehabilitation works.
* Participation of the farmers in the discussion of the draft report and their constructive suggestions helped improve the quality of the report.
* Group discussion in the classroom, lectures and team work in the field exercise encouraged and ensured participation of even the shyest person in the class.
* The atmosphere during the entire period of the course was relaxed and conducive to learning.
* Appraisal techniques can be easily adapted to study other aspects of rural development.
* Logistics provided by the ITI in accommodation, food, games (both recreational and competitive), sightseeing, etc., helped keep spirits high.

Program Weaknesses

* Duration of lectures, i.e., more than 8 hours per day was a little too long.
* Some lectures were too fast.
* Computer facilities were inadequate.
* Adequate help was not provided during report writing.
* Environmental aspects were not covered.
* The RRA and PRA techniques were weak in quantitative evaluations.
* Some lecturers provided many pages of handouts resulting in long and boring sessions.
* More case studies covering wider subject areas should have been provided.
* Two days were insufficient for field exercises.
* Time allocated for report writing was not adequate.
* Differences in RRA and PRA were not clear enough.

Improvements Suggested

* More time should be devoted to field work and report writing.
* Each lecture should preferably be followed by a case study.
* Increase the duration of the course.
* Video film of a real RRA should be shown during the course.
* Environmental aspects should be addressed.
* Clearer explanations describing the difference between RRA and PRA should be provided.
* Arrangements should be made for increased computer facilities.
* Role play sessions may be included in group discussions.
* Training should be provided on technical report writing.

* Such a course will be extremely helpful to TAs, especially to those working for the NIRP. It is, therefore, recommended to organize such a course for the Tas.
* Instead of three separate groups appraising different aspects of the scheme it would be better if all three groups appraise all the aspects separately.
* More time should be allowed for group discussions among the participants.

Appendix I

PARTICIPANTS OF THE RRA TRAINING

1. Mr. T.P. Alwis
   Irrigation Engineer, Planning/HQ

2. Mr. Y.A. Abdul Majeed
   Irrigation Engineer, DDI Office/Amparai

3. Mr. Buhari Ahamed
   Irrigation Engineer, DDI Office/Amparai

4. Mr. N.A.I.U.K. Nissanka
   Irrigation Engineer, DDI Office/Matara

5. Mr. T.D.M. Deheragoda
   Irrigation Engineer, DDI Office/Moneragala

6. Mr. W.P. Palugaswewa
   Irrigation Engineer, DDI Office/Anuradhapura

7. Mr. A.L. Buruuhanudeen
   Irrigation Engineer, ITI/Galgamuwa

8. Mr. D. Mangalagama
   Irrigation Engineer, Provincial Engineering Department/Kandy

9. Mr. M. Sathiyendra
   Irrigation Engineer, DDI Office/Puttalam

10. Mrs. E. Sathiyendra
    Irrigation Engineer, DDI Office/Puttalam

11. Mr. K.A.S. Susantha
    Irrigation Engineer, IRMU/HQ

12. Ms. S. Malini
    Irrigation Engineer, IRMU/HQ

13. Ms. Samantha Perera
    Irrigation Engineer, ITI/Galgamuwa

14. Ms. H.G.M. Kulasinghe
Irrigation Engineer, DDI Office/Kurunegala

15. Mr. G.D.F.U. Perera
Irrigation Engineer, ITI/Galgamuwa

16. Ms. D. Priyanie
Irrigation Engineer, DDI Office/Galle

17. Mr. K.A.C. Piyabandu
Irrigation Engineer, ITI/Galgamuwa

Appendix II

RAPID RURAL APPRAISAL TRAINING COURSE 1994

Time	7 Tues.	8 Wed.	9 Thurs.	10 Fri.	11 Sat.	13 Mon.	14 Tues.	15 Wed.	16 Thurs.	17 Fri.
8:15 a.m. 10:00 a.m.	Registration and inaugural session	Appraisal methods for irrigation supplies and drainage R.S.	Appraisal methods for agricultural productivity C.R.P.	Participatory rural appraisal P.G.	RRA exercise preparation A. Orientation J.B., K.A.H.	Field exercises at irrigation schemes	Field exercises at irrigation schemes	Review of field exercises	Discussing the reports with the farmers at the scheme	Preparation of final report
10:30 a.m.-11:00 a.m.	TEA INTERVAL									
11:00 a.m. 12:30 a.m.	Introduction to RRA K.A.H.	Appraisal methods for social and institutional aspects J.B.	Organizing RRA C.M.W.	Appraisal methods for farm management aspects P.A.	B. Methods and field plans J.B., K.A.H.	Field exercises at irrigation schemes	Field exercises at irrigation schemes	Review of field exercises	Discussing the reports with the farmers at the scheme	Presentation and submission of final report
12:30 p.m.-2:30 p.m.	LUNCH INTERVAL									
2:00 p.m. 3:00 p.m.	Needs of RRA for NIRP schemes K.S.R.	Farmer group interview D.V.*	RRA case studies C.M.W.	RRA case studies K.A.H.	RRA case studies K.A.H.	Field exercises at irrigation schemes	Field exercises at irrigation schemes	Preparation of draft report	Preparation of final report	Closing session
3:00 p.m.-3:30 p.m.	TEA INTERVAL									
3:30 p.m. 4:30 p.m.	RRA: A tool for identifying research needs B.M.S.	RRA analyses and presentation techniques J.B.	Exercise preparation C.M.W.	RRA case studies P.G.	Review of the course H.M.J.	Field exercises at irrigation schemes	Field exercises at irrigation schemes	Preparation of draft report	Preparation of final report	
7:00 p.m.-8:00 p.m.	VIDEO PRESENTATIONS									

Appendix III

Rapid Appraisal of Irrigation Systems for Rehabilitation and Modernization and Research Needs

PROGRAM EVALUATION

Goals

The objectives of this training program are listed below:

Please indicate the number that closely resembles your feeling about the degree to which each objective has been achieved.

The scale is from 1 to 5, 1 denoting lowest, i.e., the objective not achieved and 5 denoting highest, i.e., the objective achieved very well.

1. Ability to describe RRA techniques

   1 2 3 4 5

2. Ability to decide the needs of RRA for NIRP schemes

   1 2 3 4 5

3. Using RRA as a tool for identifying research needs

   1 2 3 4 5

4. Applying appraisal methods for irrigation supplies and drainage

   1 2 3 4 5

5. Ability to use appraisal methods for social and institutional aspects

   1 2 3 4 5

6. Ability to interview farmers and farmer groups

   1 2 3 4 5

7. Applying RRA analysis and presentation techniques

   1 2 3 4 5

8. Using appraisal methods for agricultural productivity

   1 2 3 4 5

9. Ability to organize a rapid appraisal

   1 2 3 4 5

10. Ability to conduct participatory rural appraisals

    1 2 3 4 5

11. Using appraisal methods for farm management aspects

    1 2 3 4 5

12. Preparing and submitting reports on RRA

    1 2 3 4 5

Opinion and Feedback

What is your overall rating of the training program for each of the following items?

Please circle the appropriate number.

	Very low	Low	Average	High	Very high
1. Orientation	1	2	2	4	5
3. Interest and motivation	1	2	3	4	5
4. Participation	1	2	2	4	5
5. Productiveness	1	2	3	4	5
6. Physical arrangements and comfort	1	2	2	4	5

Please answer the following questions:

1. How would you rate the training program?
   Not good – Mediocre – Alright – Good – Excellent

2. What were the strong points?

3. What were the weak points?

4. What improvements would you suggest?

(You need not write your name.)

Report on the Rapid Appraisal of Mahasiyambalangamuwa Irrigation System for Rehabilitation and Modernization

Prepared by the Participants
of the RRA Training Course
Conducted at the
Sri Lanka Irrigation Training Institute
from 7 June to 17 June, 1994

Chapter 1

Introduction

The Mahasiyambalangamuwa Tank Irrigation System comes under the Galgamuwa Irrigation Division. It is located between Anuradhapura and Kurunegala districts. The irrigation system consists of a reservoir of 2175 acre-feet (ac.ft) of useable capacity irrigating an area of 469 acres and a distribution system with Right Bank (RB) and Left Bank (LB) main canals. The RB canal systems fall under the Anuradhapura Administrative District whereas the LB systems fall under the Kurunegala Administrative District (Co-ord:F/249 9.45 x 7.15) as given in the map (p.20).

According to the villagers, the tank was first constructed by King Dhatusena in such a manner that the bund was originally constructed between Galmediyagala in RB and Siyambalagamuwa in LB and the tank has been supplying irrigation water also to the farm village named Mahagalawewa. But they were not able to provide information on the year of its construction.

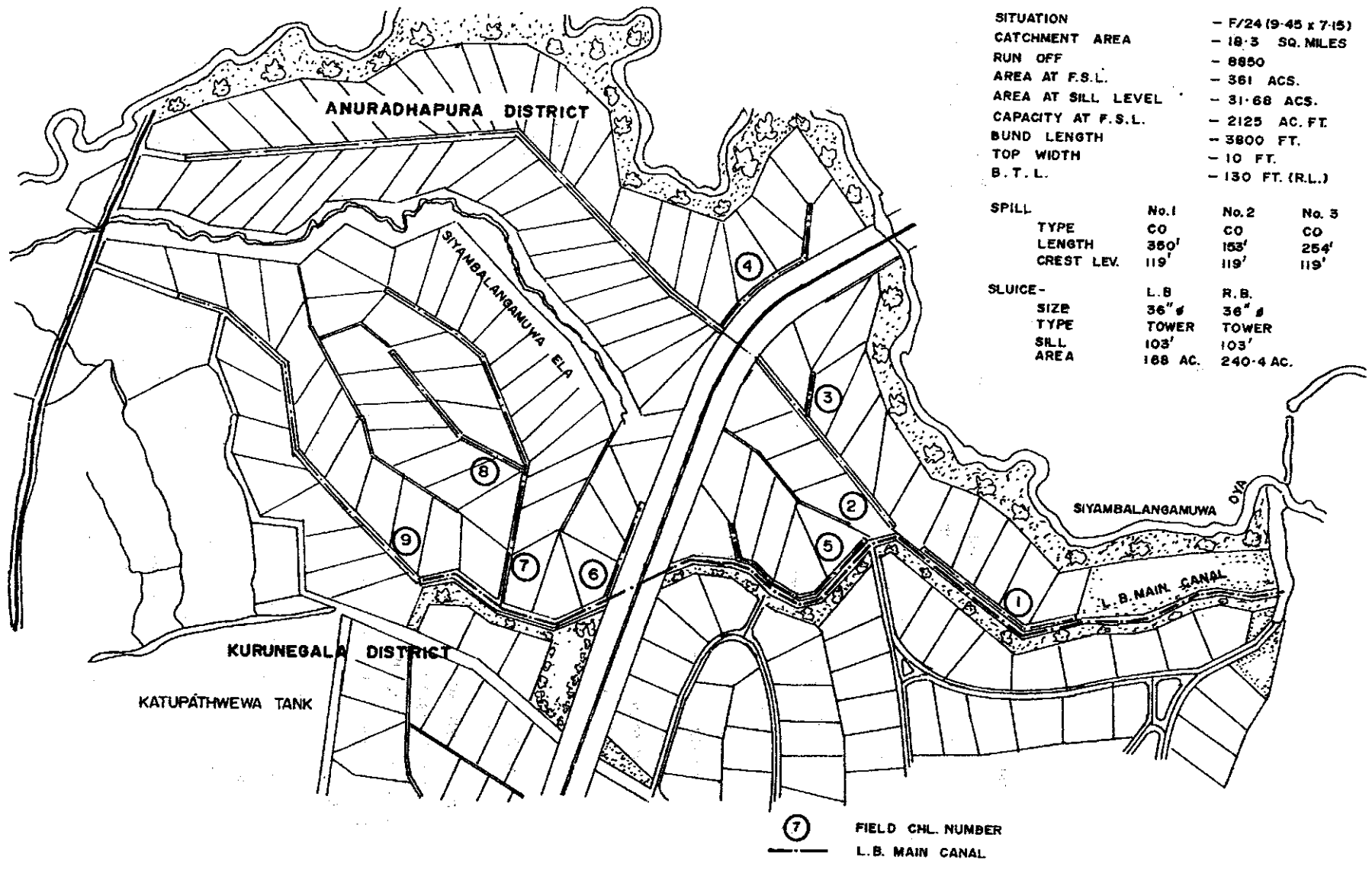
Available records, however, indicate that the construction of the irrigation scheme was initiated in 1953 and completed in 1956. Settlers were selected from Nikawa-Gambaha and Dividangaha Korales on the basis that they were landless and had a minimum of two children. Initially, 113 farm families were settled under the LB area and each family was provided with 2 acres of rice land and 2 acres of highland.

Later, 133 acres were brought under irrigation in the RB. In 1970, at the request of the farmers the spill was raised by 3 ft and the bund by 1 foot and the command area was increased to 405 acres. Before 1970, only the LB area was provided with irrigation facilities during yala due to insufficient water in the tank.

In 1977, the system was rehabilitated by the Irrigation Department (ID) and the command area was further extended to 469 acres (274 under LB and 195 under RB). In 1978, a cyclonic storm breached the tank bund near the 3rd spill and was repaired the same year.

Before 1989, the *velvidane* system prevailed for distribution of water: two velvidanas were looking after the LB area. Half a bushel of rough rice per acre was paid by the farmers for their services which was called *salaris*. In April 1989, some members of the Maranadara Society realized the importance of the formation of a farmers' organization (FO) for the forthcoming rehabilitation of the system under the ADB-assisted North Western Province Water Resource Development Project (NWPWRDP). The proponents organized the FO and became the office bearers and promised to contribute salaris to the farmer organization. But they could not live upto the promise which resulted in serious discontentment among the farmers. Seventy eight farmers signed a petition against the office bearers expressing no confidence. As a result, a general meeting was called and a decision was taken to have a new committee. The President, Vice President, Secretary, Assistant Secretary, Treasurer and two committee members were elected by consensus and this committee has continued to function since then.

Map of the Mahasiyambalangamuwa Project.



TANK DATA

SITUATION	– F/24 (9·45 x 7·15)
CATCHMENT AREA	– 18·3 SQ. MILES
RUN OFF	– 8850
AREA AT F.S.L.	– 361 ACS.
AREA AT SILL LEVEL	– 31·68 ACS.
CAPACITY AT F.S.L.	– 2125 AC. FT.
BUND LENGTH	– 3800 FT.
TOP WIDTH	– 10 FT.
B.T.L.	– 130 FT. (R.L.)

SPILL	No.1	No.2	No. 3
TYPE	CO	CO	CO
LENGTH	350'	153'	254'
CREST LEV.	119'	119'	119'

SLUICE-	L.B	R.B.
SIZE	36" ø	36" ø
TYPE	TOWER	TOWER
SILL	103'	103'
AREA	168 AC.	240·4 AC.

Presently the system is being rehabilitated under the NWPWRDP and implemented by the Irrigation Engineer (IE), Galgamuwa with active participation of the FO.

Access

Proceed along the Galgamuwa Moragollagama Road upto the Moragollagama Junction. Then turn to the right and proceed along Moragoollagama Kalawewa road for about 4 miles upto the Thalawa Junction, turn right again and proceed along the village road for about half a mile to reach the LB end of the tank where one ID labor line quarters exists.

Rapid Appraisal of the System

For the purpose of rapid appraisal the participants were organized into 3 groups to appraise engineering, agricultural and socioeconomic and institutional aspects. The participants spent 2 days in the field collecting data with active participation of the farmers. The draft report was presented to the farmers which was then finalized incorporating their comments. Group reports are presented in the following chapters.

Methodology

The following methodology was used for data collection:

1. Use of existing records from agency offices (ID, Department of Meteorology) and the FO.
2. Personal communication with the agency officials (IE, Institution Organizer, Extension Officer, etc.) and farmer representatives.
3. Walkthrough with the farmers along the system.
4. Dialogue with the farmers. Any bias was reduced by changing the dominant speaker among the informants.

Techniques

The following techniques were used for data collection:

1. Check list,
2. Group interviews,
3. Participatory appraisal,
4. Direct observation, and
5. Individual interviews.

Chapter II

Rapid Appraisal of the Mahasiyambalangamuwa Scheme: Irrigation and Drainage

Team Members:

W.B. Palugaswewa
D. Priyani
M. Sathiyendra
A.L. Buruhanuddin
K.A.C. Piyabandu
K.A.S. Susantha

Objective

To assess and appraise the existing irrigation system to identify the needs for rehabilitation to improve the technical performance of the system with the ultimate objective of increasing agricultural production and the beneficiaries' standard of living.

Water Resource availability

* Runoff from the catchment area (slope is 0.094 and catchment area is 13.7 km^2).

* Monthly rainfall and catchment yield.

* Groundwater

  The static water levels of the domestic wells located upstream of the railway track stabilize at around 8 ft below the ground level during the rainy season. The wells are almost dry during the dry season.

  The domestic wells which are located downstream of the railway track maintain higher water levels, about 4 ft below the ground level during the rainy season. During the dry season they have consumable water (for domestic use) with no scarcity.

* No agro-wells are present in the command of the LB for augmenting surface water.

Present Status

The team comprising five trainers, one resource person and five farmers walked through the tank bund from the LB end to the Spill No.3 in the RB, and along the LB Canal and the respective drainage systems. The following were observed during the appraisal of the scheme.

The Bund

Rip Rap protection along the upstream (U/S) has been disturbed in several locations. The entire bund area protected with Rip Rap was overgrown with shrubs. The downstream (D/S) slope of the bund is too steep due probably to the widening of the bund top when a breach was repaired after floods in 1978. There are some *kohomba* (margosa) and other trees along the downstream slope of the bund which pose a danger to the stability of the embankment.

Some seepage was observed along the road at the upper reaches of the LB end which caused erosion along the D/S toe and the immediate D/S of the LB sluice as well.

The LB Sluice

Inadequate safety measures were observed along the approach parallel to the LB sluice tower and the top of the tower. Also, operational difficulties were observed in the lifting rods. When the water level of the tank goes down there is no access for the water to reach the sluice.

The RB Sluice

Inadequate safety measures were observed along the approach parallel to the RB sluice tower and the top of the tower.

Spills

* It was found that operation of the planks of Spill no.1 is extremely difficult during any emergency or heavy rain.

* A mound of settled earth on the U/S of Spill no.1 is obstructing flow.

* Some cracks were observed on the crest wall of Spill no.3.

* No safety arrangements are provided to access the other side of all three spills.

* No access road exists across the spill tail channel near Spill no.1.

The LB Canal and Field Channels in the LB

The LB Inlet. There is a need for a road along the D/S toe of the bund to cross the D/S inlet of the LB Canal which should be connected to the existing damaged channel road along the LB Canal. But the space available above the LB inlet is inadequate.

The LB Canal

* There are six turnouts to feed the Field Channels 1,2,5,6,7 and 9.

* There is no approach road to Lot no.8, which makes it very difficult to move farm equipment.

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The reservation of the channel has been encroached upon and cultivated.

* No measuring devices exist along the entire channel system.

* An uncontrollable farm outlet constructed directly from the Main Canal exists at Lot no.8.

* Waterlogging and seepage were observed along the area between the parallel FC 1 and the Main Canal.

* The channel road near the turnout to FC7 has been cut open to feed FC7.

* The wing walls of the bridge at the end of the Main Canal are damaged.

FC 1

* The channel is fully damaged and no proper farm turnout exists.

FC 2

* There are two turnouts to feed the Field Channels 3 and 4.

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The existing damaged road in a lower level is not adequate.

* The reservation of the channel has been encroached upon and cultivated.

* All the D/S drop structures and drop-cum-regulating structures were found to be damaged.

FC 3

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The reservation of the channel has been encroached upon and cultivated.

FC 4

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* Lot nos. 16, 19, 20 and 21 which are irrigated by FC 4 have been extended by encroached cultivation up to the toe of the railway track, and hence, the drainage from the D/S toe of the railway track causes constant damage to FC4.

FC 5

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The reservation of the channel has been encroached upon and cultivated.

FC 6

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The reservation of the channel has been encroached upon and cultivated.

FC 7

* There is a turnout in this channel to feed FC 8.

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The size of the pipe in the turnout from the LB Canal is inadequate.

* The reservation of the channel has been encroached upon and cultivated.

* There is a pipe culvert near Lot no.77 which blocks the flow D/S due to inadequate size of the pipe.

* The existing level of the road is significantly lower than the channel bed.

FC 8

* Existence of weeds and siltation along the channel bed obstructs the channel flows.

* The reservation of the channel has been encroached upon and cultivated.

FC 9

* This channel is virtually an extension of the LB Canal.

* Existence of weeds and siltation along the channel bed obstructs the channel flow.

* The reservation of the channel has been encroached upon and cultivated.

* The existing level of the road is significantly lower than the channel bed.

* There is a chance of serious farmer conflict due to illegal tapping of irrigation water from the tail end (Lot no.111) by landholders under Katupothawewa.

In general, there are no established farm crossings and hence the movement of farm equipment during the working seasons causes severe damage to the channels. Also, there is no control or regulating structures for farm turnouts and no measuring devises exist in any FC or in any other channel in the scheme.

The Drainage System

No serious drainage problems exist in the system because of the favorable topography of the area. The drainage water is being effectively reused by constructing two anicuts feeding about 34 acres (under the same command area).

Conclusion

To improve the technical performance of the scheme the Appraisal Team recommends the following actions for rehabilitation and modernization.

The Bund

* Provide a culvert crossing with a silt trap and diverting drainage water to the tank.
* Provide Rip Rap according to Department specifications.
* Clear shrub jungle in the D/S and U/S sections of the bund.
* Assess stability of the bund under the existing slope.

The LB Sluice

* Provide a hand rail to the path way and top of the sluice structure.
* Provide concrete slabs to the sluice.
* Provide a lifting rod for the gate.
* Provide an approach channel on the tank bed to the sluice intake.

The RB Sluice

* Provide a hand rail to the path way and top of the sluice structure.
* Provide concrete slabs to the sluice.

The Spills

Spill No. 1

* Provide lifting gates.
* Provide a foot bridge.
* Remove settled earth.

Spill No. 2

* Provide a foot bridge.

Spill No. 3

* Provide a foot bridge.
* Construct a concrete membrane on the U/S.
* Construct a link road between the RB and the LB of the scheme.
* Provide a causeway across the spill tail channel (i.e., Siyambalangamuwa Oya).

The LB Canal and FCs

* Desilt and remove vegetation along each channel periodically, at least twice every season.
* Construct a channel bund road to the appropriate level and the bund along the LB of the Main Canal wherever the pools exist.
* Construct a channel bund road to the appropriate level along FC 2,5,7 and 9.
* Provide a 1-ft diameter pipe and a gate to replace the existing 9" pipe in the turnout to FC7 to ease the flow.
* Strictly restore the channel reservations to the specifications in every FC and LB Canal.

* Provide control arrangements for the existing direct farm turnouts from the Main Canal.

* Establish suitable measuring devices at strategic locations.

* Construct farm crossings wherever necessary along FC 2,5,7, and 9.

* Replace every field turnout with gated ones and with necessary controlling arrangements.

* Construct drop structures wherever necessary and carry out necessary repairs to existing structures.

* Replace the pipe in the culvert at the turnout to FC8 with a suitable pipe size.

* At the tail end of FC9, the farmer representatives of the respective parties should settle the dispute in unauthorized tapping of water by Katupathwewa landholders.

The Drainage System

* Anicut no: 2.

* Provide either a clear overflow spill on the LB side of the anicut or increase the number of gates and provide a pipe outlet with regulating arrangements.

* Strongly recommend further investigation on this matter.

Increasing Water Availability

* Recommend study on the possibilities of augmenting inflow to the reservoir by diverting water from the Mahaweli Scheme at Dewahuwa. The farmers expressed strong opinion in favor of this and indicated that during the mid-seventies the then government conducted an aerial survey to study its feasibility. But there had been no further progress.

* Recommend pilot study on agro-wells to augment surface water.

* Adapt and practice improved water management for efficient and effective water use.

* Gauge and calibrate all control points to facilitate better water management by the farmers.

Chapter III

Rapid Appraisal of the Mahasiyambalangamuwa Irrigation System for Rehabilitation and Modernization and Assessing Research Needs for Agricultural Production

Team Members

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It has been mentioned earlier that the scheme started operations in 1956. The original command area was 359 acres comprising 223 acres in the LB and 136 acres in the RB. The alienation of land was 2.0 acres of rice and 2.0 acres of high land. A house for each settler was also constructed by the government prior to settlement. Further expansion of the command area to 405 acres has affected the scheme by further stressing the available water. The management problems have been compounded by the location of the LB Canal in Kurunegala District and the RB Canal falling within the Anuradhapura Administrative District. The predominant crop is rice. It was also observed from past records that only 5 yala seasons have been partly cultivated after the commencement of the scheme. Even in the yala a major portion of the land was devoted to rice cultivation and only a few acres to other field crops (OFCs)–chili in this case–were grown.

The principal reason that has contributed to this situation is the insufficiency of water during yala. The farmers are of very strong opinion that insufficiency has resulted due to siltation of the tank.

Objectives

The objectives of the appraisal were:

* To document the existing crop production practices in the LB area of the Mahasiyambalangamuwa Tank.

* To recommend measures for increasing productivity with available resources.

* To propose suitable off-farm activities to increase farmers income.

Farm Management Practices

Soil Type and Land Use

Soils in the command area are predominantly LHG and RBE type (LHG: 45%; RBE: 55%). The principal crop is rice, both in maha and yala seasons though some OFCs are grown in the yala season. The cropping intensity of the scheme is about 100 percent.

Traces of acidity were observed in the lots 15,19,36,57 and 58 of the Blocking Out Plan. This has caused stunting of the crops. The high land lots near the tank are representative of the hilly terrain. The soil type is sandy mixed with gravel. It was observed that flat sections of these lands were cultivated with perennial crops. These were planted during the early years of the commencement of the scheme. The farmers said that there was adequate rainfall and that soil was also fertile. They are of the opinion that no field crop could survive the drought period that extends from June to August. The water table in the area was 20 ft. below ground level.

Nearly 70 percent of the soil of the homestead area is sandy loam mixed with some clay and the other 30 percent is sandy soil mixed with gravel.

The income generated from the homesteads is very low.

Crop Cultivation

The farmers prefer rice to OFC due to (1) high cost of cultivation for OFC, (2) scarcity of water and labor, and (3) inadequacy of extension services. Commonly used varieties of rice are as follows:

Variety	Growth period (months)
BG 34 - 6	3 - 3 1/2
BG 34 - 8	- do -
BG 350	- do-
Nadera 278	4 - 4 1/2

The Department of Agriculture has recommended the high-yielding 4 - 4 1/2 month variety for maha but the farmers prefer the 3 - 3 1/2 month variety due to the scarcity of irrigation water and non-availability of seed paddy.

Land Preparation

The 1st and 2nd plowing are usually done using machinery (4-wheel and 2-wheel tractors). Land leveling is carried out using buffaloes. The cost of land preparation is as follows:

a. By machinery and buffalo - Rs. 1,500 per acre.
b. Labor inputs (6 days) - Rs. 750 per acre.
Total - Rs. 2,250 per acre.

The average time taken for land preparation is about a month.

At present, farmers do not use rain water effectively for land preparation. Operations commence only after the tank reaches the 3.66 meter (12 ft) depth. This practice has become quite common due to the uncertainly of rainfall.

The duty of water, calculated on the basis of information obtained from the farmers, for rice, was 3,200 mm and 4,120 mm, respectively for maha (1993-1994) and yala 1994 which are quite high. The figures are rough estimates only.

Crop Establishment

1. Transplanting - 5 percent.
2. Broadcasting - 95 percent.

The reason for low transplanting is the nonavailability of labor and high capital cost.

Cost

Cost of broadcasting (including fine leveling) - Rs. 400.00 per acre.
Cost of transplanting - Rs.1,000.00 per acre.

Seed rate (for broadcasting) is around 80 kg/acre. The recommended seed rate is 45 kg/acre. However, nearly 100 percent excess is used due to the nonavailability of recommended varieties from the government and the low degree of germination of locally supplied seed paddy. Costs of seed paddy for recommended and local varieties are Rs. 12.00 and Rs.9.00 per kg, respectively.

Intercultural Practices

Fertilizer Application

Type	Recommended (kg/hectare (ha))	Actual application (kg/ha)
Nitrogen-Phosphorus-Potash (NPP)	150	125
Top Dressing Mixture (TDM)	300	162

The principal reason for the use of lower-than-recommended rate has been reported as high cost of fertilizer and lack of extension services.

In the lots affected by acidity, farmers use salt at the rate of 125 kg/ha and some 250 kg of lime with a view of overcoming this problem. This is applied one month before land preparation. It was, however, reported that there was no significant reduction in acidity.

Weeding

Types. The most common weed types are:

1. *Thunessa.*
2. *Kudamatta.*
3. *Bajiri.*

Method of Control. The principal method of weed control in the rice fields is the combination of weedicide application and maintaining standing water.

1. Standing water - practiced by 90 percent.
2. Manual weeding - - do - 10 percent.
3. Weedicide - - do - 90 percent.
4. Traditional tools - - do - 10 percent.

The selection of the types of weedicide is decided upon by the farmers themselves and the shop owners. Lack of extension services has contributed most to this state of affairs.

Usage of Weedicide

Types	Type of weed	Quantity used (%)	Price per bottle (Rs.)
Whip Super	Bajiri	20	1,200.00
MCPA 40 - 60	Wide leaves	64	85.00

Labor input: 1 man-day per acre.

Pest Control

Types of common pests:

1. Brown plant hopper (BPH).
2. Stemborer.
3. Thrips.

Method of control - Principal method of control is the application of chemicals.

Types of chemicals used - Basudeen 50 percent EC.

Almost all the farmers used these chemicals.

Irrigation Practices

Method

1. Continuous supply for land preparation.
2. Rotational issue at 6 day intervals is practiced afterwards.

The cropping calendar and irrigation schedule are prepared by the Project Manager and is ratified at the *prekanna* meeting and subsequently at the kanna meeting. It was reported that 90 percent of the farmers adhered to these decisions.

Labor Used

The system is operated by 7 farmers who are committee members of the FO. These farmers are compensated by the payment of "salaries" at the rate of 22 kg of unhusked rice per ha. The input of labor for water delivery is excessive and should be revised. The cost of operation of the system was estimated at Rs. 26,448.00 (4,408 kg unhusked rice raised as salaries at the rate of Rs. 6 per kg) per season.

The tail end of FC 2 utilized the drainage flow by two pickup anicuts situated in the Siyambalangamuwa Weir which irrigates approximately 34 acres. The farmers also pointed out that there is visible flow in the drainage channel even one month after closing of the main sluice at the end of the maha season.

Harvesting, Threshing and Transportation

Harvesting is done manually. It takes about 8 to 12 man-days to harvest 1 acre of rice and the cost ranges from Rs. 1,000.00 to Rs. 1,200.00.

Threshing and cleaning are done by a man-machine combination. Most of the threshing is done by machine while cleaning is done manually. The per acre cost of this combined operation is around Rs. 600, Rs. 400 for machine and Rs. 200 for labor.

The cost of transportation is around Rs. 500.00.

Cost and Return

The average production cost for rice is around Rs. 7,000.00 per acre. The return for a 1.20 ton/acre of unhusked rice (estimated average yield of unhusked rice in the scheme) is about Rs. 8,500.00.

Conclusions and Recommendations

It is evident that net return from rice is very marginal which may go down even further as the cost of production keeps increasing. The team, therefore makes the following recommendations to increase returns from irrigated agriculture:

* Use rainfall more effectively in both maha and yala seasons to reduce pressure on the limited reservoir storage.

* In yala season, replace the limited rice cultivation by OFCs especially chili and onion in well- drained soils.

* Make efforts to increase cropping intensity (presently 100%) by exploring the potential for using agro-wells to supplement surface water.

* Ensure timely delivery of inputs including credit by the relevant agencies to enable the farmers to plant their crops in time.

* Improve on-farm water management to reduce the very high water duty of rice.

* To increase income encourage the farmers to initiate homestead vegetable gardening as well as agro-forestry.

* Substantially strengthen the extension service in the scheme area especially for OFC cultivation.

Chapter IV

Rapid Appraisal of Irrigation Systems for Rehabilitation and Modernization: Socioeconomic and Institutional Aspects

Team Members

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Objectives

The main objectives were to:

* Appraise the L-B area of Mahasiyambalangamuwa Irrigation System with respect to social and institutional aspects.

* Recommend ways for further strengthening of the FO.

* Propose ways to increase productivity and income of farmers.

* Develop recommendations for upgrading the standard of living of the population.

In evaluating the farmer organization the team did the following:

** Documented the socioeconomic status of the population.

** Examined the effectiveness of the FO and its capacity in contributing to various aspects in the socioeconomic activities of the farmers in the scheme.

Names and Designations of the Farmer Participants

The following persons were interviewed both individually and in groups to obtain the required information:

N.K. Wimal Ranasinghe	-	Secretary of the FO
R.M.U. Herath	-	Vice President
R.V. Menike	-	Farmer
M.A. Heen Banda	-	Farmer
R.M. Punchi Banda	-	Farmer
E.M. Dingiri Banda	-	Farmer
R.M. Jayasiri Herath	-	Exective Secretary and Auditor
H.M. Ratnayake	-	Secretary of Maranadara Society
M.B. Randeniya	-	Executive Committee Member

Two teachers from the local primary school

Data on Social and Economic Characteristics of the Population

Population

No of households	= 225
Total population	= 1,060
Persons below 18 years of age	= 500
Persons above 18 years of age	= 560
Female members	= 525
Male members	= 535
School attendance	= 95
No. of graduates	= 05
Average no. of students passing GCE (AL) Examination every year	= 02
Average no. of students passing GCE (OL) Examination every year	= 20

Settlement

Age of the settlement = 39 years (1955 to 1994).

The settlers came from the Ibbagamuwa AssistanT Government Agent Division.

Social Divisions

Ethnic groups	=	100 percent Sinhala Buddhist
Caste groups	=	75 percent Govigama and the rest from different castes
Political groups	=	UNP and SLFP

Socioeconomic Indicators

Land Tenure

a. Arrangements

Allottee	=	113
Owner-operators	=	80
Lessees	=	25

b. Size of Holding

Biggest holding	=	4 acres
Smallest holding	=	1.75 acres

Quality of Life

a. Income level

Less than Rs. 700 per month	=	86 families
Between Rs. 700 and 1,500 per month	=	99 families
Above Rs. 1,500 per month	=	35 families

b. Housing quality

Number of families who have more than two rooms	=	140
Roof: tiles or sheets	=	156
cadjan and tin	=	60
Floor: cement	=	165
Wall: bricks	=	92
Toilet available	=	10
Electricity	=	None
Source of drinking water	=	3 tubewells and 08 open dug wells
Source of bathing water	=	The tank and the well

Other Occupations

Government services	=	25
Armed forces	=	35
Garment factory	=	05
Working abroad	=	05
Masons	=	20
Carpenters	=	25

Organization and Management of the Irrigation System

Current Status of the Farmer Organization

The Mahasiyambalangamuwa LB FO was formed in April, 1989 and was registered under the Agrarian Services Act. The objectives of forming the FO were as follows:

a. To take over the responsibility of looking after the equal distribution of water.
b. To resolve conflicts among the farmers.
c. To promote knowledge and attitude among the farmers.
d. To create harmony between officials and the farmers.
e. To obtain the necessary inputs and marketing facilities from the supporting agencies.
f. To participate in the operation and maintenance of the irrigation system.

The present FO, according to the farmers, is carrying out its functions quite well as far as water distribution is concerned. The FO has also completed a construction contract amounting to Rs. 100,000.00 in rehabilitating the scheme which is being implemented under the North Western Province Water Resources Development Project with financial assistance from the ADB. It has also planned to take a second contract. It was reported by the farmers that the contract was obtained and executed by the office bearers of the organization in the name of the FO. The office bearers confirmed this but indicated that they were depositing 5 percent of the profit in the FO account. This, however could not be confirmed. The members complained that rehabilitation contracts were never discussed in the FO meetings and the majority of the members were extremely dissatisfied with the lack of transparency in this regard.

The FO's income comes principally from membership fees which include an entrance fee of Rs. 10.00 and the application form fees of Rs. 3.00 per person. In addition, a monthly fee of Rs. 1.00 is collected from each member. Presently there are 77 members including 7 elected office bearers in the FO. Elected members are eligible to serve for a two-year term. Those members who do not attend three consecutive meetings lose their membership. There is a provision for the members to take action against the office bearers whenever they find the behavior of the office bearers to be detrimental to the FO activities.

Being a member of the FO the farmer has the advantage of obtaining agricultural inputs at a lower price than that prevailing in the market. He can also find work as a wage laborer in any contract works that the FO undertakes.

Three types of meetings are usually conducted by the FO: general meetings, kanna meetings and committee meetings.

According to the constitution of the FO, general meetings are to be held once a month, committee meetings whenever the need arises and pre-kanna and kanna meetings before the season commences. These meetings however, are not held regularly and even when held the attendance is very poor. Asked about the reasons it was revealed that the meetings are not properly organized and the members are not informed in time to enable them to attend the meetings.

Although the Irrigation Department, the Department of Agrarian Service, the Department of Agriculture, the Land Commissioner's Department, the Divisional Secretariat, banks, crop insurance departments, etc., are involved as supporting agencies to deliver their respective services in carrying out successful farming yet the farmers felt that the contribution from these agencies was far from that expected though they conceded that some agencies were better than others.

The FO is also taking responsibilities for seasonal planning. As far as the maha season is concerned, as there is enough water, the kanna meeting decisions involve the preparation of the water distribution plan by the management committee. The committee comprises the Project Manager and committee members of the LB and RB FOs. Such a plan is usually implemented without major objections. In the yala season, due to shortage of water, instead of trying to irrigate the entire area farmers usually go for *bethma*.

Depending on the availability of water, the type of crops and the land types, water scheduling is usually decided at the kanna meetings by the farmers with the assistance of the officers concerned. Operational plans are prepared by the water management committee at the kanna meeting and a copy is sent to the Divisional Secretary. Once the plan is drawn, the responsibility for the areawise implementation is assigned to the respective committee members.

The main canal maintenance program is planned and implemented by the Irrigation Department whereas the field channel maintenance schedule is decided upon and carried out by the farmers themselves.

Support agencies play a very important role in successful irrigated agriculture. Farmers, however, indicated that due to the strict rules and regulations in those agencies they find it difficult to obtain credit, seed paddy, fertilizer, pesticides, weedicides and in the case of a crop failure, insurance. Again, according to the farmers, some agencies provide inputs only if they see that the crops are insured by the farmers. Due to the unreliable supply of water the farmers are often reluctant to obtain credit from the bank because of the fear that in case of a crop failure they will not be able to pay back the loan. The Department of Agrarian Services call for requests to supply their input, two months prior to the start of the season. This is somewhat inconvenient to the farmers as they are not in a position to decide, two months in advance, about the types of crops and the extents they would grow. Such experiences as well as the loss of crops in some seasons have eroded the confidence of the farmers in the government agencies. On one occasion farmers were not given compensation even though they had insured their crops and the reasons were not clearly explained to them. Such things breed suspicion and build gaps between the farmers and the agencies.

Most farmers complained about the poor extension services provided by the Department of Agriculture in selecting crops as well as technologies for their successful cultivation. They complained that the extension workers seldom visit them but whenever they do their efforts are uncoordinated and out of tune with the requirements of the farmers.

Due to lack of adequate support (according to farmers) from the agencies they turn to two *mudalalies* of the village who provide credit facilities, tractor, fertilizer and other necessary agricultural inputs. After the harvest the mudalalies recover their money from the farmers who are obliged to sell the crops at a price fixed by the mudalalies themselves. Prices fixed are usually 25 percent to 35 percent less than those prevailing in the market at the time. Though the mudalalies recover a very high service charge the farmers appeared to be quite satisfied with the arrangements even though they continue to remain at the subsistence level.

The farmers are of the opinion that though there have been changes in the management of the scheme, including the establishment of the FO, there has been no significant change in their income and quality of life. Some indicated that their real income from agriculture has, in fact, gone down due to the withdrawal of the subsidy from agricultural inputs and disproportionate increase in the cost of production.

On the basis of the above discussion, the team makes the following recommendations to improve management and performance of the scheme, obtaining higher production and income, mobilizing resources for the FO:

1. Efforts should be made to augment water resources of the scheme to ensure adequacy, as far as possible in both the seasons. Farmers opined that this can be done by diverting and transporting water from the nearest Mahaweli System. A technical and financial feasibility study should, however, precede to confirm this contention. Another alternative is to explore the possibility of using agro-wells to supplement reservoir water.

2. The FO has to be strengthened for managerial capabilities. Some of the suggestions are as follows:

   a. The objectives and importance of the FO should be very clearly explained to the members, preferably through an intensive awareness program. Such programs may include educating the members on the constitution of the FO.

   b. An effective campaign should be launched to enroll nonmembers to the FO by explaining the importance and the benefit of being a member.

   c. To ensure higher attendance, meetings should be properly organized by notifying the farmers well in advance. More transparency should be practiced in discussing various issues including finance. For example, most of the farmers indicated that the committee members have taken rehabilitation contracts without discussing the details with members which caused considerable resentment among them.

   d. An important factor for poor attendance in the meetings, according to the farmers is the casual approach adopted by the officers from the line agencies towards FOs. Project Managers and the office bearers should make special effort to obtain cooperation from them. Officials should also recognize that it is obligatory on their part to provide the best possible cooperation.

e. The present office bearers must show more concern towards the common and declared objectives rather than seeking to satisfy their own needs through the FO, for example, taking contracts on their own in the name of the FO.

f. To increase the income of the FO, a mutually agreed percent of the "salaris" collected by the committee members for distributing water may be credited to the FO fund.

g. The office bearers must be well trained in all activities related to the management of the FO including financial management. For example, it was informed that presently they have Rs. 4,982.00 in the bank account but proper books are not maintained; no auditing is done and most importantly no transparency is maintained on disbursements.

3. The supporting agencies should introduce some flexibility in their terms and conditions so that the farmers' needs can be adequately and timely addressed.

4. It appears that there are serious personnel constraints in the extension service. This has made the extension service totally ineffective though this is the most organized channel to reach the farmers. The *Krushi Viyapthi Sewaka* (Agriculture Extention Worker) and Agricultural Instructor should work effectively to help the farmers and regain their confidence.

5. Efforts should be made to provide timely compensation for insured crops when crops fail. At the same time, ensuring availability of credit and other inputs in time will have positive effect on the farmers.

6. There are only about 80 Janasaviya recipients in the scheme whereas almost 80 percent of the farmers falls in that category. If the selection criteria are adjusted to accommodate the farmers it will have a positive impact on the FO activities.

7. All the contracts under rehabilitation should be given to the FO to help raise its financial status as well as to improve the farmers' skill in construction and maintenance management.

8. The FO has to find some other sources of revenue (like bulk procurement and sale of fertilizer) to raise funds.

The above measures are expected to increase the organizational strength and management capability of the FO which in turn will result in improved management of the scheme leading to increased crop production and income. This will offset declining standards of living which have resulted from the fragmentation of holdings as well as from the fragmentation of the original 113 allotments to 173.