Appendix B

Record of Training on Irrigation Scheme Formulation for DADP (VS-2)

Chapter 3

Record of Training on Irrigation Scheme Formulation for DADP in Mkuranga District

Session VII

Kickoff Seminar
in Mkuranga District

Activities Carried Out:

Before starting the process shown in the guidelines, a Kickoff Seminar was held at Mkuranga District. Members of the DPDT, ZRC and JICA Study Team were introduced each other, and overall schedule was agreed among them.

Then, status of the latest prepared DADP and constraints in preparing it were confirmed through the interview. Technical and educational background of the DPDT and ZRC members was confirmed by questionnaire survey (see page B-4-18 to 21 for the result) to understand the situation before starting the training.. Before closing the meeting, schedule of the Step-2 activity was decided.

List of Records:

1. Outline of Kickoff Seminar
2. Attendance List
3. Summary Result of the Interview Survey
4. Record of Discussion
5. Findings
6. Photos

1. Outline of Kickoff Seminar

Date: May 21, 2004

Place: Mkuranga District Agriculture Office

Chairperson: Mr. Simukanga (DITS)

Facilitator: Mr. H. Shimazaki (Team Leader)
Mr. H. Ohnuma (Agriculture/Land Use)
Mr. J. Tsurui (Irrigation)
Ms. W. Yamamoto (Irrigation)

Material: Draft Guidelines for Irrigation Scheme Formulation for DADP

Program No.	Time	Program Title	Facilitator
1	10:00-10:05	Opening Address	Mr. Simukanga
2	10:05-10:10	Introduction of members	Each Group
3	10:10-10:20	Objectives and Overall Schedule	Mr. Shimazaki
4	10:20-10:40	Explanation of the Guideline 1 Introduction 2 Application Procedure of Irrigation Scheme Development	Mr. Shimazaki
5	10:40-11:20	Questionnaire on Organizational Experience (Status of the latest DADP)	Mr. Tsurui
6	11:20-11:40	Questionnaire on Personal Experience	Ms. Yamamoto
7	11:40-11:50	Formation of the Technical Teams	Mr. Tsurui
8	11:50-12:20	Preparation of Site Visit Schedule	Mr. Ohnuma
9	12:20-12:25	District Policy on Irrigation Development	Mr. Mdshy (DALDO Mkuranga)
10	12:25-12:30	Closing Address	Mr. Ishengoma (Zonal Irrigation Unit)

2. Attendance List

No.	Name	Organization
1	Ms. Daniel P. Moshy	Mkuranga District Office (DALDO)
2	Mr. Joseph Luaga	Mkuranga District Office
3	Mr. Yahya Mtongori	Mkuranga District Office
4	Mr. Constantine P. Mboya	Mkuranga District Office
5	Mr. Jackson. A. R. Sange	Mkuranga District Office
6	Mr. Donald S. Ndesaiya	Mkuranga District Office
7	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit

8	Mr. Lait A.Simukanga	DITS, MAFS
9	Mr. Hitoshi Shimazaki	JICA Study Team
10	Mr. Hiroyasu Ohnuma	JICA Study Team
11	Mr. Jun Tsurui	JICA Study Team
12	Ms. Wakana Yamamoto	JICA Study Team

3. Summary of Result of the Interview Survey

- Status of the Latest DADP -

Question	Answer
How many irrigation schemes were proposed in the latest DADP?	The District office selected cashew nuts project and did not propose irrigation development in the last DADP.
Why did you choose?	The District office did not propose irrigation development due to limitation of the budget and absence of irrigation technician. However, it was recognized by the District office that the irrigation development is one of the most important issues for the District.

4. Record of Discussion

The following matters were discussed at the meeting.

(1) It was confirmed that the DPDT was organized by following experts of Mkuranga District Office.

District Project Development Team (DPDT)	
	
Name: Mr.Joseph Luaga Position: SMS for Information	Name: Mr.Yahya Mtongori Position: SMS for Irrigation
	
Name: Mr.Constantine P. Mboya Position: Extension Officer	Name:Mr. Jackson. A. R. Sange Position: SMS for Food and Nutrition

	
Name:Mr. Donald S. Ndesaiya Position: SMS for Crop Production	Note: SMS; Subject Matter Specialist

(2) It was agreed that the member of ZRC was organized by following experts of Morogoro Zonal Irrigation Unit (ZIU)

Zonal Review Committee (ZRC)	
	
Name: Mr.Rodgers Ishengoma Position: Senior Executive Engineer	Name: Ms.Eliamani Nnyiti Position: Senior Agriculture Officer

(3) It was decided that the quick site inspection of all irrigation scheme (Step-2) was going to be conducted in May 24 – May 26.

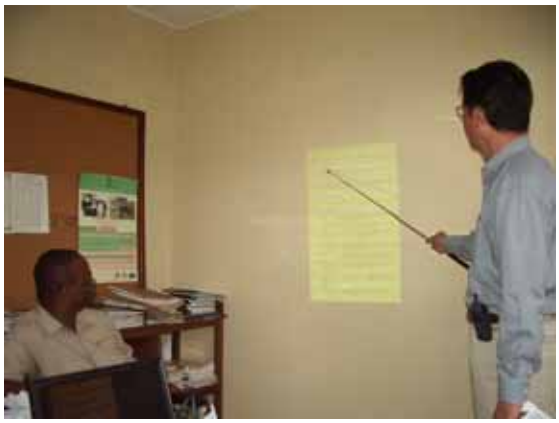
(4) It was agreed by all of the participants that irrigation development was one of the most important issues in the District and the draft guidelines will be used for the irrigation scheme formulation in this year in Mkuranga District. However, it was requested by the District office that the JICA Study Team should consider time, financial, and staffing constraints of the District office on irrigation planning, since the District office was responsible also for other sub-sector development.

5. Findings

The following facts were found at the meeting.

1. It was found that allowable time and manpower for irrigation scheme formulation in DADP stage was very limited. It was agreed with participants of the meeting that the volume and contents of the guidelines would be revised through the verification study activities considering limited time and manpower of the DPDT.

6. Photos

	
The JICA Study Team is explaining the irrigation scheme formulation procedure	Preparation of the quick site inspection schedule

Session VIII

Training on Scheme Formulation Step-2 in Mkuranga District

Activities Carried Out:

In this session, training on Step-2: Quick Site Inspection of All Irrigation Schemes was carried. The Mkuranga DPDT visited all the listed irrigation schemes (8 schemes) in the District and confirmed the site condition. During the site inspection, the DPDT tried to collect necessary data for the Step-3: Screening of All Irrigation Schemes. After the site inspection, inconvenient parts of the survey sheet were rectified. Finalized survey sheet with actual data for 20 schemes are presented in page B-2-30 to 53.

List of Records:

1. Outline of Training on Step-2
2. Attendance List
3. Findings
4. Summary Result of the Questionnaire
5. Result of Quick Site Inspection

1. Outline of Training on Step-2

Date: May 24 – May 26, 2004
Place: Irrigation scheme sites
Facilitator: Mr. H. Ohnuma (Agriculture/Land Use)
Material: Draft Guidelines for Irrigation Scheme Formulation for DADP

Program No.	Date	Program Title	Facilitator
1	May 24	Step-2: Quick Site Inspection for All Irrigation Schemes Site inspection of following schemes. 1) Msambanyamani scheme 2) Nyamaronda basin 3) Ngwale basin (Nyamato)	Mr. Ohnuma
2	May 25	Step-2: Quick Site Inspection for All Irrigation Schemes Site inspection of following schemes. 1) Kisele basin 2) Mbezi basin (Kiparaganda) 3) Mbezi basin (Msufini/Kidete)	Mr. Ohnuma
3	May 26	Step-2: Quick Site Inspection for All Irrigation Schemes Site inspection of following schemes. 1) Yavayava scheme 2) Choga basin	Mr. Ohnuma

2. Attendance List

May 24

No.	Name	Organization
1	Ms. Joseph Luaga	Mkuranga District Office
2	Mr. Yahya Mtongori	Mkuranga District Office
3	Mr. Constantine P. Mboya	Mkuranga District Office
4	Mr. Jackson. A. R. Sange	Mkuranga District Office
5	Mr. Donald S. Ndesaiya	Mkuranga District Office
6	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
7	Mr. Hiroyasu Ohnuma	JICA Study Team

May 25

No.	Name	Organization
1	Mr. Joseph Luaga	Mkuranga District Office
2	Mr. Yahya Mtongori	Mkuranga District Office
3	Mr. Constantine P. Mboya	Mkuranga District Office
4	Mr. Jackson. A. R. Sange	Mkuranga District Office
5	Mr. Donald S. Ndesaiya	Mkuranga District Office
6	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
7	Ms. Rhoda Kweka	DITS, MAFS
8	Mr. Hiroyasu Ohnuma	JICA Study Team
9	Ms. Wakana Yamamoto	JICA Study Team

May 26

No.	Name	Organization
1	Mr. Joseph Luaga	Mkuranga District Office
2	Mr. Yahya Mtongori	Mkuranga District Office
3	Mr. Constantine P. Mboya	Mkuranga District Office
4	Mr. Jackson. A. R. Sange	Mkuranga District Office
5	Mr. Donald S. Ndesaiya	Mkuranga District Office
6	Mr. Daniel Moshy	Mkuranga District Office (DALDO)
7	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
8	Mr. Hiroyasu Ohnuma	JICA Study Team

3. Findings

The following facts were found in the process of activity.

(1) After the quick site inspection, rectification of the draft guidelines was requested by the DPDT. The following is the list of requests.

- The terminology of the scheme should be redefined properly, because the potential area for irrigation development is located in most cases basin-wise rather than scheme-wise in the District.
- The kind of current irrigation system (e.g. traditional and modern) should also be redefined properly and “No Irrigation” should be included as one of the optional answers.
- More than one village can be involved in a scheme, since the scheme consists of many villages in the District.
- Since farmers’ association can be considered as potential association for the future irrigation development, an inquiry about farmers’ association should be made.
- An inquiry about irrigators’ association for new development scheme should be elaborated in order to understand the farmers’ eagerness to the contribution.
- Currently cultivated area should be inquired together with the potential area in order to understand the present condition of agriculture.
- An inquiry about market condition should be separated into “before irrigation development”

and “after”.

(2) It was agreed that the past record of farmers’ visits and direct appeal to the District Office or other indicators would be examined since farmers’ willingness for the irrigation development could not be judged through the survey sheets for the quick site inspection.

(3) It was also agreed to include an inquiry about on-going support on irrigation development by the government or some other organization in order to judge the necessity of further support under DADP.

(4) There is no irrigated area in whole Mkuranga District at present. It means that the concept of irrigation development in the District is not matured enough as compared to other districts. It is therefore important to introduce an idea including (i) the type of irrigation, (ii) required natural condition for each type, (iii) necessary operation and maintenance to the villagers step by step.

(5) It was thus agreed by the DPDT that the function as a model might be one of the important criteria for the selection of irrigation scheme as a candidate scheme for DADP in Mkuranga District.

4. Summary of Result of the Questionnaire

Question	Answer	
Organization:	District office	6 persons
	Zonal Irrigation Unit	1 person
Subject contents:	“very satisfied”	3 persons
	“satisfied”	3 persons
	“regular”	1 person
Facilitator:	“very satisfied”	5 persons
	“satisfied”	2 persons
Facilities:	“very satisfied”	2 persons
	“satisfied”	5 persons
Timetable:	“very satisfied”	3 person
	“satisfied”	2 persons
	“regular”	2 persons
Material:	“very satisfied”	3 persons
	“satisfied”	4 persons
Did you get interested in the topics?	“got much interested”	6 persons
	“got interested”	1 person
Important topic -Keyword and why?-	“Site inspection of irrigation schemes.” (3 persons) -It gave me an opportunity to visit all the schemes and I understood the real situation on the ground. -Most farmers requested implementation of irrigation development. “Water harvesting " (2 persons) -Topography of the site prefers the rain water harvesting	

	system for irrigation purposes. -Most of our schemes need to learn how to do water harvesting from natural rain, rather than other methods. Other methods are very expensive. "Awareness of irrigation, water conservation and management" -Educating farmers to understand what is irrigation and the suitable irrigation for their development is important (ZIU staff). "Expectation of farmers" -Many studies have been made in villages without feedback and outcome.
Evaluation about your work	"much satisfactory" 3 persons "satisfactory" 4 persons
Suggestions and comments	"The program was well organized and in line with our needs at that time." (4 persons) "The check list needs to be improved so that all necessary issues to be covered and willingness of the farmers could be extracted." (2 persons) "The time schedule was tight." (2 persons)

Session IX

Training on Scheme Formulation Step-1, 3 and 4 in Mkuranga District

Activities Carried Out:

In this session, training on Step-1: Confirmation of Irrigation Development Priority of the District, Step-3: Screening of All Irrigation Schemes, and Step-4: Assessment and Endorsement by Zonal Irrigation Unit were carried out. At first, the DPDT examined surveyed schemes based on the information obtained through the quick site inspection (Step-2). And then, the DPDT set their own criteria considering the district development priority and local condition to carry out the screening. As a result, Yavayava and Kisele schemes were selected for further study. The DPDT submitted the screening report to the Morogoro ZRC and the committee endorsed their result.

List of Records:

1. Outline of Training on Steps-1, 3 and 4
2. Attendance List
3. Record of Discussion
4. Photos
5. Findings
6. Summary Result of the Questionnaire

1. Outline of Training on Steps-1, 3, and 4

Date: May 31, 2004
Place: Mkuranga District Agriculture Office
Facilitator: Mr. H. Ohnuma (Agriculture/Land Use)
Ms. W. Yamamoto (Irrigation)
Material: Draft Guidelines for Irrigation Scheme Formulation for DADP

Program No.	Time	Program Title	Facilitator
1	9:30-10:00	Explanation on revised survey sheet for quick site inspection	Mr. H. Ohnuma
2	10:00-10:30	Confirmation of the actual data collected during quick site inspection	
3	10:30-12:30	Step-1: Confirmation of Irrigation Development Priority of the District Step-3: Screening of All Irrigation Schemes	Mr. H. Ohnuma Ms. W. Yamamoto
4	12:30-13:00	Step-4: Assessment and Endorsement by Zonal Irrigation Unit	Mr. H. Ohnuma
5	13:00-13:30	Questionnaire on today's session	Ms. W. Yamamoto

2. Attendance List

No.	Name	Organization
1	Mr. Daniel P. Moshy	Mkuranga District Office (DALDO)
2	Mr. Joseph Luaga	Mkuranga District Office
3	Mr. Yahya Mtongori	Mkuranga District Office
4	Mr. Constantine P. Mboya	Mkuranga District Office
5	Mr. Jackson. A. R. Sange	Mkuranga District Office
6	Mr. Donald S. Ndesaiya	Mkuranga District Office
7	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
8	Ms. Rhoda Kweka	DITS, MAFS
9	Mr. Hiroyasu Ohnuma	JICA Study Team
10	Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed in the process of activity.

(1) It was agreed by the DPDT that the survey sheet for quick site inspection would be completed by filling newly added articles such as (i) Opinions of Village Officers and

Beneficiaries, (ii) History of the Scheme and (iii) Findings of the Inspection Team.

(2) The format of the survey sheet for quick site inspection was finalized by the JICA Study Team by taking all suggestions pointed out during quick site inspection activities in Mvomero and Mkuranga Districts into account.

(3) It was confirmed that the DPDT should prepare a report by compiling the results of screening work according to the procedure mentioned in the guideline and submit it to the ZRC along with the survey sheet of each scheme.

4. Findings

The following facts were found in the process of activity.

(1) It was observed that the screening procedure could effectively be carried out with three stages: the first stage to reject inappropriate schemes, the second stage to prioritize according to the potential of the scheme and the third stage to reconsider the particular circumstance.

(2) It was agreed by the participants to eliminate the scheme that was already receiving sufficient support in the beginning of the screening

(3) Selection of the screening criteria and the adjustment of score were found to be important process in the second stage. It was thus conceived that this process was useful not only for the screening of schemes but also for determining the district's development priorities.

(4) An active discussion by all the participants was observed in the selection of the screening criteria. It was understood that the reason for such active discussion was that the DPDT could express their opinions easily to set their own screening criteria and score. Without such clear purpose, it was difficult for the DPDT to express their opinion. Many participants thus involved in the discussion and it was considered that this process was carried out in fully participatory manner.

(5) It was found that one of the probable ways of selecting the suitable criteria was to focus on the questionnaire items and this can be carried out through the careful observation of the survey sheet.

(6) As it was already agreed during the quick site inspection activities, the function as a model was considered as one of the important criteria. The questionnaire items in the survey sheet were carefully examined from those viewpoints.

(7) It was confirmed that once appropriate criteria were selected and scoring was made properly, ranking of the schemes could be carried out rather mechanically by simply shifting the data from the survey sheet to the scoring table.

(8) It was observed that the scheme with highest score was not always necessary to be selected as a candidate scheme for DADP. Particular circumstance of each scheme such as existing support and environmental problems should carefully be compared among priority schemes

with higher score for the final decision in the process of the third stage.

5. Photos

	
Discussion about the criteria for scoring	Calculating the scores of proposed schemes

6. Summary Result of the Questionnaire

Question	Answer	
Organization:	District office	5 persons
	Zonal Irrigation Unit	1 person
Subject contents:	"very satisfied"	4 persons
	"satisfied"	2 persons
Facilitator:	"very satisfied"	5 persons
	"satisfied"	1 person
Facilities:	"very satisfied"	3 persons
	"satisfied"	3 persons
Timetable:	"very satisfied"	4 persons
	"satisfied"	2 persons
Material:	"very satisfied"	5 persons
Did you get interested in the topics?	"got much interested"	4 persons
	"got interested"	2 person
Important topic -Keyword and why?-	"Screening of irrigation schemes." (4 persons) -I learned the good way of selecting indicators for screening. -Applying this way, DPDT can make judgment on priority project among many, within short time and cheaply. "Review of quick site inspection and screening criteria." -The review of quick site inspection was important in order to add or delete necessary information which was required for screening purposed. Screening of the scheme for further study provided an opportunity to identify those schemes which have high potential and higher priority to the beneficiaries without external influence (ZIU staff).	

	"Water Harvesting " (2 persons) -I chosen this because most of our paddy growing area do not fit for gravity and pump method is expensive.
Evaluation about your work	"much satisfactory" 1 person "satisfactory" 5 persons
Suggestions and comments	"I suggest that beneficiaries or farmers should be included in the screening process for transparency. With farmers participation much of the information which maybe we didn't gather could be collected from them. In case of Mkuranga district, further comparison in gravity, rain water harvesting and pumping need to be made (ZIU staff)." "The training program was good because it used the criteria of indicator which was clear. It should be applied to all project selection." "It was well planned in relation to time available." "The training programmed was very scientific."

Session X

Training on Scheme Formulation Step-5 in Mkuranga District

Activities Carried Out:

In this session, training on Step-5: Field Survey for Selected Irrigation Schemes was carried out. The Mvkuranga DPDT conducted the field survey consists of 1) interview survey with stakeholders, 2) preparation of village resource map, 3) confirmation of site conditions, and 4) preparation of present situation map for the selected irrigation schemes that are Yavayava and Kisele schemes. The DPDT tried to carry out the survey based on the draft guidelines under the guidance of the JICA Study Team. After the field survey, rectification was made to cope with difficulties faced in the survey in the District

List of Records:

1. Outline of Training on Step-5
2. Attendance List
3. Record of Discussion
4. Photos
5. Findings
6. Summary Result of the Questionnaire

1. Outline of Training on Step-5

Date: June 7 – June 10, 2004
Place: Irrigation scheme sites
Facilitator: Mr. H. Ohnuma (Agriculture/Land Use)
Mr. J. Tsurui (Irrigation)
Ms. W. Yamamoto (Irrigation)
Material: Draft Guidelines for Irrigation Scheme Formulation for DADP

Program No.	Date/Time	Program Title	Facilitator
1-1	June 7-8	Step-5: Field Survey for Selected Irrigation Schemes for Yavayava scheme Confirmation of related information at the office (a) Meteorology (c) Agriculture (land cover, soil type etc.) (g) Environment (protected area)	Mr.Ohnuma Mr.Tsurui Ms.Yamamoto
1-2		Interview with the farmers at the village (c) Agriculture (crop production etc.) (f) Input supply and marketing (e) Irrigators Association (g) Environment	
1-3		Field measurement (c) Agriculture (soil)	
1-4		Confirmation of river conditions (b) Hydrology	
2-1	June 9-10	Step-5: Field Survey for Selected Irrigation Schemes for Kisele scheme Confirmation of related information at the office (a) Meteorology (c) Agriculture (land cover, soil type etc.) (g) Environment (protected area)	Mr.Ohnuma Mr.Tsurui Ms.Yamamoto
2-2		Interview with the farmers at the village (c) Agriculture (crop production etc.) (f) Input supply and marketing (e) Irrigators Association (g) Environment	
2-3		Field measurement (c) Agriculture (soil)	
2-4		Confirmation of river conditions (b) Hydrology	

2. Attendance List

June 7

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Constantine P. Mboya	Mkuranga District Office
3	Mr. Jackson. A. R. Sange	Mkuranga District Office
4	Mr. Donald S. Ndesaiya	Mkuranga District Office
5	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
6	Ms. Rhoda Kweka	DITS, MAFS
7	Mr. Hiroyasu Ohnuma	JICA Study Team
8	Mr. Jun Tsurui	JICA Study Team
9	Ms. Wakana Yamamoto	JICA Study Team

June 9

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Jackson. A. R. Sange	Mkuranga District Office
3	Mr. Donald S. Ndesaiya	Mkuranga District Office
4	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
5	Ms. Eliamani Nnyiti	Morogoro Zonal Irrigation Unit
6	Mr. Hiroyasu Ohnuma	JICA Study Team
7	Mr. Jun Tsurui	JICA Study Team
8	Ms. Wakana Yamamoto	JICA Study Team

June 10

No.	Name	Organization
1	Mr. Jackson. A. R. Sange	Mkuranga District Office
2	Mr. Donald S. Ndesaiya	Mkuranga District Office
3	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
4	Ms. Eliamani Nnyiti	Morogoro Zonal Irrigation Unit
5	Mr. Hiroyasu Ohnuma	JICA Study Team
6	Mr. Jun Tsurui	JICA Study Team

3. Record of Discussion

The following discussion was made in the process of the activity.

Confirmation of the past activities

(1) It was informed to the DPDT that the screening report was basically accepted by the ZRC and the copy of the screening report was submitted to DIMU of DITS for data input.

Activity for the Step-5

(2) It was confirmed that the DPDT would finalize the survey sheet of field survey by filling the results of the interview survey and the field observation activities for the both sites.

(3) It was agreed that the topographic survey of the Kisele scheme would be carried out for the area generally accepted by the villagers and specifically selected by the DPDT and the study team from the technical viewpoint within the upper stream of Mbezi River.

4. Findings

The following facts were found in the process of the activity.

(1) Regarding the field survey for the irrigation schemes selected, the Draft Guideline was explained by the subject such as meteorology, hydrology, agriculture and so on. However, such explanation was found to be inconvenient for the DPDT to understand the procedures on site. It was thus decided to restructure the explanation of the Guideline to be sequential order of the activity such as interview, map preparation, field inspection and so on.

(2) There were various activities to be carried out in the office prior to the field survey including the collection of the meteorological data and various map data through the Irrigation GIS in order to grasp the general conditions of the sites. It was therefore decided to extract all such activities as preparatory works and describe them at the beginning of the step for the field survey.

(3) Since the execution of the interview survey took extraordinary long time, it was decided to simplify the questionnaire by concentrating into focal points in the following manner;

- The questionnaires on agriculture and marketing were combined and the duplicated and other insignificant questions were deleted.
- The questionnaire on irrigators' associations was also simplified by deleting the insignificant questions.
- As for the questionnaire on the present environmental conditions, the question of which the villagers cannot answer was omitted.
- Various minor suggestions obtained from participants that can make villagers easier to answer were reflected on the questionnaires.

(4) Although the process for the preparation of the village resource map was not included in the original guideline, it was judged to be essential for the planning activities. This process was therefore executed using temporarily prepared guideline. The following were observed during the actual mapping activities.

- The locations to be drawn on the map should be indicated along with the proper sequence in the Guideline.
- It was experienced that the mapping took long time under the participation of many villagers. To make the map efficiently, it was recommended to prepare the map with small group and then prepared map should be presented to all participants for the confirmation.

(5) It was observed that the survey area for the planning needed to be delineated and agreed by the villagers, especially if the proposed development area was judged larger than the area that could be covered under the budget of DADP. Since this process was not included in the Draft Guidelines, it was decided to add such a process in the rectified guidelines.

(6) The measurements of soil properties and river discharge were carried out after the reaching

agreement on the survey area by visiting the farm plot and water resource point. The following were observed during the actual measurement activities.

- Regarding the measurement of soil properties, it was found that soil pH and soil fertility could not be measured due to expiry of the "Soil Test Kit" distributed by the extension department. The situation seemed similar in many other districts and it was decided to omit pH and fertility from the measurement items.
- As for the measurement of water resources, it was impossible to measure the river discharge due to the dry condition of the river. The periodical observation was indispensable for such kind of measurement and it was recommended to appoint some villagers to keep the record of river flow periodically.

(7) In order to make rough design of the irrigation facilities, the map showing the locations of proposed weir site, proposed development area and other necessary facilities such as flood protection dike and bridges on farm road became to be necessary. Such kind of present situation map could be prepared based on the village resource map drawn by the villagers. Since this process was not included in the Draft Guidelines, it was decided to add such a process in the rectified guidelines.

(8) The guidelines were prepared under the precondition that all the irrigation schemes were requested to be developed through the Opportunity and Obstacles to Development (O&OD) process. If it is observed that the scheme is not requested through O&OD process, it will be an important role of the district staff to guide the village and ward authority for executing this process. The DPDT members thus confirmed their role in the transition period from top-down to bottom-up system.

5. Photos

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Resource mapping by villagers under a guidance of district staff</td><td>Explanation for measurement of river discharge</td></tr>
</table>

	
Interview with the farmers at Kisele basin	Confirmation of soil texture of the potential area

6. Summary of Result of the Questionnaire

Question	Answer	
Organization:	District office	4 persons
	Zonal Irrigation Unit	2 persons
Subject contents:	"very satisfied"	5 persons
	"satisfied"	1 person
Facilitator:	"very satisfied"	5 persons
	"satisfied"	1 person
Facilities:	"very satisfied"	3 persons
	"satisfied"	3 persons
Timetable:	"very satisfied"	2 persons
	"satisfied"	3 persons
	"regular"	1 person
Material:	"very satisfied"	1 person
	"satisfied"	5 persons
Did you get interested in the topics?	"got much interested"	6 persons
Important topic -Keyword and why?-		
Confirmation of related information at the office (meteorology, agriculture, environment)	"Meteorology." (2 persons) -I could realize the importance of meteorology data in planning irrigation schemes. "All " -All the information confirmed at the office was very important in relation to what we did at the field level. The information was also important for the irrigation scheme development (ZIU staff).	
Evaluation about your work	"much satisfactory"	2 persons
	"satisfactory"	4 persons
Interview with the farmers at the village (agriculture, input supply and marketing, irrigators' association, environment)	"Irrigation association, information, awareness." -During interview, I found that farmers' awareness of problems and success was governed by irrigators association.	

	"Major/Main problems in Agriculture" (2 persons) -It included farmers' needs which were important and necessary. "Farmers interest in responding to interviews" -Farmers could be very resourceful in giving information which can help our work. "All Topics " -The interview made to the farmers gave us a general picture on what the farmers are doing and it could guide us to get relevant information regarding the irrigation scheme formulation (ZIU staff).
Evaluation about your work	"much satisfactory" 2 persons "satisfactory" 4 persons
Village resource mapping (preparatory work for preparing a scheme map)	"Identification of rivers and ponds." -To identify river and ponds available in the site is key information since water is a vital important aspect in irrigation planning. "Scheme mapping." -The mapping of scheme carried out by farmers is very helpful since it lead us to know the places for water, resource and other important things necessary during scheme development. Also helps to direct and guide the surveyor to establish prints for survey (ZIU staff). -It can help to get general knowledge of the village within short time. "Locating resources properly." -I witnessed argument going on between farmers (ZIU staff).
Evaluation about your work	"much satisfactory" 3 persons "satisfactory" 3 persons
Confirmation of field condition (agriculture i.e. soil)	"Soil Texture." -Texture of soil is an important aspect in irrigation in order to know how much moisture could be retained in the soil. "Accessibility to chosen area " -We could not reach the selected area for development because of poor accessibility. The soil texture was determined from the site nearby (ZIU staff).
Evaluation about your work	"much satisfactory" 3 persons "satisfactory" 3 persons
Confirmation of river condition (hydrology)	"River discharge and water depth." -Measurement of depth of water is important since the flow depth is used to estimate the river discharge. "Estimate amount of water at the source." - I did not know the relationship between amount of water at the river and water to be irrigated. "Water flow could not be measured." -There was no water flow in the river. River flow estimation was done assuming some condition based on the villagers information (ZIU staff).

Evaluation about your work	"much satisfactory" 3 persons "satisfactory" 3 persons
Suggestions and comments	"The training is well organized but more field work is required to get more experience in planning." "In order to get better response, it will be necessary to divide farmers in groups when they are too many in the interview survey." "It was good to add something in my knowledge as far as irrigation is concerned." "More works should be done by the District authority to assist ward or even villages to select smaller areas which could be developed under DADPs rather than the whole Kisele valley which is very large (ZIU staff)." "Farmers interview. The question asked to the farmers should be more relevant to their farming practices, otherwise we cannot get good answer. Field measurements. More and frequent measurements need to be done since there is much seasonal change in river flow and may be water quality . Also soil survey kit need to be introduced. Map preparation. Few members involving village government need to be involved and let other members be informed to ensure satisfactory input etc (ZIU staff)."

Session XI

Training on Scheme Formulation Step-6 in Mkuranga District

Activities Carried Out:

In this session, training on Step-6: Preliminary Planning for Selected Irrigation Schemes was carried out. The Mkuranga DPDT made preliminary planning for Yavayva and Kisele schemes based on the information collected through the field survey (Step-5). Those procedures were carried out in the manners of: (i) brief explanation on the procedure by the JICA Study Team, (ii) practice by the DPDT using the guidelines revised after the trial in Mvomero, (iii) confirmation of the result by the DPDT, ZRC and the JICA Study Team. The DPDT accomplished the whole planning process: water balance study, scheme development planning and cost estimate, calculation of scheme incremental benefit, and scheme evaluation. As a result, Yavayava scheme was determined to be proposed in the next DADP. Those results are shown in page B-3-54 to 78.

List of Records:

1. Outline of Training on Step-6
2. Attendance List
3. Findings
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Training on Step-6

Date: June 28 – July 5, 2004
Place: Mkuranga District Office
Facilitator: Mr. H. Ohnuma (Agriculture/Land Use)
Mr. J. Tsurui (Irrigation)
Ms. W. Yamamoto (Irrigation)
Material: Revised Guidelines for Irrigation Scheme Formulation for DADP

Program No.	Date	Program Title	Facilitator
1	June 28	Step-6: Preliminary Planning for Selected Irrigation Schemes Confirmation of the collected data and explanation on procedure of the preliminary planning	Mr.Ohnuma Mr.Tsurui Ms. Yamamoto
2	June 29	Step-6: Preliminary Planning for Selected Irrigation Schemes Supplemental survey at the scheme site	None
3	June 30	Step-6: Preliminary Planning for Selected Irrigation Schemes Supplemental survey at the scheme site	None
4	July 1	Step-6: Preliminary Planning for Selected Irrigation Schemes Preliminary planning of the two schemes	- do -
5	July 2	Step-6: Preliminary Planning for Selected Irrigation Schemes Progress check of the scheme formulation plans	Mr.Ohnuma Mr.Tsurui Ms. Yamamoto
6	July 5	Step-6: Preliminary Planning for Selected Irrigation Schemes Supplemental survey at the scheme site	None

2. Attendance List

June 28

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Constantine P. Mboya	Mkuranga District Office
3	Mr. Jackson. A. R. Sange	Mkuranga District Office
4	Mr. Donald S. Ndesaiya	Mkuranga District Office
5	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
6	Ms. Rhoda Kweka	DITS, MAFS
7	Mr. Hiroyasu Ohnuma	JICA Study Team
8	Mr. Jun Tsurui	JICA Study Team
9	Ms. Wakana Yamamoto	JICA Study Team

June 29

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Constantine P. Mboya	Mkuranga District Office
3	Mr. Jackson. A. R. Sange	Mkuranga District Office
4	Mr. Donald S. Ndesaiya	Mkuranga District Office
5	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit

June 30

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Jackson. A. R. Sange	Mkuranga District Office
3	Mr. Donald S. Ndesaiya	Mkuranga District Office
4	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
5	Mr. Jun Tsurui	JICA Study Team

July 1

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Jackson. A. R. Sange	Mkuranga District Office
3	Mr. Donald S. Ndesaiya	Mkuranga District Office
4	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit

July 2

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Jackson. A. R. Sange	Mkuranga District Office
3	Mr. Donald S. Ndesaiya	Mkuranga District Office
4	Mr. Joseph Luaga	Mkuranga District Office
5	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
6	Mr. A.H.Simba	DITS, MAFS
7	Mr. Hiroyasu Ohnuma	JICA Study Team
8	Mr. Jun Tsurui	JICA Study Team
9	Ms. Wakana Yamamoto	JICA Study Team

July 5

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Jackson. A. R. Sange	Mkuranga District Office
3	Mr. Donald S. Ndesaiya	Mkuranga District Office
4	Mr. Constantine P. Mboya	Mkuranga District Office
5	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit

3. Findings

The following facts were found in the process of activity.

(1) Some of the data collected in the field survey could not be appropriately applied in the planning by following reasons.

a) The yield and the price data of the major crops were expressed in bags/area and Tsh/bag according to the answer of farmers in the interview survey sheet. These data were not appropriately converted to the required unit for the scheme benefit estimation.

b) Since the detail soil texture type was not finalized to one answer, two of the general soil texture types were selected. Accordingly the average value of net unit water requirement was calculated. It was emphasized to select one of the detail soil texture types as described in the guideline.

(2) Since the definition of term “area” was clearly explained in the terminology of the revised guidelines, the confusion was minimized. However, estimation of the cropped area in the development area was still difficult for the DPDT. It was suggested by the DPDT to add explanation to estimate the cropped area of major crops in the preparation of the present situation map.

(3) There were still confusions in the estimation of irrigation water requirement although the revised cropping pattern was applied. The conceivable reasons for such confusions were considered similar as the experience in Mvomero District as follows.

a) It was difficult for the DPDT members who had not much experience in irrigation to set proper cropping pattern after irrigation system application (cropping pattern after irrigation system application may not be same as present cropping pattern under rainfed condition).

b) It was difficult for the DPDT to choose appropriate cropping pattern from several candidate cropping patterns, since it is difficult for them to compromise accuracy of candidate cropping pattern.

Therefore, it was agreed by all the participants that the process to estimate the irrigation water requirement should be again simplified.

(4) As for the format of the water requirement, some formats start from dry season and some others from wet season. It was decided to unify into the formats of starting from dry

season according to the suggestion of District staff that the annual cropping season ends when the rainy season crop harvest is completed.

(5) In the process of planning, it was found that some information should be confirmed again on site since it seemed not to be accurate, especially for paddy yield of Yavayava scheme and the river discharge of Kisele scheme.

(6) It was confirmed that there was no major problem on the estimation of total construction cost. As for other costs, such as soft component cost, administration cost, O&M cost, replacement cost and engineering services cost, the JICA Study Team explained meaning and purpose of them.

(7) The DPDT requested to include the suitable indicator for the decision of flood dike construction in the guidelines. The JICA Study Team explained that the table about loss of crop production due to poor drainage could be used as one of the indicators. The decision could be made according to the information on the table and the result of interview survey on flood condition.

(8) It was found that scheme benefit estimation could not be made smoothly due to various reasons mentioned above such as inaccurate data, inappropriate conversion of data, difficulty on estimating cropped area. Furthermore, it seemed to be difficult for the DPDT to determine the strategic crop for the scheme and also to estimate the target yield of the strategic crop under with project condition by taking the present conditions and the farmers' requirement into consideration.

(9) It seemed to be very important for the DPDT to understand the significance of project feasibility with special attention on cost and benefit analysis. The JICA Study Team explained the relation between the investment to the project and the benefit from the project. It was also explained by the JICA Study Team that the analysis could be made by comparing with the situation of development area before and after the development.

4. Photos

	
Members of the JICA Study Team are explaining about the planning procedure.	DPDT is working to prepare the scheme plans.

5. Summary Result of the Questionnaire

Question	Answer	
Organization:	District office	5 persons
	Zonal Irrigation Unit	1 person
Subject contents:	"very satisfied"	5 persons
Facilitator:	"very satisfied"	4 persons
	"satisfied"	1 person
Facilities:	"very satisfied"	2 persons
	"satisfied"	2 persons
Timetable:	"very satisfied"	1 person
	"satisfied"	2 persons
	"regular"	2 persons
Material:	"very satisfied"	2 persons
	"satisfied"	2 persons
	"regular"	1 person
Did you get interested in the topics?	"got much interested"	4 persons
	"got interested"	1 person
Important topic -Keyword and why?-		
Preparation of present situation map	"Plotting" -It is important to decide appropriate map scale before starting the plotting to show all the required features on the sheet. "Plotting with scale" -Plotting of the coordinates on the section (graph) paper needs a lot of skill.	
Evaluation about your work	"much satisfactory"	2 persons
	"satisfactory"	3 persons
Irrigation water requirement and water balance study	"Irrigable land." -Because it is key to determine the land to develop for irrigation. "Water balance." -This is very important since it helps to estimate the area that can be supplied with irrigation water during rainy & dry season.	
Evaluation about your work	"much satisfactory"	2 persons
	"satisfactory"	1 person
	"regular"	1 person
Scheme development planning	"Estimate weir height." -The height of weir should be the same as the height of the water level at the intake.	
Evaluation about your work	"much satisfactory"	2 persons
	"satisfactory"	2 persons
	"regular"	1 person
Estimation of scheme incremental benefits and development cost	"Irrigation" -It helps to decide whether the project need to be implemented or not and to avoid wasting investment.	

	"Determination of incremental benefit and costs involved " -This is important since it guides particular scheme to be implemented or not (ZIU staff).
Evaluation about your work	"much satisfactory" 2 persons "satisfactory" 2 persons "regular" 1 person
Environmental consideration	"Proposed scheme in protected areas." -Because most people don't know the importance of protected areas, so it needs to be informed to the people. "Screening procedure." -Procedure for screening based on the information about presence of forest reserves or other reserves is important.
Evaluation about your work	"much satisfactory" 2 persons "satisfactory" 1 person "regular" 1 person
Scheme evaluation and prioritization	"To analyze economic viability of the scheme." -IRR makes the decision either to continue scheme development or stop it. "Evaluation of schemes and prioritization." -This evaluation helps to select the most appropriate scheme among others in the District. (ZIU staff).
Evaluation about your work	"much satisfactory" 2 persons "satisfactory" 2 persons
Suggestions and comments	"The programme should be carried out continuously because the big time gap between the sessions will make the planning difficult." (2 persons) "Because these topics were new for some members of the team, more time should have been allocated." "The training program was clearly understood if the member constantly attended the program." "The training program is quite satisfactory and very educative. However more time needs to be given during field survey since the information obtained from the farmers need to be reviewed several time before finalizing it as final information (ZIU staff)."

Session XII

Training on Scheme Formulation Step-7 to 12 in Mkuranga District

Activities Carried Out:

In this session, training on Steps-7 to -12, identification and design of district supporting programme, preparation of irrigation scheme formulation plan report, and feedback workshop, were carried out. The Mkuranga DPDT prepared district supporting programmes based on the information obtained through the former planning process. Then the DPDT submitted irrigation scheme formulation report, which was summary of preliminary planning result and district supporting programmes, to the Morogoro ZRC. After it was acknowledged by the ZRC, feedback workshops were held for selected and non-selected irrigation schemes (Yavayava and Kisele schemes) by the DPDT to explain the planning result to the villagers.

List of Records:

1. Outline of Training on Step-7 to 12
2. Attendance List
3. Record of Discussion
4. Findings
5. Photos
6. Summary Result of the Questionnaire

1. Outline of Training on Steps-7 to 12

Date: July 6 – July 12, 2004
Place: District office
Facilitator: Mr. H. Ohnuma (Agriculture/Land Use)
Mr. J. Tsurui (Irrigation)
Ms. W. Yamamoto (Irrigation)
Material: Revised Guidelines for Irrigation Scheme Formulation for DADP

Program No.	Date	Program Title	Facilitator
1	July 8	Confirmation of the result of preliminary planning Steps-7 and -8: Preparation of the District Supporting Programmes	Mr.J.Tsurui
2	July 9	Explanation of the planning result to DALDO	(none)
3	July 12	Steps-9: Preparation of Irrigation Scheme Formulation Plan Report Steps-11: Feedback workshop for the Selected Irrigation Schemes Explanation on how to conduct Step-12: Finalize Irrigation Scheme Formulation Plan for DADP	Mr.J.Tsurui

2. Attendance List

June 8

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Constantine P. Mboya	Mkuranga District Office
3	Mr. Jackson. A. R. Sange	Mkuranga District Office
4	Mr. Donald S. Ndesaiya	Mkuranga District Office
5	Mr. Joseph Luaga	Mkuranga District Office
6	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
7	Mr. Jun Tsurui	JICA Study Team

June 9

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Constantine P. Mboya	Mkuranga District Office
3	Mr. Jackson. A. R. Sange	Mkuranga District Office
4	Mr. Donald S. Ndesaiya	Mkuranga District Office
5	Mr. Joseph Luaga	Mkuranga District Office

June 12

No.	Name	Organization
1	Mr. Yahya Mtongori	Mkuranga District Office
2	Mr. Constantine P. Mboya	Mkuranga District Office
3	Mr. Jackson. A. R. Sange	Mkuranga District Office
4	Mr. Donald S. Ndesaiya	Mkuranga District Office
5	Mr. Joseph Luaga	Mkuranga District Office
6	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
7	Mr. Jun Tsurui	JICA Study Team

3. Record of Discussion

In the feedback workshop at Yavayava scheme, which was selected as a candidate for DADP, the following matters were discussed.

(1) Process of the planning and final decision on the scheme selection was explained to the villagers by the DPDT.

(2) The villagers appreciated the DPDT, since Yavayava scheme was selected for the first priority candidate for DADPs in this year.

(3) Some villagers asked how they can obtain water rights. The DPDT replied that they could assist villagers to obtain the water rights, whenever they visit the District office.

In the Feedback workshop at Kisele scheme, which was not selected as a candidate for DADP, the following matters were discussed.

(1) Process of the planning and final decision on the scheme selection was explained to the villagers by the DPDT.

(2) The reason why the scheme was not selected for DADPs in this year was clearly explained to the villagers. The major reasons are; i) insufficient consensus on the irrigation development by villagers, and ii) insufficient water resources study.

(3) The villagers admitted that their weakness is poor group activities and some villagers started to blame each other on their behavior in their farmers' group.

(4) The DPDT asked the villagers to stop quarrelling and explain them that if they had no good group activities, it was difficult for them to choose Kisele scheme as a candidate for next DADPs.

(5) It was also explained by the DPDT that Kisele scheme had some chance to be selected as a candidate scheme for next DADPs, if the village can meet the requirement.

(6) The villagers agreed that they would improve their group activities not to miss next opportunity for the irrigation development.

(7) The villagers appreciated the DPDT's explanation even the scheme was not selected as a candidate for DADPs this year, since they understood the DPDT did not hide anything from them.

4. Findings

The following facts were found in the process of activity.

(1) Holding of the feedback workshop was found to be very important, especially for the scheme not selected for the DADP this time, since it could encourage villagers for further improvement by themselves.

(2) It was confirmed that the DPDT could explain their result of prioritization and made villagers understand, though they had worried to do it initially. The DPDT members found that it is important to keep transparency to the beneficiaries.

5. Photos

Explanation about planning result to the villagers at Kisele Scheme

Explanation about planning result to the villagers at Yavayava Scheme

6 Summary Result of the Questionnaire

Question	Answer	
Organization:	District office	4 persons
	Zonal Irrigation Unit	1 person
Subject contents:	"very satisfied"	4 persons
	"satisfied"	1 person
Facilitator:	"very satisfied"	3 persons
	"satisfied"	2 persons
Facilities:	"very satisfied"	2 persons
	"satisfied"	3 persons
Timetable:	"very satisfied"	2 persons
	"satisfied"	2 persons
	"regular"	1 person
Material:	"very satisfied"	3 persons
	"satisfied"	2 persons
Did you get interested in the topics?	"got much interested"	5 persons

Important topic -Keyword and why?-	
Identification of District Subject-wise Development Plan and Design of the Subject-wise Development Plan	"Design of District supporting programme matrix formula." -This formula is the best way for attain the main problems facing before the start of implementation. -Because it simplifies planning work. "Design of District supporting programme." -This helps the DPDT to decide the priority in various subject related to development of irrigation schemes in the District. The priority helps to make wise decision (ZIU staff).
Evaluation about your work	"much satisfactory" 4 persons "satisfactory" 1 person
Feedback Workshop for Selected Irrigation Schemes	"Feedback for non selected scheme." -Feedback for non-selected scheme was much interested since it was very complicated to deliver the message. "Feedback of planning results of the selected irrigation schemes." -Because it made farmers understood that their scheme was selected or not. It also increased credibility of technical staff. "Reporting the results to the beneficiaries." -Delivering the results and findings of the survey to the beneficiaries was very important to make farmers their situation understood.
Evaluation about your work	"much satisfactory" 5 persons
Suggestions and comments	"Feedback needs to be carried out for all the schemes visited." "More practice was necessary for better understanding." "The whole exercise was well planned to ensure that positive effects will be delivered to the beneficiaries. (ZIU staff)." "The training was well organized and conducted. (2 persons)."

Result of Scheme Formulation in Mkuranga District

Record of Site Inspection (Step-2)

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: May 24, 2004

(1) Name of the scheme : Msambanyamani Scheme

(2) Location (any point in the scheme) : Latitude: 7º23.137' Longitude: 39º16.215'

(3) Administration : Ward Magawa

: Village(s) Nasibuni

(4) Number of households : 1,000 households/ Scheme

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (200 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☐ Vegetable ☐ Others ( )

(3) Present markets : Within Village (0 km from the site)

(4) Drainage problem : ☐ No problem ☒ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional
☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☒ Perennial river ☐ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Msambanyani River/ Kidogori Tributary

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☐ Established in year ☒ Not established yet

(2) Name of the association :

(3) Registered year :

(4) Number of member : members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : 400 ha

(2) Main water resources : ☒ Perennial river ☐ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(3) Name of the water source : Msambanyani River / Kidogori Tributary

(4) Water right : ☐ Granted ☒ Not granted yet ☐ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development
☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☒ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☒ Not sure

(2) Mode of contribution to development : ☐ In cash ☒ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☐ Maize ☐ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (125 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the scheme ☒ None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☐ High ☒ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers request irrigation practices due to unreliable rainfall since the production of crops mainly paddy depends mostly on rainfed Agriculture.

Also farmers needs support in inputs and machinery for higher production.

7. History of the Scheme

The history of Msambaranyamani scheme goes back to 1970's when Mkuranga district was not yet formed, but was part of Kisarawe district. The scheme was constructed and two motor- pumps installed, but the scheme did not function because of what seems to be technical problems. The pumps were then stolen, and after that nothing has taken place.

8. Findings of the District Project Development Team

Only during sufficient rainfall, the river will overflow and pour-out water to paddy fields. For the last two seasons, the river did not overflow and paddy growers did not benefit from it. The river is within the scheme and water can easily be pumped out for utilization. The scheme is along Dar es Salaam – Mtwara highway.

Member of the Site Inspection Team		**Msambanyamani Scheme**
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Meeting with farmers

General View of the Scheme

Old structure of water distributor

Old siphon structure

Observation

- Pump scheme was initiated in 1970's but irrigation practice was not performed at all.
- Msambanyamani river is the perennial river but it was dried up once in the past during the last year.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: May 24, 2004

(1) Name of the scheme : Nyamaronda Basin

(2) Location (any point in the scheme) : Latitude: 7°28.306' Longitude: 39°8.642'

(3) Administration : Ward Lukanga

: Village(s) Njopeka, Lukanga, Nyamaronda, Mkiu

(4) Number of households : 200 households/ Basin

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (50 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others ( )

(3) Present markets : Within Village (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional
☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☒ Perennial river ☐ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Nyamaronda River

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☐ Established in year ☒ Not established yet

(2) Name of the association :

(3) Registered year :

(4) Number of member : members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : 800 ha

(2) Main water resources : ☒ Perennial river ☐ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(3) Name of the water source : Nyamaronda River

(4) Water right : ☐ Granted ☒ Not granted yet ☐ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development
☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☒ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☒ Not sure

(2) Mode of contribution to development : ☐ In cash ☒ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (100 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the ☒ scheme None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☐ High ☒ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers request irrigation due to unreliable rainfall since the production of crops especially paddy depends on rainfed water.

Farmers also request for inputs and machinery.

7. History of the Scheme

There is no define hitory, except that farmers have been dealing with paddy production for long time depending on rainfed water. But rainfall is becoming unrealible, and farmers think they need assistance to engage in irrigation.

8. Findings of the District Project Development Team

Some farmers engage in vegetable production using buckects to fetch water from the perennial river. The river is just at the scheme so even paddle –pumps could be used to draw out water to crops to case farmers work. The Dar es Salaam – Mtwara highway pass through the basin consisting the scheme.

Member of the Site Inspection Team		Nyamaronda Basin
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Nyamaronda River

Paddy cultivation

Irrigation by bucket for watermelon

Watermelon cultivation

Observation

- During interview, farmers answered that vegetables are not produced due to no inputs supply.
- But some farmers are cultivating water melons under bucket irrigation successfully.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: May 24, 2004

(1) Name of the scheme : Ngwale Basin

(2) Location (any point in the scheme) : Latitude: 7°25.972' Longitude: 39°4.238

(3) Administration : Ward Nyamato

: Village(s) Mvuleni

(4) Number of households : 200 households/ Basin

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (200 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others ( )

(3) Present markets : Within Village (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional
☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☐ Perennial river ☒ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Ngwale River

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☐ Established in year ☒ Not established yet

(2) Name of the association :

(3) Registered year :

(4) Number of member : members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : >200 ha

(2) Main water resources : ☐ Perennial river ☒ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(3) Name of the water source :

(4) Water right : ☐ Granted ☒ Not granted yet ☐ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development
☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☐ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☒ Not sure

(2) Mode of contribution to development : ☐ In cash ☒ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (84 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the ☒ scheme None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☐ High ☒ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers have no knowledge where they coukd get water for irrigation durig dry seasons.
Also they suffer the problem of vermine such as monkey, wild, pig etc.

7. History of the Scheme

There is no define history, except that farmers have been dealing with paddy production for long time depending on rainfed water. But rainfall is becoming unveliable and farmers think they need assistance to engage in irrigation.

8. Findings of the District Project Development Team

Farmers have no knowledge of irrigation since it's the new thing to them.
Water is the problem since there is the seasonal river only.
The only alternative is to establish infield water harvesting such as building bunds.

Member of the Site Inspection Team		Ngwale Basin
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Meeting with farmers

General view of the area

Paddy cultivation

Mgwale River

Observation

- There is a wide range of fluctuation in the yield of paddy according to the rainfall condition of the year.
- Majority of the farmers are not aware of the effect of irrigation.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: 25 May 2004

(1) Name of the scheme : Kisele Basin

(2) Location (any point in the scheme) : Latitude: 7°11.886' Longitude: 39°7.213'

(3) Administration : Ward Mwarusembe

: Village(s) Kizito, Tundu, Kise, Bigwa, Kiparaganda, Mamkipera, Mwarusembe

(4) Number of households : >3,000 households/ Basin

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (2,400 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others ( )

(3) Present markets : Within Village (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional ☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☐ Perennial river ☒ Seasonal river ☒ Lake/Pond ☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Lukwale River, Mbezi River, Manze Lake

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☒ Established in year 1996 ☐ Not established yet

(2) Name of the association : UKIWAKI

(3) Registered year : (Not registered)

(4) Number of member : >2,000 members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : 14,000 ha

(2) Main water resources : ☐ Perennial river ☒ Seasonal river ☒ Lake/Pond ☐ Groundwater ☐ Spring ☒ Rain for water harvesting

(3) Name of the water source : Lukwale River, Mbezi River, Manze Lake

(4) Water right : ☐ Granted ☒ Not granted yet ☐ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development ☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☒ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☐ Not sure

(2) Mode of contribution to development : ☐ In cash ☐ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (60 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the scheme ☒ None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☒ High ☐ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers eagerly request for irrigation due to unreliable rainfall, since the production rainfed water.
Farmers also request for inputs on rainfed water.
Farmers also request for inputs and machinery.

7. History of the Scheme

Since 1996, farmers in Kisele had shown interest and eagerness to improve agriculture pratices as a measure to alleviate poverty.They have formed an association in the same year called UKIWAKI, to put – up together their efforts.
Subsequently, the district office had made a request for financial assistance to the scheme from ministry, regards rain water harvesting for irrigation. There request is now in the stage of approval fromm the Government.

8. Findings of the District Project Development Team

Kisele basin is very huge and attracts many people for paddy production, but they are now getting discourage by current unreliable rains.
Farmers have formed an association so that their voices can be heard when seeking for assistance. If the scheme is fullyutilized for paddy and vegetable production, it will help increase food sufficiently and poverty alleviation in Mkuranga District.

Member of the Site Inspection Team		Kisele Basin
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Rhoda Kweka	MAFS Central Office	Agriculture/Soil
Ms.Wakana Yamamoto	JICA Study Team	Irrigation
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Meeting with farmers

General view of the basin

Paddy cultivation

Lukwale river

Observation

- Farmers are frequently visiting the district office for requesting the irrigation scheme.
- Association has been established in order to obtain assistance on paddy production.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: 25 May, 2004

(1) Name of the scheme : Mbezi Basin (Kiparaganda)

(2) Location (any point in the scheme) : Latitude: 7°11.624' Longitude: 39°10.339

(3) Administration : Ward Mkuranga

: Village(s) Kiparaganda-B, Kitonga

(4) Number of households : 200 households/ Basin

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (50 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others ( )

(3) Present markets : Within Village (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional

☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☐ Perennial river ☒ Seasonal river ☐ Lake/Pond

☒ Groundwater ☐ Spring ☒ Rain for water harvesting

(4) Name of the water source : Mbezi River

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☐ Established in year ☒ Not established yet

(2) Name of the association :

(3) Registered year :

(4) Number of member : members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : >50 ha

(2) Main water resources : ☐ Perennial river ☒ Seasonal river ☐ Lake/Pond

☒ Groundwater ☐ Spring ☒ Rain for water harvesting

(3) Name of the water source :

(4) Water right : ☐ Granted ☒ Not granted yet ☐ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development

☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☒ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☒ Not sure

(2) Mode of contribution to development : ☐ In cash ☐ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☐ Paddy ☐ Maize ☐ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (50 km from the site)

4. Anticipated Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the scheme ☒ None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☐ High ☒ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers request irrigation pratices due to unreliable rainfall since the production of rops depends only on rainfed water.

Farmers also request for inputs and machinery.

7. History of the Scheme

There is no defined history, except that farmers have been dealing with paddy production for long time, depending on rainfed water for the crop. But rainfall is becoming unrealiable and farmers think they need assistance to engage in irrigation.

8. Findings of the District Project Development Team

Since production of crops mainly paddy in the scheme depends only on rainfed and the water source is seasonals and since the river (water source) is passed along / within the basin and since for the last two seasons the river did not overflow and farmers did not make use of it hence the paddle pumps could be utilized to supplement rain water during less rainfall seasons.

Member of the Site Inspection Team		Mbezi Basin
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Rhoda Kweka	MAFS Central Office	Agriculture/Soil
Ms.Wakana Yamamoto	JICA Study Team	Irrigation
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Meeting with farmers

General view of the basin

General view of the basin

Paddy cultivation

Mbezi river

Observation

- Farmers are concentrating paddy production rather than maize and vegetables in the basin
- Vegetables are mainly cultivated for sale by bucket irrigation.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information | Surveyed Date: 25 May, 2004

(1) Name of the scheme : Mbezi Basin (Msufuni/Kidete)

(2) Location (any point in the scheme) : Latitude: 7°9.765' Longitude: 39°13.894'

(3) Administration : Ward Mbezi

: Village(s) Msufini/Kidete, Ngarambe, Mwanzega, Msorwa, Mkwanga, Mkwalia/Kitumbo

(4) Number of households : 400 households/ Basin

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (400 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others ( )

(3) Present markets : (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional ☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☐ Perennial river ☒ Seasonal river ☒ Lake/Pond ☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Mbezi River, Nyibake, Kidete Lake

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☐ Established in year ☒ Not established yet

(2) Name of the association :

(3) Registered year :

(4) Number of member : members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : 800 ha

(2) Main water resources : ☐ Perennial river ☒ Seasonal river ☒ Lake/Pond ☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(3) Name of the water source : Mbezi River, Nyibake Lake, Kidete Lake

(4) Water right : ☐ Granted ☒ Not granted yet ☐ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development ☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☒ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☒ Not sure

(2) Mode of contribution to development : ☐ In cash ☒ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (53 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the ☒ scheme

☐ None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☐ High ☒ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers request irrigation due to unreliable rainfall since the production of crops especially paddy depends only on raifed water.

Farmers also request for inputs and machenery.

7. History of the Scheme

There is no define history, except that farmers have been dealing with paddy production for long time depending on rainfed water. But rainfall is becoming unveliable and farmers think they need assistance to engage in irrigation.

8. Findings of the District Project Development Team

There is the natural pond which is invaded by water needs, in order to make use of it for irrigation purposes excavation of the pond is needed.

Member of the Site Inspection Team		Mbezi Basin
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Rhoda Kweka	MAFS Central Office	Agriculture/Soil
Ms.Wakana Yamamoto	JICA Study Team	Irrigation
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

General view of the basin

Maize and vegetables cultivation

Mbezi river

Nyibake lake

Observation

- There is a wide range of fluctuation in the yield of paddy from year to year.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: 26 May,2004

(1) Name of the scheme : Yavayava Scheme

(2) Location (any point in the scheme) : Latitude: 7°7.948' Longitude: 39°22.005'

(3) Administration : Ward Vikindu

: Village(s) Yavayava, Kisayani

(4) Number of households : 300 households/ Scheme

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (54 ha in average year)

(2) Present crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others ( )

(3) Present markets : Within Village (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional
☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☒ Perennial river ☐ Seasonal river ☒ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Kogamimba River, Mbezi River, Kikulwa Lake

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☒ Established in year 1996 ☐ Not established yet

(2) Name of the association : UWAYAKI (Polintial for Irrigation)

(3) Registered year : 2003 (Certificate not issued)

(4) Number of member : 140 members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☒ Irrigation Facilities ☒ Others (Farmer Training) ☐ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : 300 ha

(2) Main water resources : ☒ Perennial river ☐ Seasonal river ☒ Lake/Pond
☒ Groundwater ☐ Spring ☐ Rain for water harvesting

(3) Name of the water source :

(4) Water right : ☐ Granted ☒ Not granted yet ☒ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development
☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☒ Gravity ☒ Pump ☐ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☐ Not sure

(2) Mode of contribution to development : ☐ In cash ☒ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☒ Maize ☒ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (65 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the scheme ☒ None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☒ High ☐ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☒ Additional support is required ☐ None

6. Opinions of Village Officers and Beneficiaries

Farmers request highly irrigation practises due to unveliable rainfall since the production of crops mainly paddy and vegetables depends only on rainfed water, but sometimes in case of vegetables they use groundwater by digging the shallow wells.

7. History of the Scheme

Farmers in Yavayava scheme have been coordinating with the District Agriculture office, as an effort to get extension services in their farming activities. In 1996, they got more organised and formed an association called UWAYAKI. Because of their efforts and eagerness, it was eventually decided at Ministry level, that, the scheme be funded. The scheme is now funded, survey drawing and design work has been done in 2000 construction work has started in March 2004.

8. Findings of the District Project Development Team

Construction work mobilizing Kogamimba River for gravitational irrigation has begun. But, funds available is sufficient for only part of the scheme. The scheme is shared between Yavayava and Kisayani village. However , with initial construction work funded, Yavayava village will be the beneficiary. For Kisayani village is benefit, it will require Mbezi River be mobilizer Therefore, this portion of the scheme needs to be funded.

Member of the Site Inspection Team		Yavayava Scheme (including Kisayani)
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Danial Moshy	Mkuranga District Office	DALDO
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Meeting with farmers

Proposed weir site

Paddy harvesting

Kogamimba river

Observation

- The area in between Kogamimba river and Mbezi river of about 54 ha can be irrigated by gravity.
- The construction of weir is going to be started soon by the counterpart fund of Japan's Grant Aid
- The fund can cover a part of the requirement for the full development of the scheme.

Record of Site Inspection **Survey Sheet for Quick Site Inspection**

1. General Information Surveyed Date: 26 May,2004

(1) Name of the scheme : Choga Basin

(2) Location (any point in the scheme) : Latitude: 7°8.919' Longitude: 39°6.180

(3) Administration : Ward Mkuranga

: Village(s) Magoza ,Kise

(4) Number of households : 300 households/ Basin

2. Present Condition of the Potential Area (should be interviewed with villagers and confirmed by site visit)

2.1 Present Agricultural Conditions in the Potential Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (400 ha in average year)

(2) Present crops : ☐ Paddy ☐ Maize ☐ Vegetable ☐ Others ( )

(3) Present markets : Within the Village (km from the site)

(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected

(5) Flood : ☐ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional

☐ Modern ☐ Rainwater harvesting ☒ No irrigation

(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)

(3) Main water resources : ☐ Perennial river ☒ Seasonal river ☒ Lake/Pond

☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(4) Name of the water source : Lukwale River, Kise Lake, Mzinga River

2.3 Existing Irrigators' Association (IA) or Group Related with Irrigation

(1) Establishment of IA : ☐ Established in year ☒ Not established yet

(2) Name of the association :

(3) Registered year :

(4) Number of member : members

2.4 On-going support on irrigation development by government or some organization

(1) Type of support : ☐ Irrigation Facilities ☐ Others ( ) ☒ None

3. Village Proposed Plan by O&OD etc. (proposed development plan by village)

3.1 Irrigation System Development Plan

(1) Potential area : 800 ha

(2) Main water resources : ☐ Perennial river ☒ Seasonal river ☒ Lake/Pond

☐ Groundwater ☐ Spring ☐ Rain for water harvesting

(3) Name of the water source : Lukwale River, Kise Lake, Mzinga River

(4) Water right : ☐ Granted ☒ Not granted yet ☒ Intended ☐ Not aware

(5) Required works : ☐ Rehabilitation ☒ New development

☐ Improvement (from traditional to modern) ☐ Drainage improvement

(6) Irrigation type : ☐ Gravity ☒ Pump ☒ Rain water harvesting

(7) Water quality : ☒ No problem ☐ Anticipated to damage crop cultivation

3.2 Irrigators' Association Establishment Plan

(1) Establishment plan : ☐ Established ☐ Planned by year _____ ☒ Not sure

(2) Mode of contribution to development : ☐ In cash ☒ In kind ☐ None

3.3 Agriculture Development Plan

(1) Proposed crops : ☒ Paddy ☐ Maize ☒ Vegetable ☐ Others (_____)

(2) Proposed markets : Name DSM (50 km from the site)

4. Current Negative Impacts

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Affection of protected area ☐ Soil erosion in the ☒ scheme None

Cause of conflict (_____)

5. Observation by the Inspection Team

(1) Farmers motivation for irrigation : ☐ High ☒ Moderate ☐ Low

(2) Present support to the scheme : ☐ Enough ☐ Additional support is required ☒ None

6. Opinions of Village Officers and Beneficiaries

Farmers need irrigation for water surplus since production of paddy depend only on rainfed water. Also farmers request inputs and machinery.

7. History of the Scheme

There is no define history ecept that farmers have been dealing woth paddy production for long time depending on rainfed water. But rainfall is becoming unveliable and farmers think they need assistance to engage in irrigation.

8. Findings of the District Project Development Team

The land is suitable for paddy production but the proble is water since there isn't perewal water source, but the only technic which could be applicable is construction of bunds of harvest water for irrigation . Also the natural pond is a bit far since it is almost 10-15 cm fro the site.

Member of the Site Inspection Team	Choga Basin	
Name	Organization	Specialty
Mr.Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Irrigation
Mr.Joseph Luaga	Mkuranga District Office	SMS Information
Mr.Yahya Mtongori	Mkuranga District Office	SMS Irrigation
Mr.Constantine P. Mboya	Mkuranga District Office	Extension Officer
Mr.Jackson. A. R. Sange	Mkuranga District Office	SMS Food and Nutrition
Mr.Donald S. Ndesaiya	Mkuranga District Office	SMS Crop Production
Mr.Danial Moshy	Mkuranga District Office	DALDO
Mr.Hiroyasu Ohnuma	JICA Study Team	Agriculture/Land Use

Site Photos

Meeting with farmers

Meeting with farmers

General view of the basin

Paddy cultivation

Observation

- Farmers are concentrating in rainy season paddy production in the basin due to water scarcity

Result of Scheme Formulation in Mkuranga District

Record of Preliminary Planning (Step-5 and -6)

Form-3 Survey Sheet for Interview Survey with Stakeholders (1/3)

Sub-step 3(a) Present Conditions of Agriculture and Marketing

Applicability The sub-step should be applied to all schemes.

1) Land Use in the Potential Area | Scheme Name | *Yavayava* | Surveyed Date | *7/6/2004*

If the potential area is not clearly defined, agree with villagers on the potential area as village area, basin area or other area. If the cultivated area is not clear, estimate from the total household number and the average holding size. The village extension officer should confirm the villagers' answers in order to avoid odd data.

(1) Potential Area (ha):	*150 ha*
(2) Cultivated Area within the Potential Area (ha):	*54 ha*
(3) Present Irrigated Area in the cultivated Area (ha):	*0 ha*
(4) Present Rainfed Area in the Cultivated Area (ha):	*54 ha*
(5) Average Holding Size/Family in the Potential Area (ha):	*0.8 ha*
(6) Total Household Number in the Potential Area:	*300*

2) Crop Production in the Potential Area

Let the farmers select two major rainy and dry season crops grown in the potential area. As for the yield and the price (farm gate price), ask farmers the maxima and minima in order to obtain average figures. Avoid any data for extraordinary years. The village extension officer should confirm the villagers' answers in order to avoid odd data.

*** Unit for Yield: bags/acre and weight/bag for cereals (paddy/maize), kg/acre for vegetables**
**** Unit for Price: Tsh/bag and weight/bag for cereals (paddy/maize), Tsh/kg for vegetables**

	Rainy Season		Dry Season	
(1) Name of Crops:	*Paddy*		*Vegetable*	*Maize*
(2) Cropped Area (ha):	*54 ha*		*Not significant*	*8*
(3) Rainfed or Irrigated:	*Rainfed*		*Irrigated*	*Rainfed, Residual moisture*
(4) Month of Land Preparation:	*Dec-Jan*		*Jun-July*	*Jun-July*
(5) Month of Harvest:	*Jun-Jul*		*Aug-Oct*	*Sep-Oct*
(6) Maximum Yield*:	*15*		*N/A*	*5*
Minimum Yield*:	*7*		*N/A*	*1*
Weight/bag (kg):	*70*		*N/A*	*80*
(7) Maximum Price**:	*20,000*		*N/A*	*100/cob*
Minimum Price**:	*7,000*		*N/A*	*50/cob*
Weight/bag (kg):	*70*		*N/A*	*Solo green cob*

3) Major Constraints to Crop Production

Let the farmers select three major constraints to crop production in the potential area. Do not spend a long time for discussion; just try to understand the level of irrigation needed for the scheme.

(1) *Drought* (2) *Poor Farm Implement* (3) *Vermin & Pest*

4) Farmers Supporting System

Ask the following questions on technical assistance and extension services.

(1) Technical Assistance on Irrigation: [ ] Available (extension) [ ] Available (other party) [X] Not available

(2) Extension Services: [ ] Satisfied [X] Not satisfied (Reasons) No residential extension

5) Input Supply for the Potential Area

(1) Improved Seeds:	[ ]	In use: Amount __	[X]	Not in Use: Reason *Own seeds*	
(2) Chemical Fertilizers:	[ ]	In use: Amount __	[X]	Not in Use: Reason *Low purchase power*	
(3) Agro-chemicals:	[ ]	In use: Amount __	[X]	Not in Use: Reason *Low purchase power*	
(4) Agricultural Machinery:	[X]	In use: Amount __	[ ]	Not in Use: Reason _____	

6) Marketing System in the Potential Area

(1) Market for Paddy:	[X]	Middleman	[X]	Local Market	[ ]	Town Market
(2) Market for Vegetables:	[X]	Middleman	[X]	Local Market	[ ]	Town Market

7) Possibility of Group Purchasing and Selling

Since group purchasing and selling of inputs and products seems important for future development, ask the possibility in the future.

[X] High possibility through ____ [X] Low possibility [ ] No possibility

Form-3 Survey Sheet for Interview Survey with Stakeholders (2/3)

Sub-step 3(b) Present Conditions of Institutions

Applicability This sub-step should be applied to proposed schemes where circled groups already exist.

1) Existence of organization

[O] Irrigators' Association (IA) [O] Farmers' Group (FG) etc. [ ] No organization

1) General Information | Scheme Name | *Yavayva* | Surveyed Date | *7/6/2004*

(1) Name of IA/FG: *UWAYAKI-UMOJA WA WAKULIMA WA YAVAYAVA NA KISAYANI*

(2) Established Year of IA/FG: *2003*

(3) Registration of IA/FG: [ ] Cooperative Act [ ] Association Act [X] None

(4) Number of Present Members: *140* People (Male *60* people, Female *80* people)

(5) Area covered by IA/FG: _____ ha

2) Activities

(1) Frequency of Meetings;	Weekly	Monthly	Half yearly	Yearly	According Needs	No meeting	NA
General Meeting:					X		
Committees:							X
Each canal group:							X

(2) Documentation of Meeting Results: [X] Done [ ] Not done

(3) Major Issues Discussed and Decisions Made: *Minor land disputes, pest & diseases, tractor hiring, extension service*

(4) Have by-laws and regulations been adopted: [ ] Yes [ ] No [X] Intended

(5) Does IA/FG have a bank account? [X] Yes [ ] Cash in hands [ ] Others [ ] NA

(6) Is book-keeping prepared? [X] Yes [ ] No [ ] No Answer

3)Farmers' Contribution to the Construction/Repair Works

(1) Construction Works: [X] In Kind [ ] In cash [ ] None

(2) Repair Works: [X] In kind [X] In cash [ ] None

Form-3 Survey Sheet for Interview Survey with Stakeholders (3/3)

Sub-step 3(c) Present Conditions of Environment

Applicability The sub-step should be applied to all schemes.

1) Physical Conditions | Scheme Name | *Yavayava* | Surveyed Date | *7/6/2004*

(1) Siltation:	[ ] Significant	[X] Not significant	[ ] Not known
(2) Soil erosion:	[ ] Significant	[X] Not significant	[ ] Not known
(3) Salinity problem:	[ ] Significant	[X] Not significant	[ ] Not known

2) Change in Ecosystems

(1) Vegetation degradation:	[X] Significant	[ ] Not significant	[ ] Not known
(2) Destructive animals:	[X] Significant	[ ] Not significant	[ ] Not known
(3) Aquatic plants:	[ ] Significant	[X] Not significant	[ ] Not known

3) Agricultural Activity

(1) Water use conflict:	[ ] Significant	[X] Not significant	[ ] Not known
(2) Land use conflict:	[ ] Significant	[X] Not significant	[ ] Not known
(3) Loss of soil fertility:	[ ] Significant	[X] Not significant	[ ] Not known

4) Sanitation and Public Health

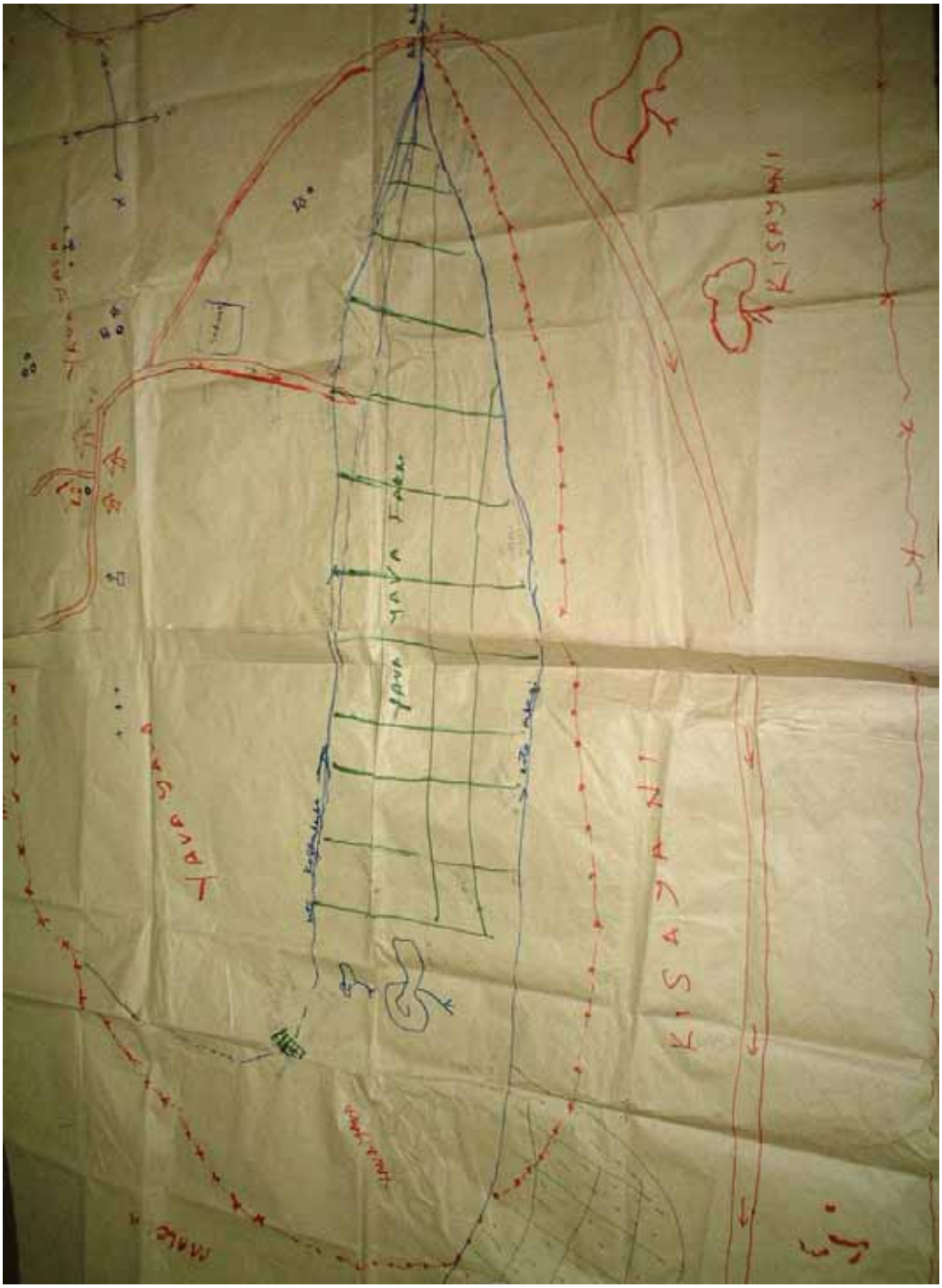
(1) Soil and water pollution:	[ ] Significant	[X] Not significant	[ ] Not known
(2) Water borne diseases:	[ ] Significant	[X] Not significant	[ ] Not known

5) Socio-economic Conditions

(1) Population increase (immigrant)	[ ] Significant	[X] Not significant	[ ] Not known
(2) Increase in water demand:	[ ] Significant	[X] Not significant	[ ] Not known
(3) Vandalism of structures:	[ ] Significant	[X] Not significant	[ ] Not known

Note: Next step of page 3-15 (d) should be continued.

Village Resource Map – Yavayava Scheme -



Form-4 Survey Sheet for Field Condition Confirmation (1/7)

Sub-step 1 Confirm Soil Texture of the Proposed area

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

[O] Gravity [O] Pump (River) [O] Pump (Lake/pond) [O] Rain water harvesting

2) Type of irrigation development

[O] Rehabilitation [O] Improvement [O] New Development [O] Extension [ ] Drainage

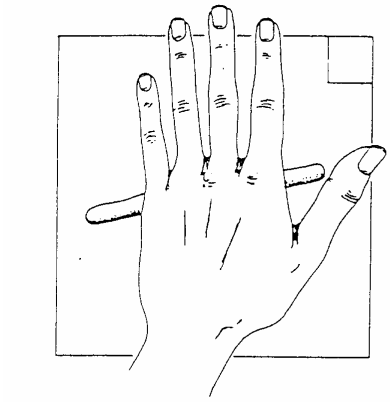
Instruction	Scheme Name	*Yavayava*	Surveyed Date	*7/6/2004*

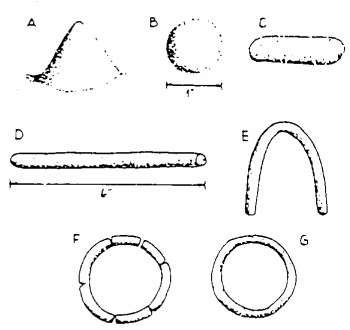
1) Visit the survey together with village chief and villagers.
Visit the proposed area and choose typical soil in the area with the consultation of the village chairperson and villagers.

2) Sampling of the soil
Gather a soil sample from the soil surface (sample should be about 10 x 10 x 10 cm).

3) Knead the soil with water.
Add some water to the soil sample so it is moist but not wet. Knead it well. Pebbles should be removed.

4) Try to create ring shapes with the soil sample and choose the most advanced shape that can be made.





A: Soil can only be shaped into a cone. No other shapes hold together.
B: Soil can be formed into a circle, but not a rod shape.
C: Soil can be formed into a stout rod shape.
D: A thin rod (about 6 mm diameter) can be formed but not bent.
E: Thin rod can be bent without breaking
F: Circle can be formed with some breaks.
G: Complete circle with no breaks can be formed.

5) Evaluate the soil texture
According to the result of 4), circle one of the detailed soil texture types and choose a general soil texture type by conversion of the detailed soil texture type.

Detailed soil texture type			conversion	General soil texture type	
Shape A	Sand	[ ]	if you choose Shape A →	Sand	[ ]
Shape B	Loamy sand	[ ]	if you choose Shape B or C →	Sandy Loam	[ ]
Shape C	Silty Loam	[ ]			
Shape D	Loam	[ ]	if you choose Shape D or E →	Clay Loam	[ ]
Shape E	Clay Loam	[ ]			
Shape F	Light Clay	[ ]	if you choose Shape F or G →	Clay	[X]
Shape G	Heavy Clay	[ ]			

6) Notable Soil Characteristics
If there are any notable soil characteristics such as high rock outcrop, shallow soil depth and symptom of salt accumulation, please note.
Note:

None

Form-4 Survey Sheet for Field Condition Confirmation (2/7)

Sub-step 2 Confirm Field Drainage Condition

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity O Pump (River) O Pump (Lake/pond) O Rain water harvesting

2) Type of irrigation development

O Rehabilitation O Improvement O New Development O Extension O Drainage

Instruction	Scheme Name	*Yavayava*	Surveyed Date	*29/6/2004*

1) Interview with farmers

Inundation of proposed area in normal year *50* cm depth for *2* days

Highest flood water depth in the past *100* cm depth in (10-50 years)

Form-4 Survey Sheet for Field Condition Confirmation (3/7)

Sub-step 3 Confirm Bridge and River Crossing Condition

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity O Pump (River) O Pump (Lake/pond) O Rain water harvesting

2) Type of irrigation development

O Rehabilitation O Improvement O New Development O Extension O Drainage

Instruction	Scheme Name	*Yavayava*	Surveyed Date	*29/6/2004*

1) Observe bridge or river crossing point

River crossing point(s): Number *1* nos. Total length *20* m

Survey river crossing point(s) where provision of bridge is required.

Existing bridge(s): Number *None* nos. Total length _____ m

☐ 100 % replacement ☐ 50 % replacement ☐ 30 % replacement

☐ minor rehabilitation ☐ functioning well ☐ Facility not exist

Form-4 Survey Sheet for Field Condition Confirmation (4/7)

Sub-step 4 Confirm Intake Point Condition

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity ☐ Pump (River) O Pump (Lake/pond) O Rain water harvesting

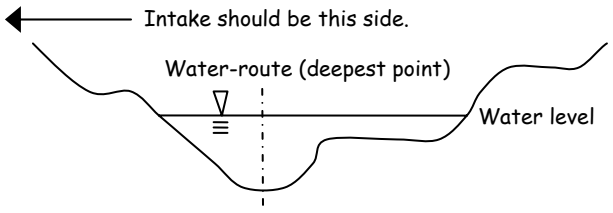
2) Type of irrigation development

O Rehabilitation O Improvement O New Development O Extension O Drainage

Instruction	Scheme Name	*Yavayava*	Surveyed Date	*29/6/2004*

1) Determine intake point

Determine intake point (location of the weir). The intake point should be narrow, strait, moderate (not too gentle) steep (to avoid siltation), stable flow, intake side water-route (see figure in the right), geologically strong and have easy access.



Elevation of the intake point should not be very different from the elevation at the upstream-end of the command area of the main canal (see **Figure-2**). If you cannot find a suitable intake point, search upstream on the same river or change the water source to another river (if there is one). If you still cannot find a suitable place, because of flat river bed, go to 2) and choose "Seems No Good".

2) Evaluate reliability of the intake water level

Evaluate the reliability of the determined intake water level by referring to **Figure-2**. If you are not sure about the relationship between intake water level and the elevation of the proposed area, choose "Not sure".

[X] Seems Good [ ] Not sure [ ] Seems No Good

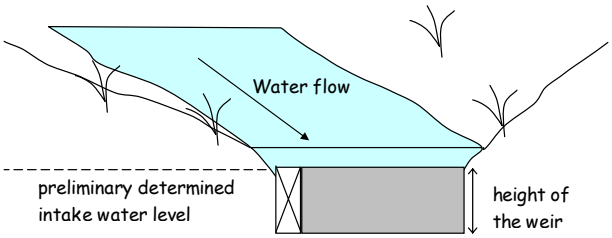
If it seems No Good, give up to irrigate the upstream part of the development area and find some lower land with elevation almost the same as the highest possible intake water level of the point.

3) Estimate intake water level

Estimate the intake water level (water level at the beginning point of the main canal). The intake water level should be almost the same or at a higher elevation than the upstream-end of the command area of the main canal. The water level should also be able to give some water depth for the main canal flow.

4) Estimate weir height

The elevation of the weir crest should be preliminarily determined as the same level as the intake water level. Estimate the weir height considering depth of the river at the intake point.



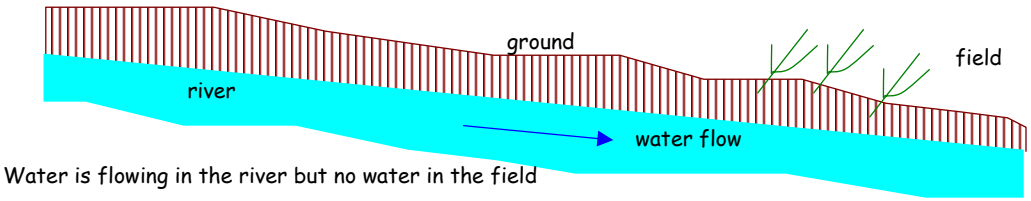
Estimated weir height (h)	1.5	m

5) Measure river width and depth at the intake point

Width of river at the intake point	6	m
Depth of river at the intake point	1.5	m

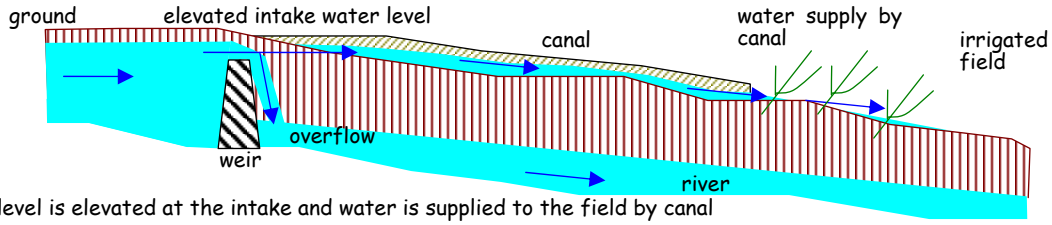
Figure-2 Required Intake Water Level

Before irrigation (profile along the water source river)



Water is flowing in the river but no water in the field

After irrigation (profile of the water source river and canal)



Water level is elevated at the intake and water is supplied to the field by canal

Form-4 Survey Sheet for Field Condition Confirmation (5/7)

Sub-step 5 Confirm Water Source River Condition

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity O Pump (River) ☐ Pump (Lake/pond) O Rain water harvesting

2) Type of irrigation development

O Rehabilitation O Improvement O New Development O Extension ☐ Drainage

Instruction	Scheme Name	*Yavayava*	Surveyed Date	*29/6/2004*

1) Determine measurement point together with village chief and villagers

Find a suitable point for measurement together with the villagers. The measurement point should be a) narrow, b) strait, c) steep, and d) upstream of any existing intake, or e) near the proposed intake site. In case of pump (lake/pond), major inflow to the lake/pond should be the measured, if there is any. If there is no major inflow, proceed to sub-step 3.

2) Estimate flow area on the day of survey

Measure average river width and water depth on the day of survey.

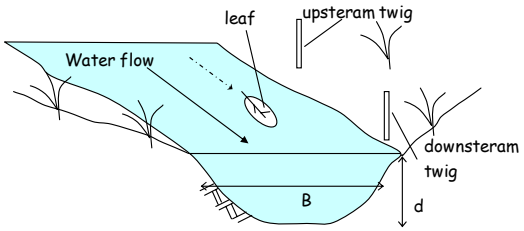
B = *6* m (average river width) Dt= *0.8* m (water depth today)

At= *4.8* m^2 (flow area of today) (At = B x Dt)

3) Measure water flow velocity of the day

a) Drive two twigs into the ground beside the river at a measured distance between the two twigs. b) Float a leaf on the water from the upstream twig to the downstream twig and measure the travel time.

c) Calculate the flow velocity.



Ls = *10* m (length between twigs) Tt= *31* sec (consumed time)

Vt = *0.33* m/sec (V t = Ls/ Tt)

4) Calculate river discharge on the day of survey

Qt= *1.6* m/sec (discharge on the day of survey) (Qt = At x Vt)

5) Estimate water depth at critical/average month in dry and rainy season

For gravity, pump (river) and rain water harvesting scheme, ask villagers when are the *critical months* (month in which most drought occurs) for rainy and dry season. Obtain water depth in those months by interviewing the villagers.

For pump irrigation, obtain water depth in *average discharge months* in each season.

Dry season	Critical/average month	*Oct*	*0.3*	m (Dd; water depth)
Rainy season	Critical/average month	*Feb*	*0.4*	m (Dr; water depth)

6) Water flow month

Dry season	from		to	
Rainy season	from		to	

7) Estimate discharge at critical/average month in dry and rainy season

Qd= *0.6* m^3/sec (Qd = Qt / Dt x Dd)

Qr= *0.8* m^3/sec (Qr = Qt / Dt x Dr)

8) Nominate river discharge record keeper

One villager who lives near the water source river should be nominated as the river discharge record keeper by the village chairperson. The keeper should measure the water level and velocity of the measurement point once every month.

Nominated name of the record keeper *Village executive officer*

Form-5 Calculation Sheet for Irrigation Water Requirement

Sub-step 1 Estimate Gross Water Requirement

Instruction	Scheme Name	*Yavayava*	Planned Date	*2/07/2004*

1) Determine crops to be irrigated

Determine the crops to be irrigated considering present crop production surveyed in **Form-3 (1/3)**, the agro-ecological zone obtained from the irrigation GIS, and the farmers' intentions for cropping after the scheme is implemented.

Choose one crop for dry season and rainy season respectively.

Dry season:	X	Paddy		Maize		Beans and Vegetables
Rainy season:	X	Paddy		Maize		Beans and Vegetables

2) Setting-up a typical cropping calendar

In order to simplify the water requirement calculation, the typical, ideal cropping calendar under irrigated conditions was established in the Action Plan study. This calendar, as shown below, was based on the following conditions.

- The major strategic crop for the irrigation development is paddy and the effective utilization of the long rains between March and May (Masika) is the key issue.
- Since irrigated conditiond are assumed, the land preparation can be performed within 1 month and the rainy season cropping can thus be started around January.
- In this case, the harvesting can be carried out around June and that period is ideal for the harvest of paddy because of the dry conditions just after the long rains.
- The double cropping of paddy will be possible if the irrigation water is available during the dry season starting from July.
- Even if the irrigation water is not sufficient during the dry season, some crops can be grown under the effective utilization of the remaining soil moisture.

Typical Cropping Calendar

Seasons	Dry season cropping						Rainy Season cropping					
	1st	2nd	3rd	4th	5th	6th	1st	2nd	3rd	4th	5th	6th
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

3) Enter net unit water requirement (NWR)

Obtain net unit water requirement (NWR) from **Table-1**. General soil texture type is confirmed from **Form-4 (1/7).**

4) Obtain irrigation efficiency (E)

Obtain suitable irrigation efficiency from **Table-2**.

Irrigation efficiency (E)
0.25

5) Calculate gross unit water requirement (GWR)

Calculation Form of Gross Unit Water Requirement (Unit: mm/month)

		Dry season						Rainy season					
Crop to be irrigated													
Name of the Month		1st Jul	2nd Aug	3rd Sep	4th Oct	5th Nov	6th Dec	1st Jan	2nd Feb	3rd Mar	4th Apr	5th May	6th Jun
Net unit water requirement (mm/month)	Table-1	*322*	*246*	*275*	*249*	-	-	*366*	*255*	*182*	*78*	*131*	-
Gross unit water requirement (GWR) (l/sec/ha)	NWR/E /8.64/ D*	*4.8*	*3.7*	*4.2*	*3.7*	-	-	*5.5*	*4.2*	*2.7*	*1.2*	*2.0*	-

*D :number of days by the month,

Form-6(a) Calculation Sheet for Water Balance Study (River)

Sub-step 1 Water balance calculation (river water source)

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

[O] Gravity [O] Pump (River) [ ] Pump (Lake/pond) [O] Rain water harvesting

Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Obtain river discharge of the critical months

Obtain river discharge for the critical months of the rainy and dry seasons (Qd and Qr) from **Form-4 (5/7)** and enter the values into the calculation form below. For other months, enter "-".

2) Calculate 80% dependable river discharge

Calculate 80% dependable river discharge by multiplying Qd and Qr by 0.6.

3) Obtain and enter gross unit water requirement (GWR)

Obtain gross unit water requirement (GWR) for 12 months from **Form-5** and enter the value in the calculation form below.

4) Calculate irrigable area in the dry and rainy season

Calculate the irrigable area of each month and determine the irrigable area in the rainy season and dry season using the following calculation form.

Calculation Form of Water Balance Study (River) (Unit: m^3/sec)

		Dry season						Rainy season					
Month		1st Jul	2nd Aug	3rd Sep	4th Oct	5th Nov	6th Dec	1st Jan	2nd Feb	3rd Mar	4th Apr	5th May	6th Jun
River discharge (1)		-	-	-	*0.6*	-	-	-	*0.8*	-	-	-	-
80% dependable river discharge (2)	(1) x 0.6	-	-	-	*0.36*	-	-	-	*0.48*	-	-	-	-
GWR (3)		*4.8*	*3.7*	*4.2*	*3.7*	-	-	*5.5*	*4.2*	*2.7*	*1.2*	*2.0*	-
Irrigable Area (ha) in the month (4)	(2)/(3) x 1000	-	-		*97.3*	-	-	-	*114*	-	-	-	-
Irrigable Area (ha) in the season	minimum of (4) in the season	*97.3*						*114*					

Note: (1) If river discharge data is available for only one month of each season, the water balance can only be made for that month.

(2) If water requirement in the critical month is "-", shift the critical month to the nearest month for which water requirement is available.

4) Determine development area (area to be provided with irrigation facilities)

Obtain the size of the proposed area from the present situation map by counting the squares in the map. Compare the area of the proposed area with the irrigable area in the rainy season; the smaller value should be chosen as the development area.

Proposed area (i)	*54*	ha
Irrigable area in rainy season (ii)	*114*	ha
Development area (smaller value of (i) and (ii))	*54*	ha

Form-7 Planning Sheet for Scheme Development Plan (1/10)

Sub-step 1(a) Preliminary Design and Cost Estimate of Weir

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

[O] Gravity [ ] Pump (River) [ ] Pump (Lake/pond) [O] Rain water harvesting

2) Type of irrigation development

[O] Rehabilitation [O] Improvement [O] New Development [ ] Drainage

Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Plot intake point on the present situation map

Plot the intake point on the present situation map.

2) Estimate width of the river at intake point

Obtain width of the river at intake point and height of the weir from **Form-4 (4/7)**.

Width of the river (W)	*6.0*	m
Height of the weir (h)	*1.5*	m

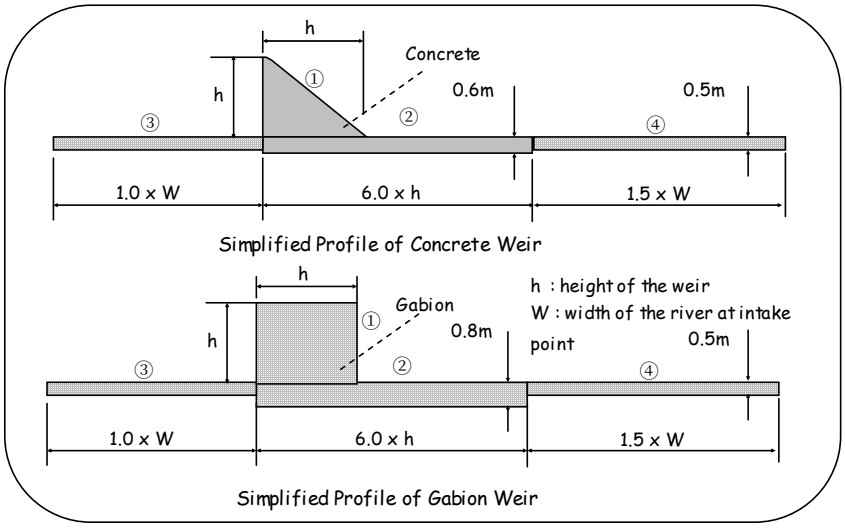
3) Choose type (material) of the weir

Choose concrete type weir if budget for that is available. If not, start the scheme with a gabion type weir. Circle one at right.

[X] Concrete Type
[ ] Gabion Type

4) Estimate work quantity of construction

Estimate work quantity of construction by using the chart at right.



a) Work quantity of concrete weir (if you choose gabion type, proceed to b))

Concrete volume (i)	h x h / 2 x W + 6 x h x 0.6 x W =	*39.2*	m^3
Gabion volume (ii)	1 x W x 0.5 x W + 1.5 x W x 0.5 x W =	*45*	m^3

b) Work quantity of gabion weir

Gabion volume (ii)	h x h x W + 6 x h x 0.8 x W + 1 x W x 0.5 x W + 1.5 x W x 0.5 x W =		m^3

5) Estimate construction cost of the weir

Obtain work quantity from 4) and estimate construction cost by multiplying unit cost.

Concrete volume (i)	*392*	m^3	x Unit cost	300,000	Tsh/m^3 =	*11,760,000*	Tsh
Gabion volume (ii)	45	m^3	x Unit cost	45,000	Tsh/m^3 =	*2,025,000*	Tsh

(1) Cost of weir body (Sub total (i + ii))	*13,785,000*	Tsh
(2) Miscellaneous works and contingency (50% of (1))	*6,892,500*	Tsh
(3) Cost for new weir ((1) + (2))	*20,677,500*	Tsh

(4) Extent of required replacement
For new development or improvement scheme, enter factor 1.0. For rehabilitation scheme, choose extent of required replacement (1.0(=100%), 0.5 or 0.3) from **Form-4 (7/7)**. Minor rehabilitation can be omitted. | *1.0*

(5) Construction/Rehabilitation cost of the weir (3) x (4) | *20,677,500* | Tsh

Form-7 Planning Sheet for Scheme Development Plan (3/10)

Sub-step 1(c) Preliminary Design and Cost Estimate of Main Canal System

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity O Pump (River) O Pump (Lake/pond) O Rain water harvesting

2) Type of irrigation development

O Rehabilitation O Improvement O New Development Drainage

Instruction | Scheme Name | *Yavayava* | Planned Date | *2/7/2004*

1) Obtain length of the main canal

Seek preliminary route of the main canal, if there is no existing main canal. The route can be obtained to follow more or less the same elevation as the upstream-end of the command area of the main canal towards the intake site. Plot the route of the main canal on the present situation map and measure its length.

2) Obtain command area of the main canal

Obtain the command area of the main canal. Not only the development area for this DADP, which was determined in the **Form-6 (a) or (b),** but all the area that water is supplied by the main canal should be the command area of the main canal.

Command area of the main canal: *54* Ha

3) Choose type of the main canal

Choose the type of main canal. If the budget is limited or future expansion is planned, choose unlined canal, considering future enlargement of the canal capacity. If not, choose lined canal, since it needs less maintenance work. Circle one option at right.

( ) Lined canal
(X) Unlined canal

4) Estimate construction cost of the main canal system

Estimate the construction cost for the main canal and structures based on the length of the main canal and the unit cost classified by command area and type of canal.

a) Basic cost of the main canal system

Length of canal *775* m x Unit cost *6,000* Tsh/m = *4,650,000* Tsh (i)

Unit cost to be applied for new development and improvement

Command area (A) (ha)	Unlined canal	Lined canal	
A > 200ha	18,500	33,500	Tsh/m
100 ≤ A <200	11,000	21,000	Tsh/m
50 ≤ A <100	6,000	12,800	Tsh/m
A <50	4,500	10,000	Tsh/m

For a rehabilitation scheme, obtain the extent of required replacement of the main canal and structures from **Form-4 (7/7)**. The unit cost for a rehabilitation scheme can be estimated by multiplying the extent of required replacement (1.0(=100%), 0.5 or 0.3) by the unit cost for a new development and improvement. Minor rehabilitation can be omitted.

b) Contingency (10% of (i))	(ii)	*465,000*	Tsh
c) Construction/rehabilitation cost of the main canal system (i + ii)		*5,115,000*	Tsh

Form-7 Planning Sheet for Scheme Development Plan (4/10)

Sub-step 1(d) Cost Estimate of Irrigation Facilities in the Development Area

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

[O] Gravity [O] Pump (River) [O] Pump (Lake/pond) [O] Rain water harvesting

2) Type of irrigation development

[O] Rehabilitation [O] Improvement [O] New Development [ ] Drainage

Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Obtain development area

Obtain development area from **Form-6 (a) or (b)**.

2) Estimate construction cost of the irrigation facilities in the development area

Estimate the construction cost from the size of development area and unit cost.

a) Basic cost of the irrigation facilities in the development area

Development Area [*54*] ha x Unit cost [*750,000*] Tsh/ha = [*40,500,000*] Tsh (i)

↑

Unit cost to be applied: New development and improvement 750,000 Tsh/ha

For rehabilitation scheme, obtain extent of required replacement of the secondary canals and structures from **Form-4 (7/7)**. The unit cost for a rehabilitation scheme can be estimated by multiplying the extent of required replacement (1.0(=100%), 0.5 or 0.3) by the unit cost for new development and improvement. Minor rehabilitation can be omitted.

b) Contingency (10 % of (i))	(ii)	*4,050,000*	Tsh
c) Construction/rehabilitation cost of the irrigation facilities in the development area (i + ii)		*44,550,000*	Tsh

Form-7 Planning Sheet for Scheme Development Plan (5/10)

Sub-step 1(e) Cost Estimate of Drainage Facilities in the Development Area

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

[O] Gravity [O] Pump (River) [O] Pump (Lake/pond) [O] Rain water harvesting

2) Type of irrigation development

[O] Rehabilitation [O] Improvement [O] New Development [O] Drainage

Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Obtain development area

Obtain development area from **Form-6 (a) or (b)**.

2) Estimate construction cost of the drainage facilities in the development area

Estimate construction cost from the size of the development area and unit cost.

a) Cost of the drainage facilities in the development area

Development Area [*54*] ha x Unit cost [*500,000*] Tsh/ha = [*27,000,000*] Tsh (i)

↑

Unit cost to be applied: New development and improvement 500,000 Tsh/ha

For a rehabilitation scheme, obtain the extent of required replacement of the drainage canals and structures from **Form-4 (7/7)**. The unit cost for a rehabilitation scheme can be estimated by multiplying the extent of required replacement (1.0(=100%), 0.5 or 0.3) by the unit cost for new development and improvement. Minor rehabilitation can be omitted.

b) Contingency (10 % of (i)) (ii) *2,700,000* Tsh

c) Construction/rehabilitation cost of the drainage facilities in the development area (i + ii) *29,700,000* Tsh

Form-7 Planning Sheet for Scheme Development Plan (6/10)

Sub-step 1(f) Preliminary Design and Cost Estimate of Flood Dike

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity O Pump (River) O Pump (Lake/pond) O Rain water harvesting

2) Type of irrigation development

O Rehabilitation O Improvement O New Development O Drainage

Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Analyze necessity for providing flood dike

Obtain the inundation condition of the proposed area in the normal area from **Form-4 (2/7)**. If the water depth of inundation in a normal year is shallower than 50 cm or inundation continuers shorter than seven days, skip this sub-step and proceed to sub-step 6. If there is a risk of irrigation facilities being washed away by heavy flood, flood dike needs to be provided. The need for a flood dike can also be analyzed from **Table-6**.

Table-6 Loss of Paddy Production due to Poor Drainage

Stage	Condition	Duration (days)			
		1-2	3-4	5-7	more than 7
Tillering	Clean water	10%	20%	30%	35%
Booting	Muddy water	70%	80%	85%	90-100%
	Clean water	25%	45%	80%	90-100%
Heading	Muddy water	30%	80%	90%	90-100%
	Clean water	15%	25%	30%	70%
Ripening	Muddy water	5%	20%	30%	30%
	Clean water	0%	15%	20%	20%

2) Determine height of the flood dike if it is necessary

Obtain the highest flood level in the past from **Form-4 (2/7)**. Determine the required height of the flood dike by adding 0.5 m allowance (freeboard) to the highest flood level.

The highest flood level *1* m + 0.5 m = *1.5* m (Height of the flood dike)

3) Estimate length of the flood dike by using the scheme development plan map

Estimate required extent of the flood dike plotting it on the scheme development map. Measure the plotted length of the flood dike.

Length of the flood dike *2,410* m

4) Estimate construction cost of the flood dike

Estimate the construction cost from the length of the flood dike and unit cost, which is classified according height of the dike.

a) Cost of the flood dike

Length of the dike *2,410* m x Unit cost *41,000* Tsh/m = *98,810,000* Tsh (i)

Unit cost to be applied		
	Height up to 2.0 m	67,000 Tsh/m
	Height up to 1.5 m	41,000 Tsh/m
	Height up to 1.2 m	26,000 Tsh/m

For a rehabilitation scheme, obtain the extent of required replacement of the flood dike from **Form-4 (7/7)**. The unit cost for a rehabilitation scheme can be estimated by multiplying the extent of required replacement (1.0(=100%), 0.5 or 0.3) by the unit cost for new development and improvement. Minor rehabilitation can be omitted.

b) Contingency (10 % of (i)) (ii) *9,881,000* Tsh

c) Construction/rehabilitation cost of the flood dike (i + ii) *108,691,000* Tsh

Form-7 Planning Sheet for Scheme Development Plan (8/10)

Sub-step 1(h) Preliminary Design and Cost Estimate of Village Bridge

Applicability The sub-step can be skipped for non-circled type of scheme

1) Type of irrigation

O Gravity O Pump (River) O Pump (Lake/pond) O Rain water harvesting

2) Type of irrigation development

O Rehabilitation O Improvement O New Development O Drainage

Instruction | Scheme Name | *Yavayava* | Planned Date | *2/7/2004*

1) Plot location of the village bridge on the present situation map

Plot the route of the village access bridge on the present situation map.

2) Obtain Total length of the village bridge

Obtain the total length of bridge(s) proposed for construction and existing village bridge(s) from **Form-4 (3/7)**.

3) Estimate construction cost of the village bridge

Estimate construction cost from the total length of the bridge and unit cost.

a) New construction (river crossing point(s))

Total length *20* m x Unit cost *700,000* Tsh/m = *14,000,000* Tsh (i)

Unit cost to be applied		
	New construction	700,000 Tsh/m

b) Rehabilitation (existing bridge(s))

Total length [ ] m x Unit cost [ ] Tsh/m = [ ] Tsh (ii)

Unit cost to be applied	700,000 Tsh/m

For rehabilitation bridge(s), obtain the extent of required replacement of the village access bridge from **Form-4 (3/7)**. The unit cost for rehabilitation scheme can be estimated by multiplying the extent of required replacement (1.0(=100%), 0.5 or 0.3) by the unit cost for new development and improvement. Minor rehabilitation can be omitted.

c) Contingency (10 % of total of (i + ii)) (iii) *1,400,000* Tsh

d) Construction/rehabilitation cost of village access bridge (i + ii + iii) *15,400,000* Tsh

Form-7 Planning Sheet for Scheme Development Plan (9/10)

Sub-step 1(i) Estimation of Total Construction Cost				
Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Estimate total construction/rehabilitation cost

Obtain the total construction cost by summing up the costs on **Form-7 (1/10)** to **(8/10)**

(1a) Weir	*20,677,500*	Tsh
(1b) Pump	-	Tsh
(2) Main canal & structures	*5,115,000*	Tsh
(3) Irrigation facilities in the development area	*44,550,000*	Tsh
(4) Drainage facilities in the development area	*29,700,000*	Tsh
(5) Flood Dike	*108,691,000*	Tsh
(6) Village Access Road	-	Tsh
(7) Village Bridge	*15,400,000*	Tsh
Total Construction Cost (sum of (1a) to (7))	*224,133,500*	Tsh

Form-7 Planning Sheet for Scheme Development Plan (10/10)

Sub-step 1(j) Scheme Development Cost Estimate				
Instruction	Scheme Name	*Yavayava*	Planned Date	*2/7/2004*

1) Estimate scheme development cost

Obtain total construction cost from **Form-7 (9/10)** and estimate the relevant costs.

(1) Total construction cost		*224,133,500*	Tsh
(2) Soft component cost	6.0% of (1)	*13,448,010*	Tsh
(3) Administration cost	4.0% of (1)	*8,965,340*	Tsh
(4) Engineering services cost	30.0% of (1)	*67,240,050*	Tsh
(5) Operation and maintenance (O&M) cost	1.5% of (1)	*3,362,003*	Tsh
(6) Replacement cost	2.0% of (1)	*4,482,670*	Tsh
Scheme development Cost		*321,631,573*	Tsh

Note: Soft component cost includes cost for institutional development (such as irrigators' association establishment) and strengthening of extension services.
Administration cost includes incremental cost of governmental administration for the scheme.
Engineering services cost includes survey, design and construction supervision.

Form-8 Scheme Incremental Benefit Estimation Sheet (1/2)

Sub-step 1 Scheme Benefit Estimate

Instruction	Scheme Name	*Yavayava*	Planned Date	*5/7/2004*

The scheme incremental benefit should be estimated for the **development area** determined through the water balance study with and without project condition in the following manner.

1) Without project condition (present condition)

a) Estimate benefit during Rainy season

Rainy season crop		Average Yield (kg/ha)		Average Price (Tsh/kg)		Cropped Area in Development Area (ha)		Benefit (Bro) (Tsh)
1) *Paddy*	x	*1925*	x	*190*	x	*54*	=	*19,750,500*
2)	x		x		x		=	

b) Estimate benefit during dry season

Dry season crop		Average Yield (kg/ha)		Average Price (Tsh/kg)		Cropped Area in Development Area (ha)		Benefit (Bdo) (Tsh)
1) *Maize*	x	*600*	x	*900*	x	*8*	=	*432,000*
2)	x		x		x		=	

c) Estimate total benefit without project Bro1+Bro2+Bdo1+Bdo2 *20,182,500* (I)

Without project condition data should be derived from the survey sheet of **Form-3 (1/3)** and be calculated in the following manner.

Average Yield and Average Price for Cereals:

Average Yield (kg/ha) = (((Max. Yield + Min. Yield) / 2) x Weight/bag) x 2.5

Average Price (Tsh/kg) = ((Max. Price + Min. Price) / 2) / Weight/bag

Average Yield and Average Price for Vegetables:

Average Yield (kg/ha) = ((Max. Yield + Min. Yield) / 2) x 2.5

Average Price (Tsh/kg) = (Max. Price + Min. Price) / 2

Cropped Area in the Development Area:

This can be estimated from the cropped area in the proposed area shown in the present situation map by applying the percentage for each crop.

Cropped Area in Development Area (ha)

= Percentage shown in the present situation map x Size of Development Area

Form-8 Scheme Incremental Benefit Estimation Sheet (2/2)

2) With project condition (after project implementation)

a) Estimate benefit during rainy season

Rainy season crop		Average Yield (kg/ha)		Average Price (Tsh/kg)		Development area (ha)		Benefit (Brw) (Tsh)
Paddy	x	*4500*	x	*190*	x	*54*	=	*46,170,000*

b) Estimate benefit during dry season

Dry season crop under irrigation		Average Yield (kg/ha)		Average Price (Tsh/kg)		Irrigable Area in Dry Season (ha)		Benefit (Bdw1) (Tsh)
Paddy	x	*4500*	x	*190*	x	*54*	=	*46,170,000*

Dry season crop under rainfed		Average Yield (kg/ha)		Average Price (Tsh/kg)		Non-irrigable Area in Dry Season (ha)		Benefit (Bdw2) (Tsh)
			x		x		=	

c) Estimate total benefit with project (Brw)+(Bdw1)+(Bdw2) *92,340,000* (II)

The with project condition data should be elaborated by the DPDT under the careful consideration of cropping intensity. The irrigable area in the rainy and dry seasons should be effectively utilized and the strategic crop should be determined. In addition, the non-irrigable area in the dry season (development area – irrigable area in dry season) should also be utilized for the effective utilization of remaining soil moisture. Although there might be several candidate crops for the dry season, the major crops under irrigation and rainfed conditions should be selected respectively. Average yield should also be estimated through various data. For example, the target yield of paddy was set as follows in the Action Plan study. Average price can basically be maintained as without project condition.

Type of Development	Present Yield (t/ha)	Target Yield (t/ha)
From rainfed condition to water harvesting or improved traditional	1.0-3.0	3.0-4.0
From traditional or poorly developed condition to improved traditional	3.0-4.5	4.5-5.5
From improved traditional or moderately developed condition to modern with full input	4.5-5.5	6.0-7.0

3) Obtain incremental agricultural benefit

Incremental agricultural benefit (II) – (I) *72,157,500*

Note: In order to simplify the calculation process and also they are in the relation of offset, the production cost was neglected for the current estimation of agricultural benefit.

Form-9 Planning Sheet for Institutional Development Plan

Sub-step 1 Irrigators' Association Activation/Establishment

Instruction	Scheme Name	*Yavayava*	Planned Date	*5/7/2004*

1) Present Situation:

Classify the present situation of Irrigators' Association or other Farmers' Group from the results of the interview survey (refer to Form-3(2/3)). Necessary actions for each category are shown below.

			Necessary Action
1)	[ ]	Both Irrigators' Association and Farmers' Group do not exist	→ a), b), c), d), e)
2)	[X]	Farmers' Group without Registration	→ b), c), d), e)
3)	[ ]	Farmers' Group registered under Cooperative Act	→ b), d), e)
4)	[ ]	Farmers' Group registered under Association Act	→ b), d), e)
5)	[ ]	Irrigators' Association without Registration	→ b), c), d), e)
6)	[ ]	Irrigators' Association registered under Cooperative Act	→ d), e)
7)	[ ]	Irrigators' Association registered under Association Act	→ d), e)

2) Necessary Action:

a) Establishment:

Any organization should be established in order to operate and maintain the irrigation facilities and this organization should be a principal actor for irrigation development.

b) Choose type of organization (Irrigators' Association or Farmers' Group)

An Irrigators' Association is not a marketing or business oriented organization and its main activities are operation and maintenance of the irrigation facilities. Compulsory participation of all irrigators is a prerequisite of irrigation development.

c) Registration:

The established organization should be registered as a legal entity to be able to access formal rights such as water rights, land tenure and public services from the government such as development assistance, technical advice, and training programmes.

d) Register under Cooperative Act or under Association Act:

Registration as a cooperative can be a lengthy procedure and, in any case, current legislation may not suit the commercial aspirations of all schemes. Registration as an association may result in there being certain limitations on profit-making activities and inadequate provision for audited accounts.

e) Write a letter of undertaking to the District Council:

The commitment of the irrigators should be confirmed in writing in a signed letter of undertaking to the District Council. This should define the obligations of the irrigators' association.

3) Institutional Development Plan:

1) Establishment	:	by year	[ ]		
2) Type of organization	:	[ ]	Irrigators' Association	[ ]	Farmers' Group
3) Registration	:	by year	[ ]		
4) Law	:	[ ]	Cooperative Act	[ ]	Association Act
5) Letter of undertaking	:	by year	[ ]		

Indicative timeframe for institutional development

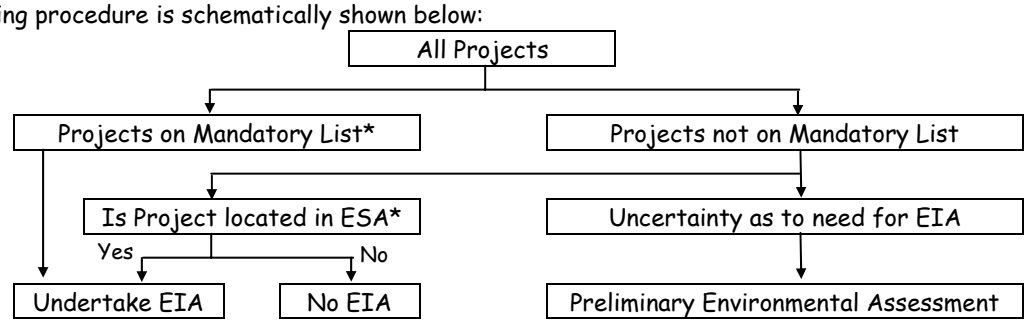
1) The organization should be established immediately after the budget is confirmed by DADP.
2) Registration and letter of undertaking need to be made before completion of the facilities construction (normally it takes about three years for further study, design and construction).

Form-10 Supplemental Information on Environmental Consideration

Sub-step 1 Screening

Instruction	Scheme Name	*Yavayava*	Planned Date	*5/7/2004*

Screening procedure is schematically shown below:



Classify the proposed scheme in one of the following decisions through the screening procedure:

(1) [ ] EIA is required where the project is known to have significant adverse environmental impacts.
(2) [ ] Preliminary environmental assessment is required where the project may have environmental impacts.
(3) [ ] EIA is not necessary where the project is unlikely to cause significant environmental impacts.

Note: Mandatory List (Agriculture)
- Cultivating natural and semi-natural not less than 50 ha,
- Water management projects for agriculture (drainage, irrigation),
- Large scale monoculture (cash and food crops),
- Pest control projects,
- Fertilizer and nutrient management,
- Agricultural programmes necessitating the resettlement of communities, and
- Introduction of new breeds of crops.

Note: ESA (Environmentally Sensitive Areas)
- Areas prone to natural disasters, - Wetlands, - Mangrove swamps,
- Areas susceptible to erosion, - Areas of importance to threatened cultural groups,
- Areas with rare/endangered/or threatened plants and animals,
- Areas of unique socio-cultural, archaeological or scientific significance and areas with potential tourist value,
- Polluted area, - Area subject to desertification and bush fires, - Coastal areas/Marine ecosystems,
- Areas declared as national park, watershed reserve, forest reserve, game reserve, wildlife corridors,
- Mountainous areas, water catchment areas and recharge areas of aquifers,
- Areas classified as prime agricultural lands or range lands,
- Green belts or public open spaces in urban area, - Burial sites and graves.

Sub-step 2 Proposed Scheme in Protected Areas

Instruction	Scheme Name	*Yavayava*	Planned Date	*5/7/2004*

Confirm whether the proposed scheme is located in a protected area or not:

As mentioned in Step-4 and Step-5(a), the information on protected areas and the distribution of surveyed schemes should be provided from the data and information management unit. Based on this information, check whether the proposed scheme is located in a protected area or not.

Proposed Scheme locates: [ ] Within the protected area [X] Outside the protected area

Proposed schemes in productive forest reserves:

If the proposed scheme is located in a productive forest reserve, it may be possible to alter part of the land to another use (e.g. irrigation development). For such conversion, a request from the district authorities has to be submitted to the Permanent Secretary of the Ministry of Natural Resources and Tourism for careful examination and has to include the following:

- Information on intended land use for the piece of land requested within the productive forest reserve,
- Total area to be developed and the detailed development plan,
- The number of beneficiaries for the intended land use,
- Results of EIA in order to ascertain possible impacts of the intended project to the environment,
- A map, or at least a sketch, of the location of the intended scheme/project in relation to the forest reserve.

Form-11 Check List of the Scheme Development Plan

Sub-step 1 Confirm Irrigation Technical Plan	Scheme Name	*Yavayava*		
1) Water Balance (River Discharge)	Checked Date	*5/7/2004*		
a) Does obtained river discharge seem reliable? (if the data is doubtful such as too much discharge in dry season, choose NO)		YES	X	NO
2) Weir and Intake				
(Reliability of intake water level) a) Does elevation of weir crest top seem to be higher than elevation of upstream end of the development area (can be obtained from **Form-4 (4/7)**)?	X	YES		NO
		NOT SURE		
b) Does the intake site have a narrow, strait, moderate slope (not too gentle), stable flow and easy access point?	X	YES		NO
3) Main Canal				
a) Does the planned main canal route connect the command area of the main canal and the intake site with a gentle slope (or almost same elevation), unless there is special suitable location for weir, such as small waterfall, etc.?	X	YES		NO
b) Has the length of the main canal plotted on the scheme development plan map been measured by using ruler?		YES	X	NO *Detailed survey was done*
4) Flood Dike				
a) Is the length of the planned flood dike enough to protect the development area from floods?	X	YES		NO
b) Has the length of the flood dike plotted on the scheme development plan map been measured by using ruler?		YES	X	NO *Detailed survey was done*
5) Village Access Road				
a) Does the planned village access road connect the main road – village – development area – intake site?	X	YES		NO
b) Has the length of the village access road plotted on the scheme development plan map been measured by ruler?	X	YES		NO
6) Village Bridge				
a) Is the total length of village bridges enough for crossing the river?	X	YES		NO
Sub-step 2 Confirm Agricultural Information	Checked Date			
(Information on scheme benefit estimate) In case the result of benefit estimation is considered inappropriate, the following information should be reconfirmed.				
a) Cropped Area: With special attention to the difference in the cropped area between the rainy and dry seasons.		YES		NO
b) Average Yield: With special attention to adjusting the unit (bag/acre to kg/ha) and proposed yield with project.		YES		NO
c) Average Price: With special attention to obtaining the price for an ordinary year.		YES		NO

The item for reconfirmation is a sample only. All the data and information should be checked.
If there is answer NO, the data should be reconfirmed on site.
In case the data is replaced with new data, revise the survey sheet and repeat Step-6.

Form-12 Schemes Prioritization Sheet

Only one Form-12 should be completed per district.

Name of the District: *Mkuranga*

Indicators	*Criteria for Ranking*
Adequacy	a) Technical adequacy i) Reliability of intake water level (see **Form-11**), ii) availability of construction material, iii) availability of construction company b) Social adequacy i) villagers consensus, ii) farmers motivation c) Environmental adequacy (see **Form-10**) d) e)
Efficiency	a) IRR (Internal Rate of Return), etc. b) c)
Dependability	a) Performance of irrigators' association, b) Performance of farmers on group activities, etc. c) d)
Equity	a) Even distribution of land in the development area, b) No water conflicts between adjacent villages (over water rights), etc. c) d)

Enter 1 for the first ranked scheme, enter 2 for the second, ...

Name of the Scheme Selected	*Ranking*				*Final Ranking*
	Adequacy	*Efficiency*	*Dependability*	*Equity*	
Yavayava	1	1 (IRR23.1%)	1	1	1
Kisele	2	1 (IRR23.1%)	2	1	2
		(IRR____%)			
		(IRR____%)			

Box

Meanings of Adequacy, Efficiency, Dependability and Equity

(1) "Adequacy" means workability of the development plan or readiness for implementation. If the scheme is ready for implementation, "adequacy" is high.

(2) "Efficiency" means rate of investment and return. High return with low investment represents high "efficiency".

(3) "Dependability" means sustainability of the scheme. If farmers' performance in the scheme area is high, "dependability" is also high.

(4) "Equity" means even distribution of public properties. An even distribution of land in the scheme area indicates high "equity".

Form-13 Scheme Digest (Summary of Preliminary Planning for DADP) (1/2)

1. General Information | Prepared Date: *4/7/2004*

(1) Name of the scheme : *Yavayava Irrigation Scheme*
(2) Name of the scheme in the Quick Site Inspection : *Yavayava*
(3) Location (any point in the scheme) : Latitude: *7 ° 7.948 S* Longitude: *39 ° 22.005 E*
(4) Administration : Ward *Vikindu*
: Village(s) *Yavayava, Kisayani*

2. Present Condition of the Development Area

2.1 Present Agricultural Conditions in the Development Area

(1) Present condition : ☐ Not Cultivated ☒ Cultivated (*54* ha in average year)
(2) Present crops : ☒ Paddy ☒ Maize ☐ Vegetable ☐ Others ( )
(3) Present markets : On farm (0 km from the site)
(4) Drainage problem : ☒ No problem ☐ Partially affected ☐ Strongly affected
(5) Flood : ☒ Scarce ☐ Once a year ☐ More than twice a year

2.2 Existing Irrigation System in the Development Area

(1) Current irrigation system : ☐ Traditional ☐ Improved traditional
☐ Modern ☐ Rainwater harvesting ☒ No irrigation
(2) Present irrigated area : 0 ha (if the scheme area is already irrigated)
(3) Main water source : ☒ Perennial river ☐ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain for water harvesting
(4) Name of the water source : *Kogamimba River, Mbezi River, Kikulwa Lake*

2.3 Existing Institution (Association or Group) Related with Agriculture/Irrigation

(1) Establishment of Institution : ☒ Established in year *1996* ☐ Not established yet
(2) Name of the association : *UWAYAKI*
(3) Registered year : *2003*
(4) Number of members : *140* members

3. Development Plan

3.1 Irrigation System Development Plan

(1) Development area : *54* ha
(2) Main water source : ☒ Perennial river ☐ Seasonal river ☐ Lake/Pond
☐ Groundwater ☐ Spring ☐ Rain water harvesting
(3) Name of the water source : *Kogaminba River*
(4) Water right : ☐ Granted ☐ Not granted yet ☒ Intended
(5) Required works : ☐ Rehabilitation ☒ New development
☐ Improvement (from traditional to modern) ☐ Drainage improvement
(6) Irrigation type : ☒ Gravity ☐ Pump ☐ Rain water harvesting
(7) Proposed facilities : Weir ☒ Concrete ☐ Gabion
(including : Pump - nos.
rehabilitation) : Main canal *0.78* km ☒ Lined ☐ Unlined
(except facilities in : Flood dike *2.41* km
the development : Village access road - km
area) : Village bridge *20* m in total

Form-13 Scheme Digest (Summary of Preliminary Planning for DADP) (2/2)

3.2 Agriculture Development Plan

(1) Dry season : Cropped area *54* ha ☒ Paddy ☐ Maize ☐ Vegetable

(2) Rainy season : Cropped area *54* ha ☒ Paddy ☐ Maize ☐ Vegetable

(3) Annual incremental annual agricultural benefit : 72,157,500 Tsh.

3.3 Institutional Development Plan

(1) Establishment : by year *2004*

(2) Type of organization : ☒ Irrigators' Association ☐ Farmers' Group

(3) Registration : by year *2004*

(4) Law : ☒ Association Act ☐ Cooperative Act

(5) Letter of undertaking : by year *2004*

3.4 Environment

☐ Water conflict within the scheme/village ☐ Water conflict with other scheme/village

☐ Land conflict ☐ Effect on protected area ☐ Soil erosion in the scheme

Cause of conflict ( )

EIA : ☐ Required ☐ Preliminary assessment is required ☒ Not required

Location : ☐ Within protected area ☒ Outside of protected area

3.5 Scheme development Cost

(1) Construction	*224,133,500*	Tsh.
(2) Soft component	*13,448,010*	Tsh.
(3) Administration	*8,965,340*	Tsh.
(4) Engineering	*67,240,050*	Tsh.
(5) O&M	*3,362,003*	Tsh.
(6) Replacement	*4,482,670*	Tsh.
TOTAL	*321,631,573*	Tsh.

Scheme development plan map should be attached.

Form-14 District Supporting Programme Digest

1) Title of the District Supporting Programme	Planned Date	*21/7/2004*
Capacity building of DPDT on irrigation scheme formulation.		
2) Target Group (Who will benefit from the plan?)		
DPDT		
3) Goal of the Programme (should be only one)		
(What is the outcome of the plan?)	(By when should it be achieved?)	
Well trained and skilled DPDT on irrigation scheme formulation and supervision	*2004/2005*	

4) Activities (Required activities to achieve the goal of the programme)		
(Activities)	(Who will take action?)	(Time Schedule)
a) *Capacity building for DPDT and farmers (selected) through training.*		*By December, 2004*
b) *Detailed study on Kisele Basin in relation to farmers organization and water harvesting possibility.*		*By June, 2005*
c) *Institutional support in terms of office equipment and working tools.*		*By December, 2004*

5) Inputs (Required inputs to conduct the activities)			
(Activities)	(Required Manpower)	(Required Equipment)	(Cost)
	- Facilitators *- DPDT staff* *- Farmers (selected)* *- Drivers*	*Vehicle* *GPS (2pcs)* *Measuring tapes (2pcs)*	a) *Capacity building* *Tsh.6,660,000/=*
		Stationery *Soil kit* *Venue*	b) *Detailed Study (Kisele)* *Tsh.906,000/=*
			c) *Institutional support* *Tsh.810,000/=*
			(Total) *Tsh.8,376,000/=*

Note: This sheet is applicable to present the plan for one programme.

Form-15 Summary of Irrigation Scheme Formulation Plan

Irrigation Scheme Formulation Plan for DADP		for Fiscal Year	*2004/2005*
Name of District	*Mkuranga*	Planned Date	*21/7/2004*

1) Operation & Maintenance Cost and Replacement Cost for Schemes in Operation

List of schemes in operation (use additional sheet if there are more than three schemes)

(a)	:		Tsh.
(b)	:		Tsh.
(c)	:		Tsh.
TOTAL	:		Tsh. (I)

2) Scheme Formulation Planning Cost for Next DADP

Required cost for scheme formulation planning for next DADP : *1,359,000* Tsh. (II)

3) Scheme Development Plan

Name of the scheme *Yavayava Irrigation Scheme*

1. Overall Scheme Development Cost (can be obtained from **Form-13**)

(1) Construction	:	*285,139,966*	Tsh.
(2) Soft component	:	*15,247,858*	Tsh.
(3) Administration	:	*11,405,239*	Tsh.
(4) Engineering	:	*85,539,290*	Tsh.
(5) O&M	:		Tsh.
(6) Replacement	:		Tsh.

In case of Yavayava scheme, detailed study had already been done and this scheme formulation was done for the purpose of the training. Therefore, the cost estimated in the detailed study was adopted for this scheme development plan as an actual budget.

2. Initial Investment Cost

(a) Initial investment cost	:	*397,323,353*	Tsh.	Total of (1) to (4) of 1.
(b) farmers' contribution	:	*42,769,645*	Tsh.	standard is 15% of 1-(1) (construction)
(c) by District government	:	*354,553,708*	Tsh.	(a) – (b)

3. Phase-wise Development Plan (should be finalized after Step-12)

(if there is no phase-wise development, enter all the initial investment cost (c) into Phase-1)

Phase-1	:	*158,200,000*	Tsh.	in fiscal year	*2003/2004*
Phase-2	:	*98,176,854*	Tsh.	in fiscal year	*2004/2005*
Phase-3	:	*98,176,854*	Tsh.	in fiscal year	*2005/2006*
Phase-4	:		Tsh.	in fiscal year	
Phase-5	:		Tsh.	in fiscal year	
TOTAL	:	*354,553,708*	Tsh.	(should be same as (c) in 2.)	

Scheme development cost for this year *98,176,854 Tsh.* (III)

4) District Supporting Programme

Title and cost of the plan (use additional sheet if there are more than three plans)

(a) Capacity building for DPDT and famers	:	*6,660,000*	Tsh.
(b) Detailed study on Kisele basin	:	*906,000*	Tsh.
(c) Institutional support in terms of office equipment and working tools	:	*810,000*	Tsh.
TOTAL	:	*8,376,000*	Tsh. (IV)

5) Cost of Irrigation Scheme Formulation for DADP	*107,911,854*	Tsh. (total of (I)-(IV))