Chapter 5

Activities for the Verification Study

Simple river discharge measurement at Digoma irrigation scheme, Mvomero District, Morogoro Region

CHAPTER 5 ACTIVITIES FOR THE VERIFICATION STUDY

5.1 Framework of the Verification Study

The following two major subjects were selected as components of the Verification Study, aiming to contribute to successful irrigation development:

Verification Study - 1 (VS-1)

Establishment of Simple Database and Information System at DITS of MAFS

Verification Study - 2 (VS-2)

Support for Irrigation Scheme Formulation for DADP

Prior to commencement of the Verification Study, a Project Design Matrix (PDM) which was one of the logical frameworks, was prepared to clarify (i) project purpose, (ii) output, (iii) required activities, (iv) required input, etc. for each of the above two studies. Then, it was finalized in the process of the Verification Study to satisfy the actual situations as shown in the so-called final PDM on the next two pages). These PDMs were used for monitoring and also to verify the Verification Study results.

Project Design Matrix (PDM) for Establishment of Simple Database and Information System (VS-1)

Project Title: The National Irrigation Master Plan, Verification Study
Project Area: Model Districts (Mvomero and Mkuranga District) and DITS
Target Group: Staff of DIMU, model DPDTs and model ZRC
Project Term: 7 months (Feb 2004 - Aug 2004)
Prepared Date: July 13, 2004
Version: 2.1 (minor revision of version 2.0 on Mar 15)

Project Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal 1.1 Sustainable irrigation development is achieved	1.1 Achievement of 405,000ha of irrigation development by year 2017 and stable crop production.	1.1 Annual irrigation development monitoring report	-
Overall Goal 2.1 Data and information on irrigation development in the mainland are properly managed by DITS	2.1 Annual irrigation development monitoring report is prepared 2.2 Operation record of the database system is reported	2.1 Annual irrigation development monitoring report 2.2 Operation record of the simple data and information management system	(a) No change on basic policies of Tanzania such as decentralization (b) Implementation of irrigation development according to the plan
Project Purpose 3.1 Model of effective data and information management is executed for DITS and the model Districts	3.1 Data and information for model Districts are properly managed in the database and information system by DIMU staff by August 2004	3.1 Monitoring and evaluation questionnaire	(a) Timely allocation of required budget for O&M of the system (b) Provision of required communication infrastructures (c) Required data for the system are collected on time
Outputs 4.1 Effective database program 4.2 Effective operation manual for the database program 4.3 Capable DIMU staff in the program operation 4.4 Information transmission between DITS, model ZRC, and model DPDTs 4.5 Verification results	4.1 The database program is evaluated as effective by DIMU in August 2004 4.2 The operation manual is evaluated as effective by DIMU in August 2004 4.3 DIMU staff acquire skill to operate the database system by August 2004 4.4 Data exchange is made between DIMU, model ZRC, and model DPDTs 4.5 Verification results are available by August 2004	4.1 Monitoring and evaluation questionnaire 4.2 Monitoring and evaluation questionnaire 4.3 Monitoring and evaluation questionnaire 4.4 Record of data transmission of respective offices 4.5 Monitoring and evaluation questionnaire	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the Verification Study period
Activities 5.1 Establish the prototype database system 5.2 Prepare the draft operation manual 5.3 Make the first operation of prototype database system in the on-the-job training to the DIMU 5.4 Rectify the prototype database system and draft operation manual 5.5 Manage the actual data for two model districts (second operation of the database system) in the on-the-job training to the DIMU 5.6 Verify the results of actual data management for two model districts	**Inputs** *Inputs from donor* (a) Database and GIS software (b) Foreign experts (c) Computers for DIMU	*Inputs from the government of Tanzania* (I) DITS of MAFS (a) Staff for data and information management unit (DIMU) (b) Room for the DIMU (II) Model ZIU (a) Zonal Review Committee (ZRC) (III) Model District offices (a) District Project Development Team (DPDT)	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the Verification Study period *Pre-conditions* (a) Good understanding of MAFS on needs of information management on irrigation development (b) Good understanding of related organizations on sharing information about irrigation development (c) High needs for irrigation development at model District offices

Project Design Matrix (PDM) for Support for Irrigation scheme formulation for DADP (VS-2)

Project Title: The National Irrigation Master Plan, Verification Study
Project Term: 7 months (Feb 2004 - Aug 2004)
Project Area: Model Districts (Mvomero and Mkuranga District)
Prepared Date: July 13, 2004
Target Group: Model DPDTs and model ZRC
Version: 2.1 (minor revision of version 2.0 on Mar 15)

Project Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal 1.1 Sustainable irrigation development is achieved	1.1 Achievement of 405,000ha of irrigation development by year 2017 and stable crop production.	1.1 Annual irrigation development monitoring report	-
Overall Goal 2.1 Appropriate irrigation scheme formulation process for DADPs is established for all the Districts in the mainland.	2.1 More than 70% of prepared irrigation scheme formulation plans for DADPs in all the Districts are evaluated as appropriate in year 2007.	2.1 Irrigation scheme formulation plans in DADPs	(a) No change in basic policies of Tanzania such as decentralization (b) Implementation of irrigation development according to the plan
Project Purpose 3.1 Model of appropriate irrigation scheme formulation process for DADPs is established in the model Districts	3.1 Appropriate irrigation scheme formulation plans for DADPs are prepared by model DPDTs for fiscal year 2004-2005 by August 2004	3.1 Irrigation scheme formulation reports 3.2 Monitoring and evaluation questionnaires	(a) Execution of training to non-model organizations (b) Distribution of an adequate quantity of the guidelines to all the District offices (c) Timely allocation of required budget for irrigation scheme formulation in DADPs
Outputs 4.1 Effective guidelines for irrigation scheme formulation for DADPs 4.2 Capable DPDT in irrigation scheme formulation for DADPs in the model Districts 4.3 Capable ZRC in endorsement and validation in the model ZIU 4.4 Verification results	4.1 The guidelines are evaluated as effective by DPDTs in the model Districts in August 2004 4.2 DPDTs in the model Districts acquire skill in irrigation scheme formulation for DADPs by August 2004 4.3 ZRC in model ZIU understand procedure of endorsement and validation by August 2004 4.4 Verification results are available by August 2004	4.1 Monitoring and evaluation questionnaire 4.2 Monitoring and evaluation questionnaire 4.3 Monitoring and evaluation questionnaire 4.4 Monitoring and evaluation questionnaire	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the Verification Study period
Activities 5.1 Prepare the draft guidelines for irrigation development 5.2 Make the first trial usage based on the draft guidelines in the on-the job training to the DPDTs and ZRC in two model districts 5.3 Rectify the draft guidelines. 5.4 Make second trial usage based on the rectified guidelines in the on-the job training to the DPDTs and ZRC in two model districts 5.5 Verify the results of activities for irrigation scheme formulation in two model irrigation schemes	*Inputs from donor* (a) Foreign experts (b) Equipment for training (c) Traveling cost for foreign experts, counterparts (d) Field allowance for counterparts	*Inputs from the government of Tanzania* (I) DITS of MAFS (a) Counterparts (b) Office space (c) Printing cost of the guidelines (II) Model ZIU (a) Zonal Review Committee (ZRC) (III) Model District offices (a) District Project Development Team (DPDT) (b) Meeting space	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the Verification Study period *Pre-conditions* (a) Good understanding of related organizations on importance of appropriate planning in DADPs (b) High needs for irrigation development at model District offices

5.2 Basic Approaches to the Verification Study

Basic approaches to the Verification Study were set to be as follows.

Basic Approach-1
Linkage with Guidelines and Database System

Basic Approach-2
Participatory Approach to Guidelines and Database System Preparation

Basic Approach-3
Introduction of User-friendly Guidelines and Database System

Basic Approach-4
Preparation of Guidelines Using Data and Information Collected in the Master Plan and Action Plan Studies

Basic Approach-5
Efficacious Transfer of Data, Information and Technologies Used in the Master Plan and Action Plan Studies to DITS through Database System

Basic Approach-6
Application of Systematic On-the-job Training

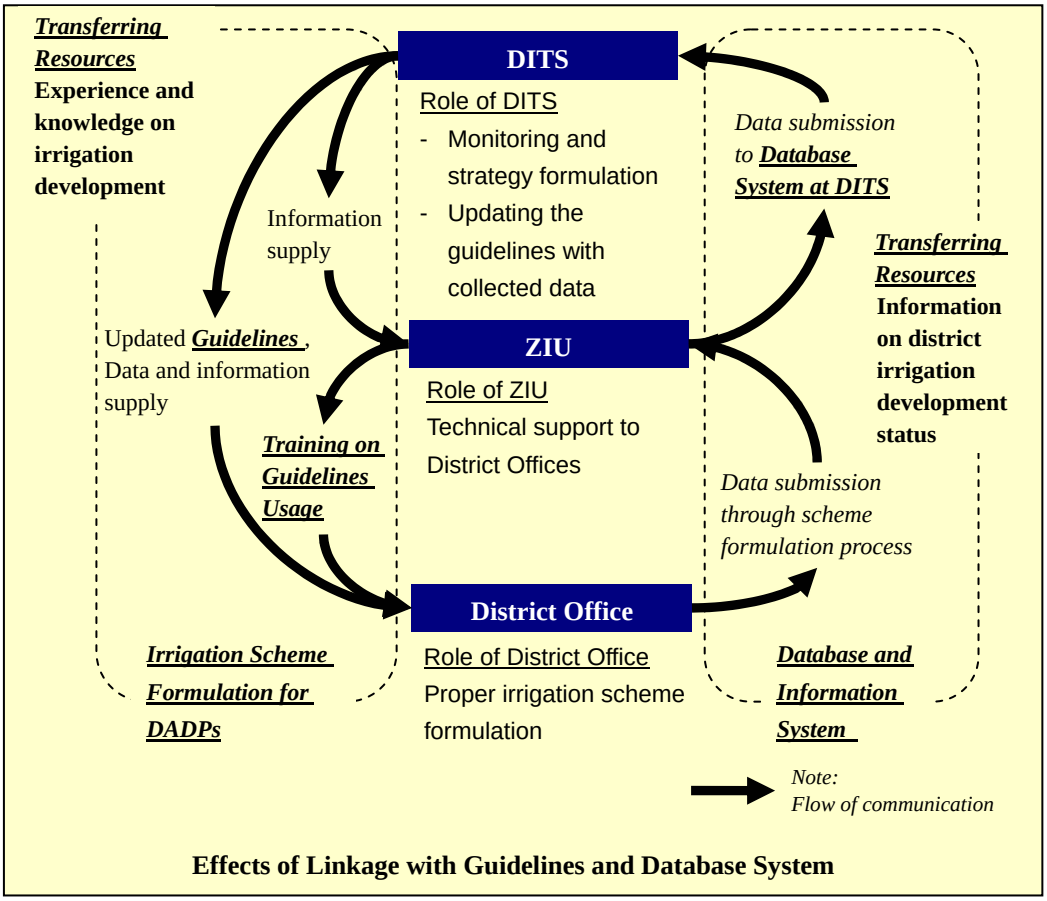
5.2.1 Linkage with Guidelines and Database System

The two subjects mentioned for the Verification Study should have close interrelation or rather are complementary to each other, so that both of them should be strengthened in parallel.

Data and information stored in the VS-1: simple database and information system at DITS are very useful for districts when District Project Development Team (DPDT: a team specially established for irrigation scheme formulation for DADP) conduct the VS-2: irrigation scheme formulation for DADP. For example, the DPDT should confirm the protected area boundaries using information from the DIMU in charge of the simple database and information system. Otherwise the DPDT will not be able to know such restrictions against scheme development at the site. On the other hand, the DPDT should submit their surveys and study results to the DIMU at DITS, which keenly contribute to, not only nation-wide monitoring of irrigation development, but also development strategy setting.

The linkage of the activities for these subjects should be clearly mentioned in the guidelines for easy understanding by district staff. Those are necessary for

requesting and receiving useful data from the simple data and information system prior to the survey and need of reporting survey and study results to the DITS through ZIU. The following figure indicates the linkage of the activities for these subjects.



Effects of Linkage with Guidelines and Database System

5.2.2 Participatory Approach to Guidelines and Database System Preparation

There are several guidelines and manuals related to irrigation in Tanzania. However, those guidelines and manuals seem to be too sophisticated and impractical for district staff, who have limited experience for irrigation scheme formulation. To prepare guidelines that are satisfactory for district staff, a "Participatory Approach to Guidelines Preparation" should be applied. By applying this approach, the comments and suggestions by district staff could be reflected upon the guidelines, so that the guidelines would become more practical and useful for them. It goes without saying that the same approach should be applied for establishment of the simple database and information system.

5.2.3 Introduction of User-friendly Guidelines and Database System

Products of the Verification Study should be fully used by users. To produce effective and practical products, a "user-friendly concept" was introduced. User-friendly does not mean to provide merely pictures or figures in the products

but should consider how to overcome users' constraints in using the products. For example, if users do not have enough time for planning, the guidelines should mention the simplified planning procedure within allowable accuracy.

User-friendly concept to be applied

To the simple database and information system

a) Provide easily understandable operation panels
b) Avoid unfamiliar operations using unfamiliar programming language
c) Apply easy and understandable pictures and figures

To the guidelines for irrigation scheme formulation for DADP

a) Explain procedures with well-designed formats
b) Simplify survey and planning methods considering available budget, time, and equipment
c) Provide data fill forms with easy instructions for proper calculation and planning

5.2.4 Preparation of Guidelines Using Data and Information Collected in the Master Plan and the Action Plan Studies

To facilitate district staff that are unfamiliar with irrigation planning, it is essential to show standard values of the planning results in their district for crosscheck purposes. If such standard values are not shown, they will not be able to judge whether the planning result is reasonable or not.

As the guidelines target nation-wide usage, collection of nation-wide data and information was thus required. Fortunately, nation-wide data and information had been already collected in the Master Plan and the Action Plan Studies, so that those data and information were fully used in the guidelines.

5.2.5 Efficacious Transfer of Data, Information and Technologies Used in the Master Plan and the Action Plan Studies to DITS through Database System

Lots of valuable data and information were collected in the Master Plan and the Action Plan Studies. Those should be kept at the DITS for further study. If those data are not kept at the DITS in an appropriate manner like database system, they might not be used effectively and finally will be lost. In order to avoid such situation, it is essential to establish database system at the DITS.

In addition, technology specially used in the Master Plan and Action Plan Studies, such as GIS technology should also be transferred to the DITS for additional analysis in the future.

For those purposes, an Irrigation Database and Irrigation GIS need to be established at the DITS and technology for operation of that system should be transferred to the DITS staff in charge.

5.2.6 Application of Systematic On-the-job Training

Training in the Verification Study was made through on-the-job training basically, because site training enabled the trainees to understand site conditions. However, there is a disadvantage in on-the-job training. This is the difficulty in systematic learning. Taking those advantages and disadvantages of the on-the-job training into account, a programme of on-the-job training should be worked out. It should present good output for the trainees, which can be used for actual irrigation development.

5.3 Inputs to the Verification Study

5.3.1 Establishment of Simple Database and Information System

The following are the inputs spent for the database system establishment.

(a) Manpower

Type of Manpower	Amount of Input
Foreign experts	5.5 person-months
DITS staff	2.0 person-months

(b) Equipment

Type of Equipment	Amount of Input
Computer	2 nos.
Scanner	1 no.
Database software	1 no. (Microsoft Access)
GIS software	1 no. (ESRI Arc View)
Office space	1 room for the DIMU

5.3.2 Support for Irrigation Scheme Formulation for DADP

The following are the inputs spent for the support for irrigation scheme formulation.

(a) Manpower

Type of Manpower	Amount of Input
Foreign experts	12.5 person-months
DITS staff	0.5 person-months
Morogoro ZIU staff	6.0 person-months
Mvomero District office staff	6.0 person-months
Mkuranga District office staff	10.0 person-months

(b) Equipment

Type of Equipment	Amount of Input
Transportation	10.0 car-months
Handheld GPS	2 nos.
Handheld EC meter	1 no.
Meeting space	1 each in Morogoro ZIU and Mkuranga District office

5.4 Activities of the JICA Study Team

5.4.1 Establishment of Simple Database and Information System

(1) Establishment of Prototype Database and Information System

As for data, reports and topographic maps as well as the results of inventory surveys obtained in the Master Plan and Action Plan Studies, it is expected that, without scattering, they will be increasingly accumulated, and will be fully utilized for irrigation development. If they are systematically kept at one place and can be easily retrieved as and when required in the near future it would be very useful for irrigation development by the DITS of MAFS and District Offices.

Currently, development of most irrigation schemes is in the hands of the district offices under DADP in line with the decentralization policy. Even under such situation, DITS of MAFS should grasp the progress of irrigation development in the country on time. This means there is need of timely exchange of monitored data on irrigation development between the DITS and district offices. The monitored data also must be filed at the same place, and to be accessed with ease by the DITS of MAFS at any time.

The database system that consisted of "Irrigation Database" and "Irrigation GIS" was therefore established as a prototype, and the major characteristics of those are as follows:

Prototype Irrigation Database

The prototype irrigation database was established based on **Basic Approach-5: Efficacious Transfer of Data, Information and Technologies Used in the Master Plan and the Action Plan Studies to DITS**. The result of inventory surveys, reports/documents and topographic maps collected during the Master Plan Study and the Action Plan Study were stored in the database and are ready to be accessed.

The prototype database has three functions (see figure in the next page);

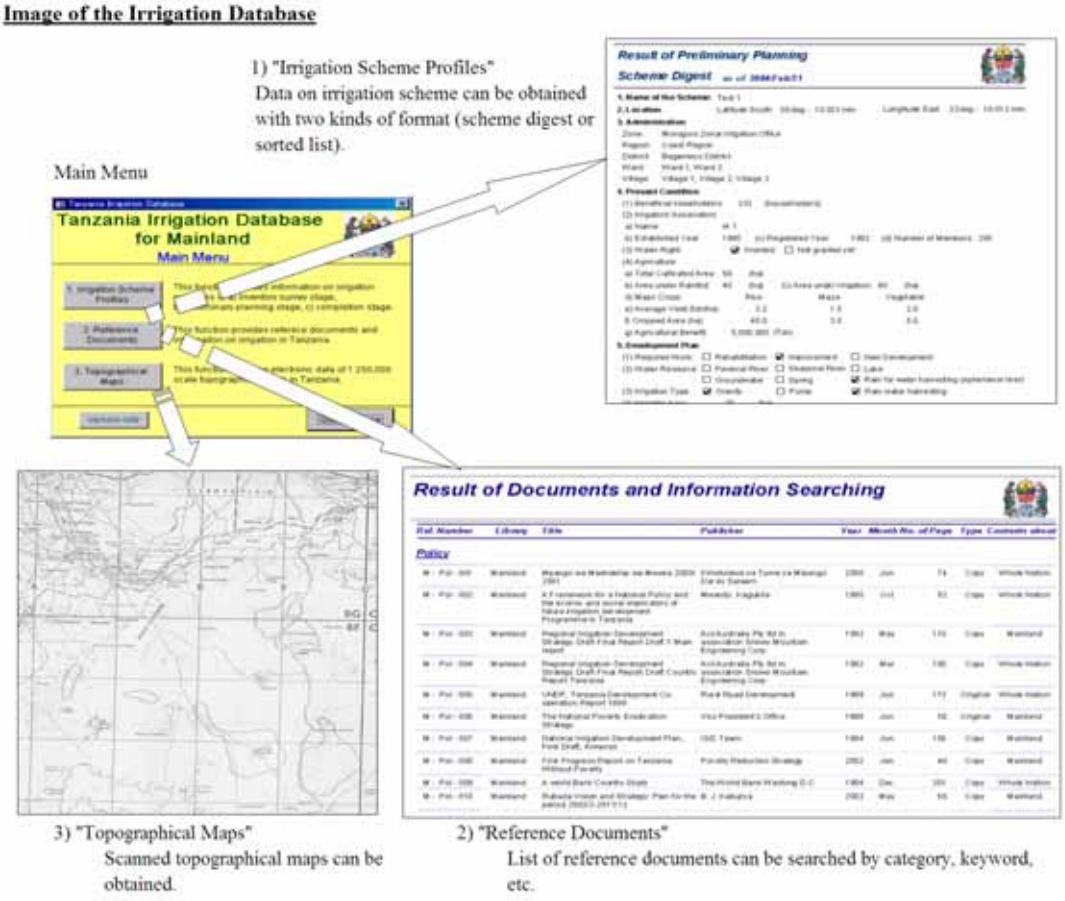
(a) Irrigation scheme profiles function,

(b) Reference documents function, and

(c) Topographic maps function.

In irrigation scheme profiles function, two types of datasets can be handled. One is result of inventory surveys conducted in the Master Plan Study in 2001/2002 and the other is the results of the preliminary planning. The results of preliminary planning can be obtained from district offices when they prepare irrigation scheme formulation plans for DADP.

Image of the Irrigation Database



Prototype Irrigation GIS

Based on the **Basic Approach-5: Efficacious Transfer of Data, Information and Technologies Used in the Master Plan and the Action Plan Studies to DITS**, a prototype Irrigation GIS was established mainly using the materials employed for the analysis of the potential area for irrigation development carried out during the Master Plan Study. The function of the Irrigation GIS can basically be divided into four areas;

(a) General features (administrative boundaries, rivers, roads),

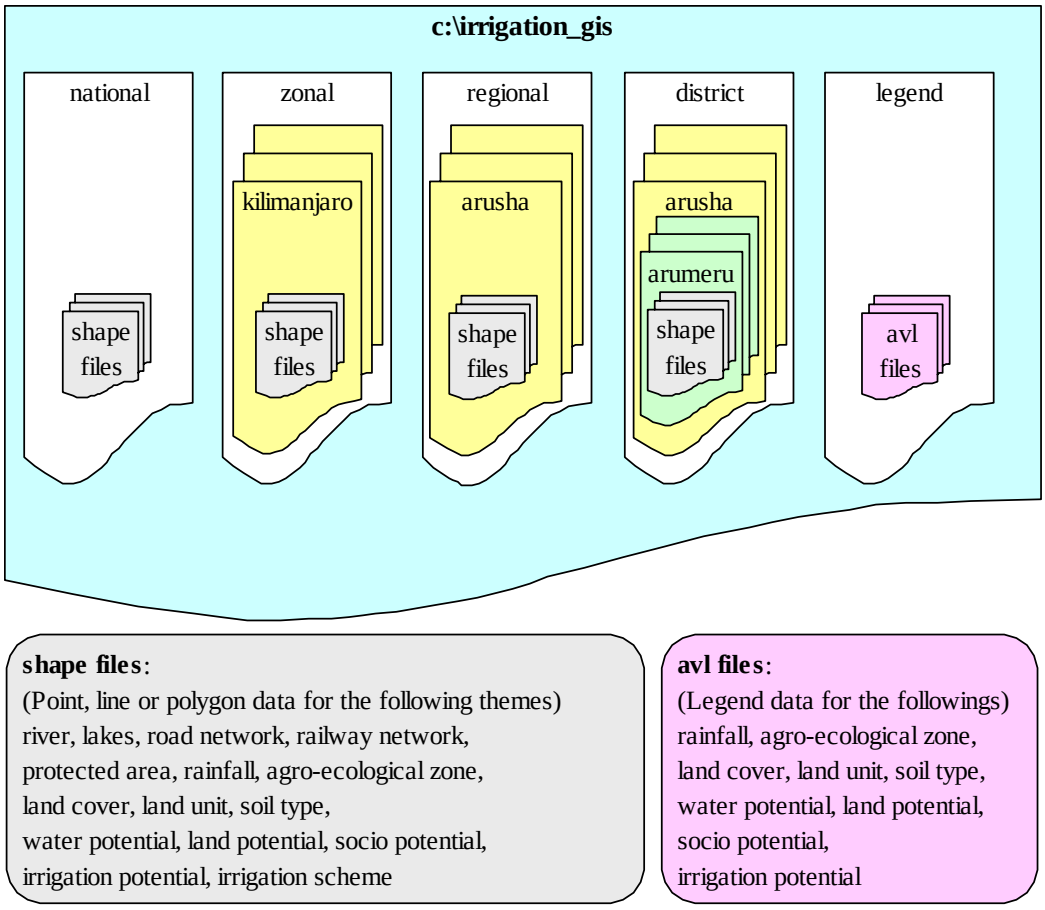
(b) Protected areas (national parks, game reserves, forest reserves, conservation areas),

(c) Natural conditions (rainfall, agro-ecological zone), and

(d) Land use (land cover, land unit, soil type).

The digital data of the agro-ecological maps was obtained from the Department of Research and Development, MAFS. Other digital data for the above mentioned areas were obtained from the Institute of Resource Assessment, University of Dar Es Salaam.

This system can therefore be utilized as one of the useful resources for evaluating the irrigation potential of a proposed scheme. All the available information was systematically stored in the manner as shown in the following figure.



Structure of the Irrigation GIS

(2) Preparation of Draft Operation Manual

The draft operation manual for the database system was prepared for test use by the staff of the DIMU of DITS in MAFS. This draft manual, along with the training kit, was utilized as material for the training on simple database and information system development. During the training activities, the appropriateness of the draft manual was examined and evaluated. The necessary rectifications were made accordingly for the convenience of the operation practice. It was expected that even the staff that did not have enough experience in database management could operate the system using this operation manual.

(3) Preparation of Training Kit

The training kit for the database system was prepared as material for the training activities. This training kit was utilized to situate the trainees in various circumstances that may happen during the actual operation of the database system in the future. The trainees are expected to understand that proper database management can contribute to irrigation development through the following simulated situations in different stages.

Contents of the Training Kit

Stages	Simulated Situations
Before starting irrigation scheme formulation	Request data and information from the district office Output the requested data Supply of output data to the district office
After completion of irrigation scheme formulation (1)	Supply of irrigation scheme formulation results from the district office Data entry into the database
After completion of irrigation scheme formulation (2)	Input of GPS data into GIS Supply of the data obtained to the district office
Upon requests for particular data sets	Request for certain data sets for a monitoring report, etc. Preparation of requested data sets
Maintenance of the system	Request for the reflection of the new administration boundary Modification of the system according to the new administration boundary

(4) Training on Database System Operation

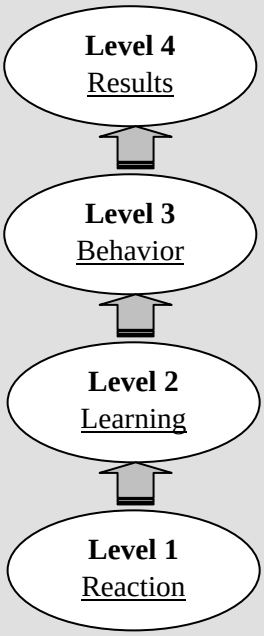
Training on the operation of prototype database and information system was given using the draft operation manual and the training kit. The training could also be recognized as a trial operation of the prototype database system, since it handled actual data and information as well. The following is the outline of the training.

(a) Conceptual Framework of Training

To conduct the training, “Kirkpatrick’s Four-Level Model” (see figure in the next page) was referred as a conceptual framework. It is obvious that the goal of this training is “Level 2: Learning” in the model, since Level 3 and 4 can be achieve only some time after the training programmes. However, the training programmes were designed to encourage participants toward Level 3. Actual examples are to (i) facilitate participants desire to be changed, (ii) make participants understand what to do and how to do it after the training programmes, etc.

Conceptual Framework of Training (Kirkpatrick's Four Levels)

Effect of training programs can be evaluated by four levels:



Results:
Final results *after the training* that occurred because the participants attended the training programme.

Behavior:
Change in behavior *after the training* because the participants attended the training programme.

Learning:
Improvement of knowledge, and/or increase skill as a result of attending the training programme.

Reaction:
Satisfaction of participants with the training programme.

Source: Kirkpatrick, D.L. 1998. Evaluating Training Programs, Second Edition. Berret-Koehler Publishers, Inc., San Francisco

(b) Methodology of Training

Training was given based on **Basic Approach-6: Application of Systematic On-the-job Training**. Training aimed at obtaining given output was conducted in actual job situations. It meant that training was on-the-job. The training menu was programmed to transfer the technologies systematically.

Training programmes were periodically adjusted so as to meet participants' demands. For that purpose, questionnaires on the training programme were distributed to the participants at the end of each training session. After the exercise, their answers were examined and subsequent programmes were modified to reflect their demands.

(c) Target of Training

As described above, Level 2 is the conceptual goal of this training. However, it is necessary to give a more concrete description on what Level 2 is. In this training, a target of Level 2 can be described as follows.

Target Organization	Target
DIMU	To acquire skills to operate the database system in the situations presented in the training kit

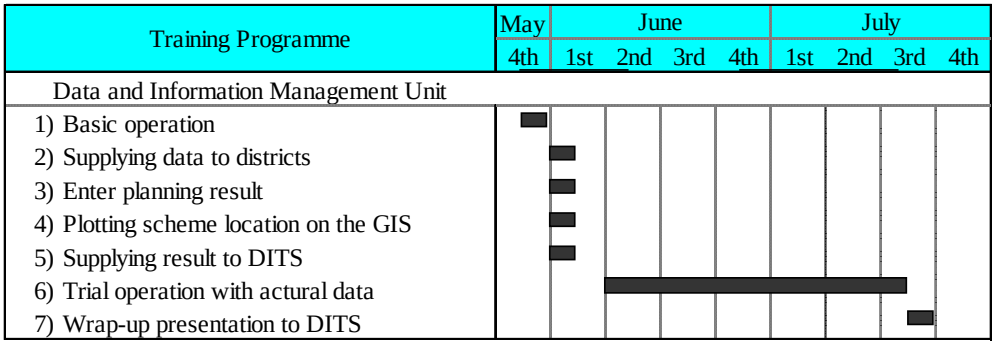
(d) Activities Conducted in the Training Programmes

The overall training schedule is as shown below. The training started with basic operation of the database and GIS software. The main part of the training was intensively conducted in the first week of June. In each exercise, the training kit was fully utilized to provide participants with virtual situations. The draft operation manual was also utilized in the training to facilitate participants of the training to solve the problem on the operation.

Actual operation was commenced after those trainings. Actual irrigation scheme data obtained through another Verification Study, "Support for irrigation scheme formulation (VS-1)", were delivered to the DIMU and entered in the database system. Progress of the data management was periodically checked by the JICA Study Team.

After all the programs, a wrap-up presentation was held to present their skills to other DITS staff. Another reason for holding the wrap-up seminar was to inform the DITS staff that the database system was ready for use.

Details of the training are given in Appendix A.



Training Activities Conducted for the Database System Operation

(5) Rectification of Prototype Database and Information Systems

Throughout the training period, which could be recognized as a trial operation period of the database system as well, requests and comments of users were collected. Rectification of the database system was made based on those requests and comments from the viewpoints of participatory approach (**Basic Approach-2**: **Participatory Approach to Guidelines and Database System Preparation**) and user-friendly approach (**Basic Approach-3: Introduction of User-friendly Guidelines and Database System**). The following is the list of rectification works.

Rectification works for the prototype Irrigation Database

- Provide a function to monitor development status of irrigation schemes in various development stages,
- Provide a function to revise administrative bodies, and
- Provide passwords to avoid unauthorized operation.

Rectification works for the prototype Irrigation GIS

- Enable access to detailed information for each polygon.

Details of the rectification works are shown in Attachment 12.

(6) Rectification of Draft Operation Manual

Throughout the training period, requests and comments of users on the draft operation manual were collected and the manual was rectified based on those requests and comments.

Concerning Irrigation Database

- Reorganize structure of explanation to follow the operation order.

Concerning Irrigation GIS

- Explain basic operation of GIS software (ArcView),
- Explain method to obtain area of polygon data,
- Explain insertion method of graticule to layout, and
- Explain useful functions such as “dissolve” and “clip”.

5.4.2 Support for Irrigation Scheme Formulation for DADP

(1) Preparation of Draft Guidelines

(a) Title

Title of the draft guidelines had been determined as “Guidelines for Irrigation Scheme Formulation for DADP”.

(b) Users

Main users of the guidelines were district staff in charge of irrigation scheme formulation. However some parts of the guidelines for ZIUs were about technical support to districts.

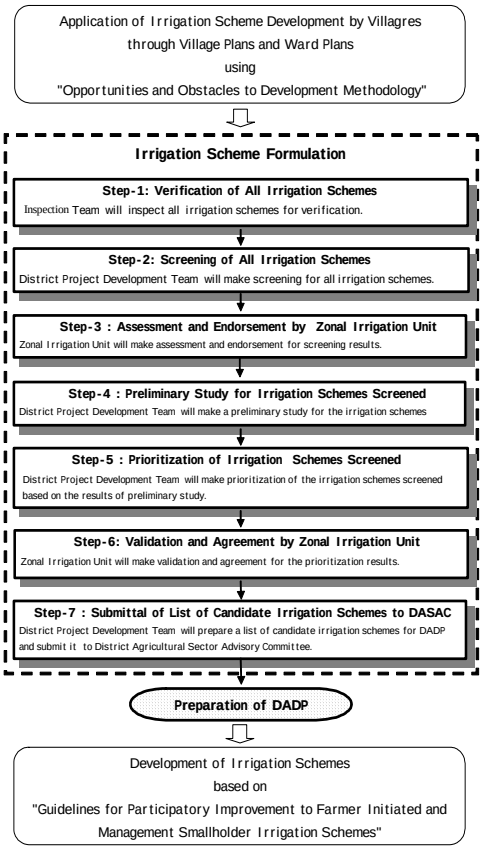
(c) Contents

The guidelines consist of seven steps as seen in the next page. As clearly shown in the figure, the guidelines should be applied only after

Opportunities and Obstacles to Development Methodology (O&OD), which was the basis of all the DADP.

(d) Features

The draft guidelines had been prepared taking into account **Basic Approach-2: Introduction of User-friendly Guidelines and Database System** and **Basic Approach-4: Preparation of Guidelines Using Data Collected in the Master Plan and the Action Plan Studies**.



Overall Work Flow of the Draft Guideline

(2) Training for Irrigation Scheme Formulation

(a) Concept of the Training

Training for irrigation scheme formulation was held using draft guidelines. The training could be recognized as trial usage of the guidelines as well. The training was given based on **Basic Approach-6: Application of Systematic On-the-job Training**. It means that the training aims at obtaining outputs that can be used for actual DADP. However, the training menu was also programmed to transfer the technologies systematically.

Training programmes were periodically adjusted to suit participants' demands. For that purpose, questionnaires on the training programme were distributed to the participants at the end of each training session. After the exercise, their answers were examined and the programmes were rectified to reflect their demands accordingly.

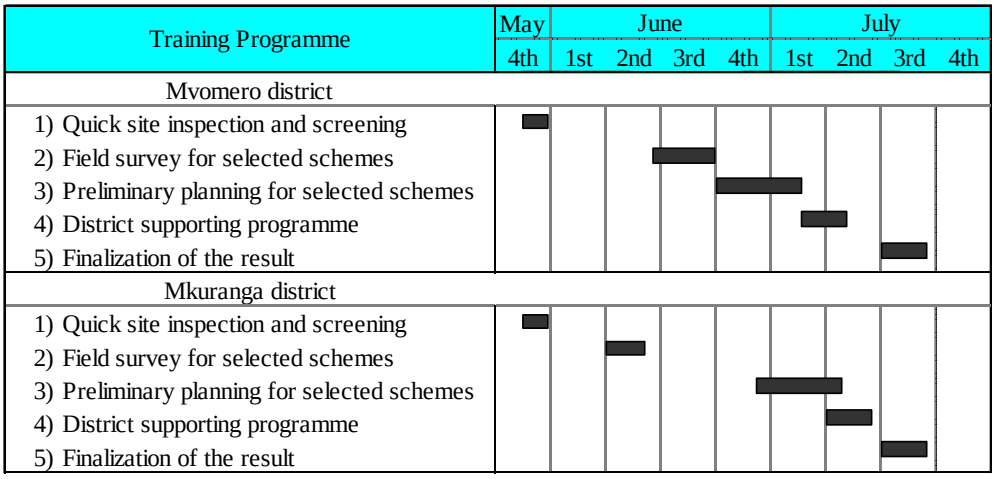
(b) Target of the Training

The target of the training was set in the same manner as Clause 5.4.1, and Level 2 was applied for the target. Level 2 in this training can be described as follows:

Target Organization	Target
DPDT in Mvomero/Mkurang Districts	To acquire skill for irrigation scheme formulation for DADPs
Morogoro ZRC	To understand endorsement and validation procedures.

(c) Activities Conducted in the Training

The overall training schedule is as shown in the figure in the next page. The training started at the end of May and continued for two months. The training programmes were prepared in the same way as the irrigation scheme formulation process stipulated in the guidelines. In each session, training was presented in the following manner: i) explanation of the procedure by the JICA Study Team, ii) practice at the site/office by the DPDTs, followed by the ZRC and the JICA Study Team, and iii) confirmation of the result by the DPDTs, ZRC and JICA Study Team. Concerning the steps to be done by the ZRC, committee members were encouraged to conduct the task using only the guidelines. Details of the training are given in Appendix B.



Training Activities Conducted for Irrigation Scheme Formulation

(3) Rectification of Draft Guidelines

Rectification of the guidelines was made based on the requests and comments of the district and ZIU staff obtained throughout the training period. The following is the list of rectification works.

Addition to the process

- Add a process for confirming district irrigation development priority.
- Add a process for listing all the irrigation schemes in the district including completed schemes.
- Explain the necessity of preparatory works before the field survey.
- Introduce a process for preparing village resource maps.
- Add a process for making agreements on the proposed area.
- Introduce a process for preparing present situation maps.
- Add procedures for identifying and designing district supporting programmes.

Improvement of the process

- Improve the check list for quick site inspection.
- Introduce stage-wise flow in the screening.
- Improve timing of data collection.
- Rearrange work flow of the field survey according to the time table.
- Explain the process of the water balance study in more detail.
- Rearrange the method of scheme development planning considering availability of topographic maps.
- Introduce detailed calculation methods and various indicators for the scheme incremental benefit estimation.

Simplification of the process

- Simplify interview survey methods for efficient data collection.
- Simplify soil survey methods based on the availability of the equipment.
- Simplify river discharge measurement methods based on the required data.
- Simplify water requirement estimation methods considering availability of the data.
- Simplify a procedure for environmental consideration taking requirements in the scheme formulation stage into account.

Improvement of the explanation

- Provide terminology for the guidelines in order to avoid confusion.
- Explain effective use of the database system.

Details of the rectification works are described in Attachment 12.

5.4.3 Verification of the Hypothesis of the Study

Since the purpose of the Verification Study is to verify the hypothesis of the study, verification activities were required. Verification activities were conducted to validate project outputs (outputs of the JICA Study Team) and project purpose

(outcome of the counterparts). If both were proved to be satisfactory, it could be regarded that the project purpose was achieved as an effect of the project outputs. The following are the verification activities conducted by the JICA Study Team.

(1) Establishment of Simple Database and Information System

To validate the project outputs, questionnaire surveys were given to the DIMU staff. To assess the project purpose, a wrap-up seminar was held to demonstrate performance of the DIMU and then the project purpose was assessed by participants of the seminar, who were the DIMU, DITS and JICA Study Team.

(2) Support for Irrigation Scheme Formulation for DADP

To validate the project outputs, questionnaire surveys to the DPDT in Mvomero and Mkuranga District and Morogoro ZRC were conducted. Another questionnaire survey to the DPDTs and ZRC was also carried out to assess the project purpose.

5.5 Activities of Counterparts

5.5.1 Establishment of Simple Database and Information System

Two staff of the DIMU of DTIS were assigned as counterparts, and attended the programme of on-the-job training conducted by the JICA Study Team. The following are the evaluation items for the counterparts at the training programmes.

Counterparts Attendance at the Training Programmes

Item	Value
Number of counterparts assigned	Two persons
Rate of attendance at the training programmes	89% in average

5.5.2 Support for Irrigation Scheme Formulation for DADP

(1) Mvomero District

Three staff in Mvomero District office were assigned as counterparts, and attended the training programme. The following is the attendance of the counterparts at the programmes.

Summary of Activities Made by Counterparts

Item	Value
Number of counterparts assigned	Three persons
Rate of attendance at the training programmes	100%

(2) Mkuranga District

Five staff in Mkuranga District office were assigned as counterparts, and attended the training programme. The following is the attendance of the counterparts at the programmes.

Summary of Activities Made by Counterparts

Item	Value
Number of counterparts assigned	Five persons
Rate of attendance at the training programmes	85% on average

5.6 Activities of the NGO

The NGO also joined in surveying candidate irrigation schemes for Mvomero and Mkuranga Districts separately from the DPDTs to confirm whether DPDTs really prepared the scheme formulation plans from villagers' viewpoints. The NGO finished their duty within their survey period. It was found that their proposed schemes were exactly the same with those of the DPDTs'. It was thus confirmed that the DPDTs' scheme formulation plans were made on the basis of villagers' viewpoints.

Although the purpose mentioned above was fulfilled, it may be said that the involvement of the NGO in the scheme formulation stage should be carefully considered for the following reasons.

- The same survey method as that of DPDTs was used by the NGO,
- No remarkable findings by NGO,
- Confusion of village people due to two similar surveys, and
- High cost compared with the budget for the DADP.

In addition, the JICA Study Team expected the NGO to, at least partially, conduct the survey with a viewpoint toward O&OD methodology,. However, the NGO was not familiar with the O&OD methodology. It came to light that NGOs familiar with the O&OD methodology were very limited in number in the country.

Chapter 6

Results of the Verification Study

Participatory approach in guidelines rectification, Mvomero District, Morogoro Region

CHAPTER 6 RESULTS OF THE VERIFICATION STUDY

6.1 Products of the JICA Study Team

Five products prepared by the JICA Study Team as outputs of the Verification Study are explained hereunder.

6.1.1 Simple Database and Information System

After rectification of the prototype database system as mentioned in Chapter 5, the functions of the system were significantly improved. A special emphasis was given so that the system could serve for the monitoring of the irrigation development status in the country under effective combination with the irrigation scheme formulation for DADP (**Basic Approach-1: Linkage of Guidelines with Database System**). Furthermore, the combination between the Irrigation Database and the Irrigation GIS was also strengthened. For example, scheme information sent from district office is firstly entered in the Irrigation Database. After that, those data can easily be transferred to the Irrigation GIS and displayed on the GIS maps.

The major characteristics of the Irrigation Database, the Irrigation GIS, the operation manual and the training kit are as follows:

Product 1
Irrigation Database

Purpose

The objective of the Irrigation Database is to supply effective information to both the districts for irrigation scheme formulation and the DITS for analysis and preparing irrigation development strategy.

Main Users

Staff of the DIMU of DITS are the main users of the database. They are in charge of maintenance of the database system as well.

Development Concept

(1) Easy Operation

Basic Approach-3: Introduction of User-friendly Guidelines and Database System is regarded as the main concept of the Irrigation Database. In the database, “user-friendly” operation panels were provided to guide users to the required information they needed. Those panels enabled people who have limited knowledge about databases to operate the irrigation database without confusion.

(2) Easy Maintenance

The most common database software in Tanzania, which is "Microsoft Access", was applied as the base software taking easy future maintenance into account. This concept can contribute to enhancement of the sustainability of the system.

(3) Minimum Installation Cost

The database should be at minimum installation cost due to use of "Microsoft Access" which is pre-installed in most computers, and hardly requires initial investment.

(4) Effective Use of Readily Available Data

Lots of useful data and information collected during the Master Plan Study and the Action Plan Study were stored in the database to satisfy the **Basic Approach-5: Transfer of Data, Information and Technologies Used in the Master Plan and the Action Plan Studies to DITS through the Database System.** In this connection, the database contained results of the inventory surveys, scanned topographic maps (1:50,000 and 1:250,000) and lists of reports/documents related to irrigation development.

(5) Compatiblility with the Data Collection System proposed in the Guidelines

It is well known that data collection is one of the critical issues to sustain the database system. To collect data and information on scheme development status periodically, **Basic Approach-1: Linkage of Guidelines with Database System** should be considered. Under this basic approach, the guidelines stress the necessity of data submission from district offices to the DITS through ZIUs. With this data collection system, scheme data should be sent to the DITS with the format proposed in the guidelines. Data input panels of the database were thus designed to be compatible with that format.

(6) Sustainable Database System

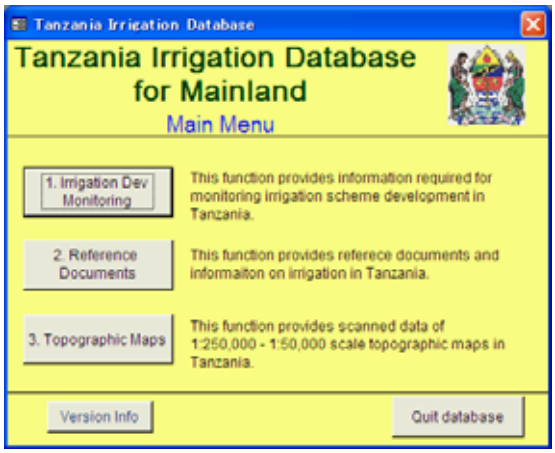
As explained in the development concepts (2) and (5), the system should be developed paying attention to the following issues to realize its sustainability:

- In future, the database system should always present the latest administrative boundaries.
- The database should treat irrigation schemes at all development stages, aiming to contribute to the future demand of the DITS, which is an analysis of development status and strategy setting.

Functions

In consideration of the development concept mentioned above, the database was

designed to have three functions; “Irrigation Development Monitoring”, “Reference Documents” and “Topographic Maps”. Each function can be approached from the main menu as shown below.



(1) Irrigation Development Monitoring

(2) Reference Documents

(3) Topographic Maps

(1) Irrigation Development Monitoring Function

“Irrigation Development Monitoring” deals with information necessary for planning and monitoring irrigation development.

Available Data

Data and information on irrigation schemes are contained in this function. There are two types of datasets in this function. These are (i) results of the inventory surveys, and (ii) present condition and the latest development plans of irrigation schemes. “Results of the inventory survey” provide irrigation scheme information surveyed in the Master Plan Study. This dataset is only for browsing. The other datasets for “present condition and the latest development plans” give the latest irrigation scheme information and it can be updated as required. Both of the datasets provide the following information on irrigation schemes.

- Location,
- Irrigation system,
- Agriculture, and
- Irrigators Association.

The datasets for “present condition and the latest development plans”, are categorized into six development stages: O&OD (village plan), DADPs, Feasibility Study (F/S), Detailed Design (D/D), Construction, and O&M. There is no difference in the format of scheme digest, but those six categorized stages help users understand whether the data collected are reliable or not.

Output Formats

There are two types of output formats for the function. One is “scheme digest”, which provides detailed data for a single irrigation scheme. The other is “listed outlines of several irrigation schemes”, which supplies summarized information of irrigation schemes in Zone, Region, or District.

-Scheme Digest-

A sample of a scheme digest is shown in the next pages. The scheme digest is useful in case data of a certain irrigation scheme is needed, e.g., obtaining pre-information before visiting the scheme site. Furthermore, in relation to the linkage with the guidelines **(Basic Approach-1: Linkage of Guidelines with Database System)**, district staff will utilize the data in irrigation scheme formulation, especially during the process of site inspection and preliminary planning.

-Listed outlines of several irrigation schemes-

A sample of listed outlines of irrigation schemes is shown in Page 6-8. The following types of scheme data are shown in the listed format:

- Present type of irrigation system,
- Present irrigated area,
- Current development stage,
- Required works,
- Planned development area, and
- Proposed irrigation type.

Using this format, users can monitor the progress of irrigation development in a certain area. If those records are accumulated and reported periodically, those help the DITS work out strategies for irrigation development based on reliable data.

Other Functions

-Transferring scheme data to the irrigation GIS-

Scheme data sent from district offices can be utilized, not only for the irrigation database, but also for the Irrigation GIS. This function can be used to transfer scheme data to the Irrigation GIS. Transferred data are displayed on the Irrigation GIS with points (geographical locations) and scheme dimensions (irrigation type, development area, etc.). Thus, combination use of the Irrigation Database and Irrigation GIS is very effective.

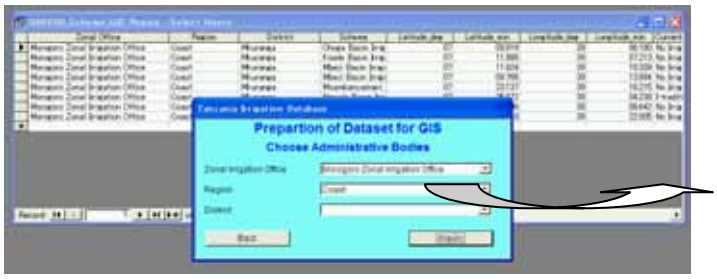
Sample of Scheme Digest (1/3)

Sample of Scheme Digest (2/3)

Sample of Scheme Digest (3/3)

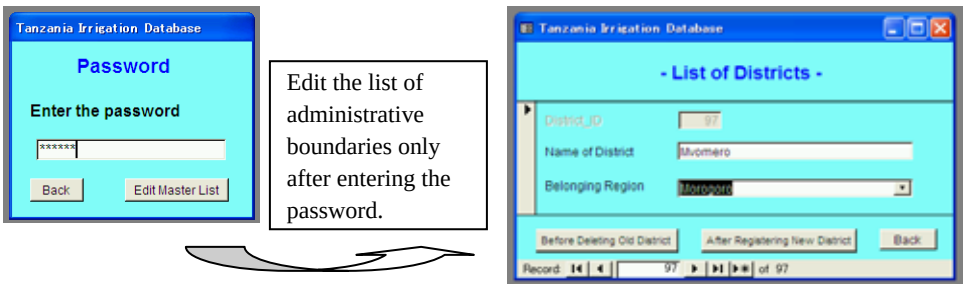
Sample of Listed Outlines of Irrigation Schemes

(Original data was partly arranged for display.)



-Changing Administrative Boundaries-

This function was provided to reflect changes in administrative boundaries. Since administration bodies are key information to search a scheme data, it is essential for the database to keep the latest information on their boundaries. Considering the importance of the information, the operation of this function was permitted only for nominated staffs that were granted the password.



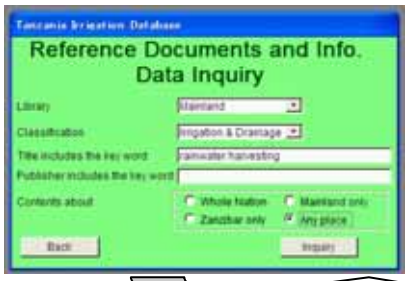
(2) Reference Documents Function

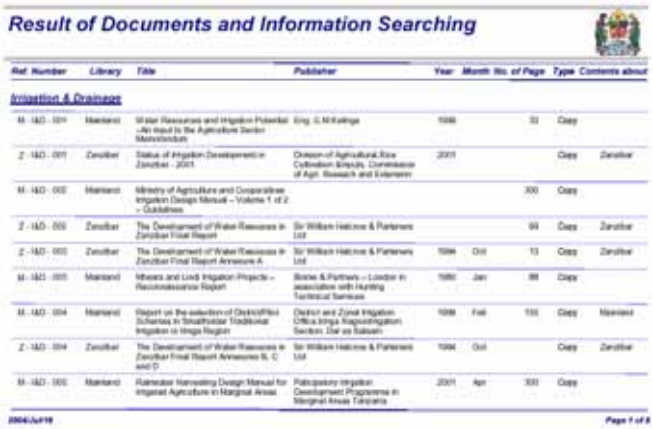
Available Data

Lots of documents/reports collected in the Master Plan and the Action Plan Studies were classified into eight categories (policy, economy, institution, irrigation and drainage, agriculture, environment, statistics, and others) and were stored in the library of the DITS. “Reference Documents” function can contribute to search and finding of required documents in the library.

Data Inquiry and Output

Documents can be searched by title, classification, or publisher of the documents. An image of data inquiry is illustrated in the next page.





By entering key information, list of searched document will be shown.

Other function

-Create Index Labels for Documents-

In the library, documents were kept on the shelf with unique index labels on their backs. Using this function, users can easily prepare index labels for new registration.

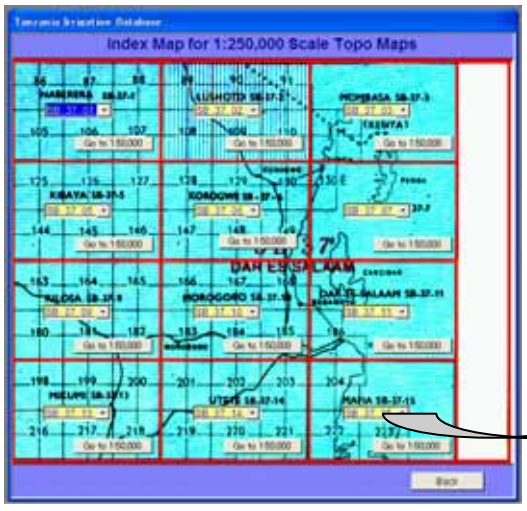
(3) Topographic Maps Function

Available Data

The "Topographic Map" function supplies scanned images of topographic maps (1:50,000 and 1:250,000) in the country. Those topographic maps were collected during the Master Plan Study. This function covers all the area for 1:250,000 and some parts for1:50,000. When new maps are obtained, those should be filed in this function.

Data Inquiry

Users can easily access to the scanned map images from index panels.



Click to obtain scanned topographical map.

Validity

Effectiveness of the Irrigation Database was examined in the following manner.

Validation Procedure for the Irrigation Database

Outputs to be evaluated	Irrigation Database
Criteria	Effectiveness of the Irrigation Database in data and information management
Required data	Evaluation of the Irrigation Database
Data source	Data and Information Management Unit
Data collection method	Questionnaire survey
Timing of data collection	After all the training

As a result of the questionnaire, the Irrigation Database was regarded as essential by the DIMU staff for their successful data and information management works (see Appendix A for detail).

Product 2
Irrigation GIS

Purpose

The Irrigation GIS was prepared mainly based on the materials employed for the analysis of the potential area for irrigation development carried out during the Master Plan Study. The objective of the Irrigation GIS is, therefore, to supply useful information mainly to District offices for evaluating the irrigation potential of the proposed scheme.

Main Users

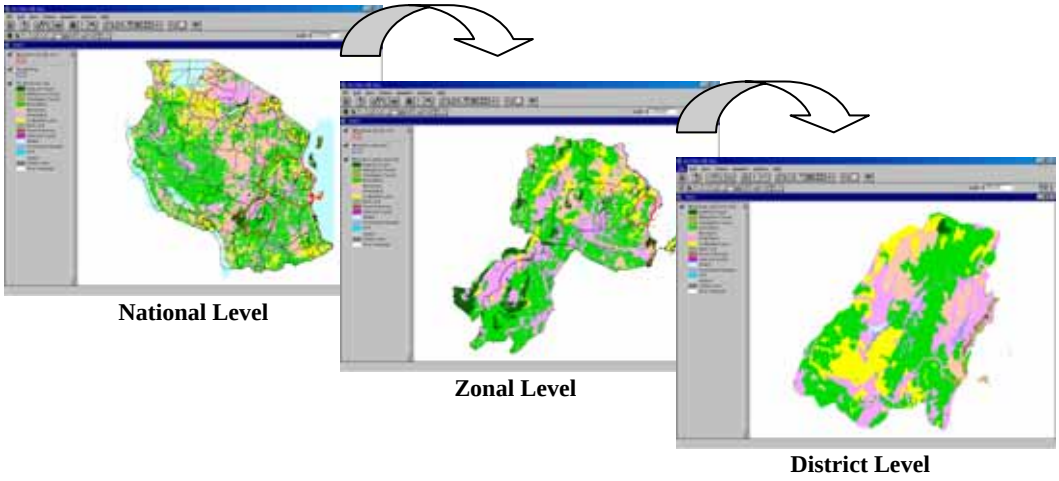
The Irrigation GIS will be operated mainly by the staff of the DIMU of DITS, MAFS. It means that the data input, the maintenance of the system and the preparation of the printout would be carried out by such central office staff. On the other hand, the products of the Irrigation GIS include the printout of district level maps showing the locations of proposed irrigation schemes on various backgrounds, such as protected area, land cover and agro-ecological zone. This can effectively be utilized by the district staff as their supporting information for their field survey activities.

Development Concept

(1) Easy Operation

Basic Approach-3: Introduction of User-friendly Guidelines and Database System is regarded as the main concept for the Irrigation GIS, too. Although most of the original data was for the national level, such national level data was clipped for zonal, regional and district levels in this Irrigation GIS. The data of any required levels can therefore easily be obtained. It means that the

staff of the ZIU can obtain the data of their specific zone and similarly the district staff can obtain the data of their specific district. Furthermore, the legends of the major themes such as land cover, soil type and agro-ecological zone for the national level were stored in the system. These legends can easily be applied for any other levels (zone, region and district) for efficient comparison of the maps produced. The land cover maps for national, zonal and district levels are shown in the figure below as an example.



(2) Easy Maintenance

The most common GIS software in Tanzania, which is "Arc View (Version 3.2)", was applied as a base software taking easy future maintenance into account. Data compatibility is also one of the crucial reasons for use of this prevailing software. This concept can contribute to enhancement of the sustainability of the system.

(3) Effective Use of Readily Available Data

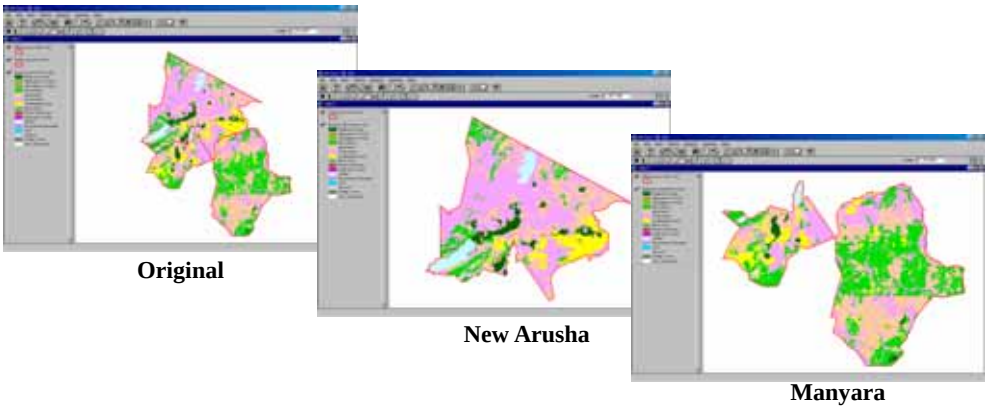
Based on **Basic Approach-5: Transfer of Data, Information and Technologies Used in Master Plan and Action Plan Studies to DITS through the Database System**, all the GIS data collected during the Master Plan Study and the Action Plan Study is basically stored in the system at national, zonal, regional and district levels. The necessary information can therefore be easily retrieved as and when required.

(4) Supply of Useful Information for Irrigation Scheme Formulation Activities

The Irrigation GIS can provide the district staff with useful information, such as the distribution of protected area and the present condition of land cover. Such information is quite useful for evaluating the irrigation potential of the proposed scheme. From this viewpoint, this system highly contributes to the **Basic Approach-1: Linkage of Guidelines with Database System**.

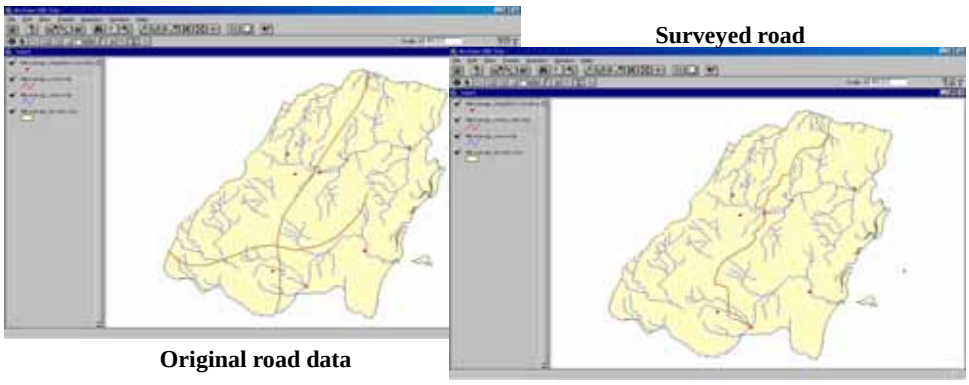
(5) Sustainable System

The system should be maintained and developed along with the availability and accuracy of the data during the actual operation of the Irrigation GIS. In case of the modification of administration boundaries, the digital data of the new administration boundaries should be obtained from the Survey and Mapping Division. Once such digital data are obtained, the modification of the irrigation GIS can be carried out by the staff of DIMU. According to the recent division of Arusha Region into New Arusha and Manyara Regions, the Irrigation GIS had already been modified under the current Verification Study. It means the DIMU has the capability to manage any further changes of administration boundaries in the future.



Original **New Arusha** **Manyara**

Most of the data is for the national level and the accuracy of some data is not satisfactory for regional and district levels at present. For example, the main road in the model district was simply surveyed by GPS under the Verification Study, and then the old road data were replaced with the new surveyed data. The accuracy of certain data can be improved in such a manner. In case more detailed data become available for a certain theme, the DIMU staff will be ready to replace the old data with the new. It means the Irrigation GIS is also well prepared for the improvement of the data accuracy in the future. The following is the sample of original road data and surveyed road data for the sample district.



Original road data **Surveyed road**

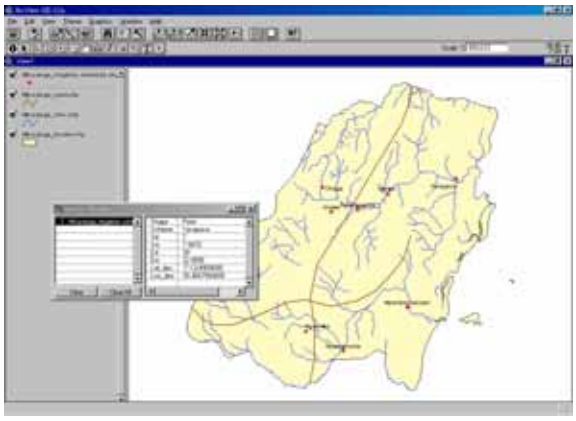
Functions

(1) Plotting Location of Proposed Irrigation Schemes on GIS

There are two ways for plotting the location of the proposed irrigation schemes on the GIS by GPS. One is use of point data, and the other is use of polygon data.

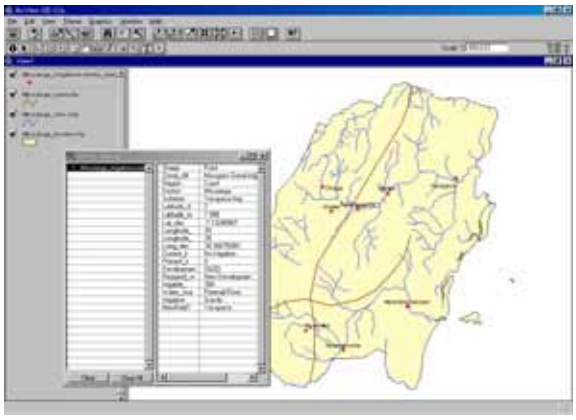
Point data mainly obtained through the quick site inspection:

In the process of the quick site inspection for irrigation scheme formulation, the coordinates of the scheme location are measured by portable GPS. This point data of the irrigation schemes can be plotted on the GIS manually by inputting the name of the scheme and the coordinate data into spreadsheet type of software such as "Excel". In this case, the name and the location of the scheme can simply be shown on the GIS.



When one of the schemes is clicked, only the name and the location of the scheme are shown on the screen.

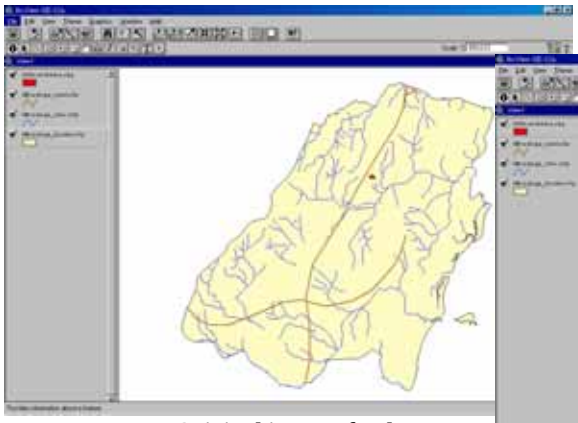
When all the data of the survey sheets for quick site inspection are entered into the irrigation database, the data sets including the coordinate data can be transferred from the irrigation database to the Irrigation GIS. This is the advantageous characteristic of this database system. In this case, all the data relevant to the scheme, such as present condition of the potential area and village proposed plan, could be incorporated into the Irrigation GIS.



When one of the schemes is clicked, the name and all the relevant data of the scheme are shown on the screen.

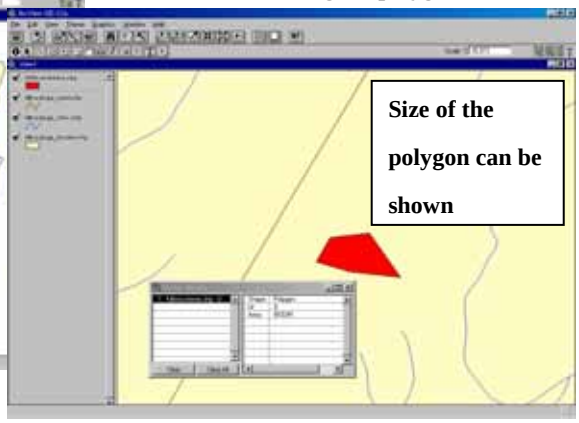
Polygon data in case the perimeter data are obtained:

In case the data of several points on the perimeter of the scheme are obtained, polygon data can be created instead of point data for the proposed scheme. The extent of the area for the proposed scheme can thus be shown on the GIS and more detailed analysis can be conducted. For example, it can be judged whether a part of the scheme area is inside the protected area or not. Since the area size can be calculated easily under the Irrigation GIS, this function is useful to estimate the general scale of the proposed irrigation scheme.



Original image of polygon

Zoom-in image of polygon



(2) Superposition of Thematic Maps on GIS

On the point or polygon data of irrigation schemes, various thematic maps can be superposed as backgrounds. As already mentioned in the development concept, these thematic maps can be shown on screen at any required levels of zone, region or district. The available thematic maps are;

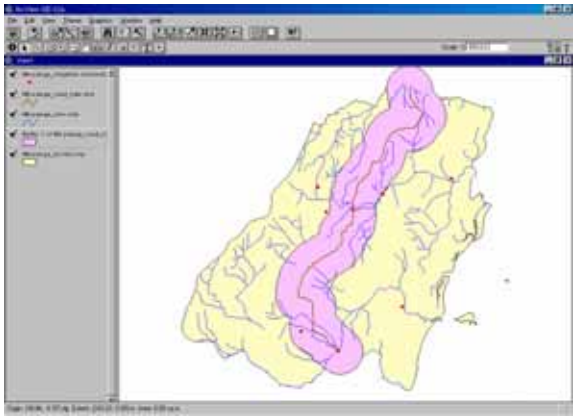
- General features such as administration boundaries (zone, region and district), rivers, lakes, roads and railways,
- Protected areas such as national parks, forest reserves, game reserves and conservation areas,
- Natural conditions such as rainfall and agro-ecological zone, and
- Land related information such as land cover, land unit and soil type.

Those maps can be utilized for various analyses of the proposed irrigation schemes in the following manner.

General Features:

It can be confirmed that the proposed irrigation schemes are really located within the district boundary by showing the district boundary on screen. Although the accuracy of the road network data is not satisfactory enough, it is possible to classify the proposed schemes by the distance from the main road. This kind of

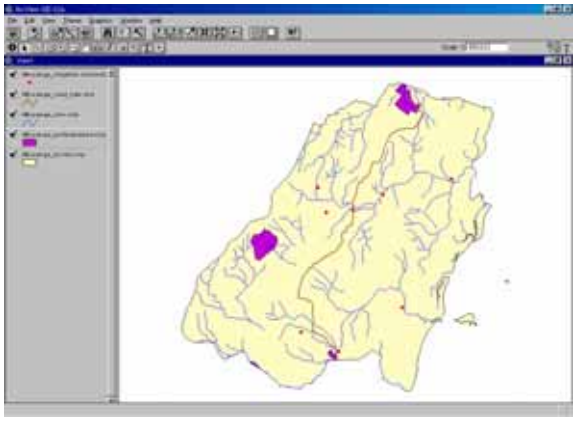
analysis is important to conducting the screening of the proposed schemes from the viewpoint of marketing and also as a function of model scheme.



For example, the scheme locating within 5km of the main road can easily be distinguished.

Protected Areas:

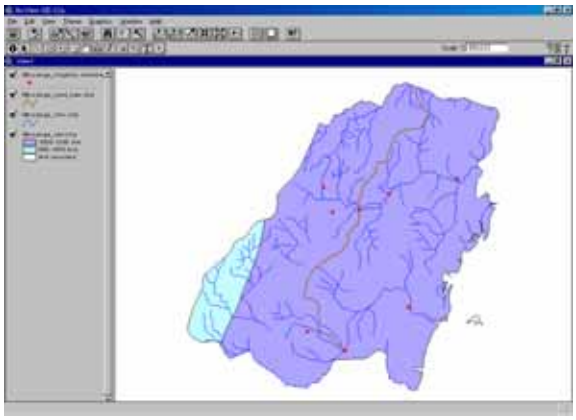
It can be judged whether some of the proposed schemes are located within the vicinity of the protected areas or not. The thematic map of the protected area is the combined map of national parks, forest reserves, game reserves and conservation areas. When it is found that some schemes are in the vicinity of the protected area, the kind of the protected area can be identified on the screen.



For example, it is clear that one of the schemes is located in the vicinity of the protected area.

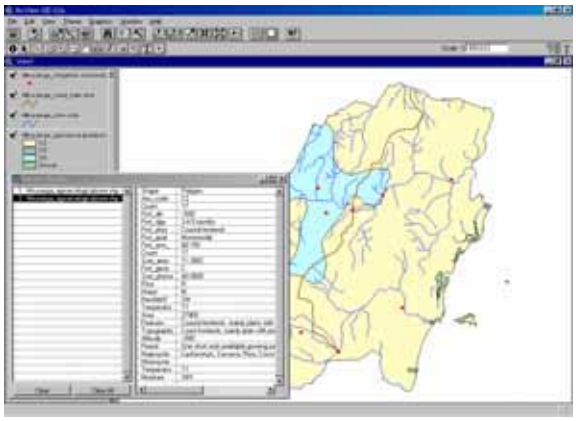
Natural Conditions:

It can be confirmed which rainfall zone the proposed irrigation scheme belongs to or to which agro-ecological zone. Although it is a rough indicator for the characteristics of the area to which the proposed irrigation scheme belongs, the information obtained can be utilized for various purposes. According to the result of the rainfall zoning, for example, the necessity of irrigated agriculture can be evaluated. The result of the agro-ecological zoning, on the other hand, can suggest the recommended crops to be cultivated in the proposed irrigation scheme.



Rainfall Zone

The general rainfall range of the area to which the target scheme belongs can easily be shown on the screen.

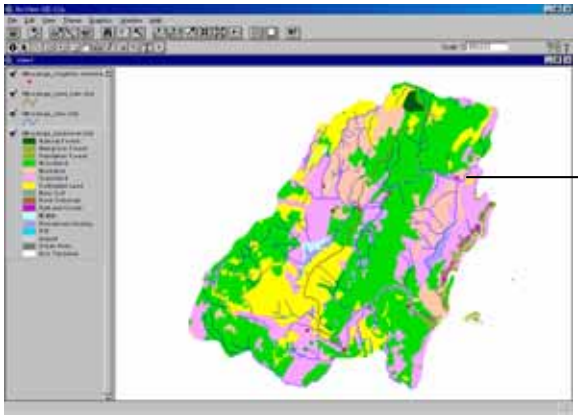


Agro-ecological Zone

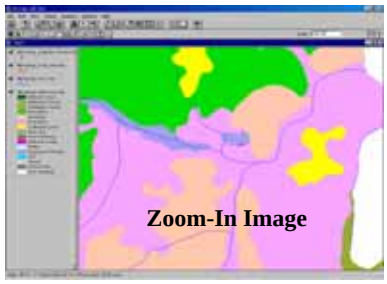
The characteristic of each zone to which the target scheme belongs can instantly be shown on the screen.

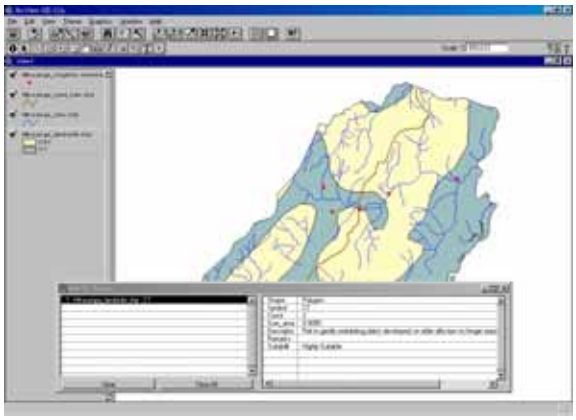
Land Related Information:

The thematic map of land cover gives detailed information on land cover and land use based on the Landsat TM scenes obtained during 1994 and 1996. The resolution of the map is satisfactory even at the district level and the present land use of the proposed irrigation scheme can be classified into cultivated land, bush land, wood land and others. Unfortunately, the resolutions for land unit and soil type maps are not satisfactory at the district level. The land unit map, however, gives topographic information such as altitude and slope conditions together with drainage and salinity situations. The soil type map gives general information on soil characteristics based on the major soil types classified by FAO/UNESCO.



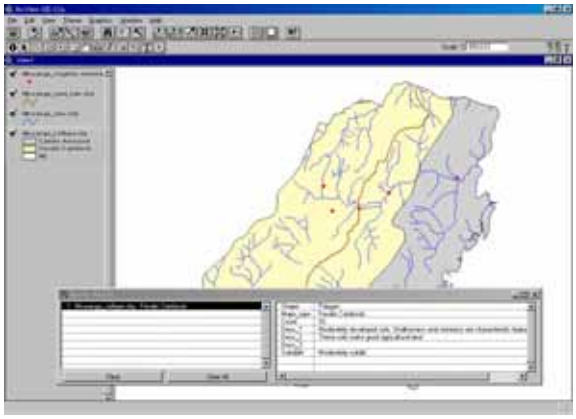
Land Cover





Land Unit

The characteristic of each zone to which the target scheme belongs can instantly be shown on the screen.



Soil Type

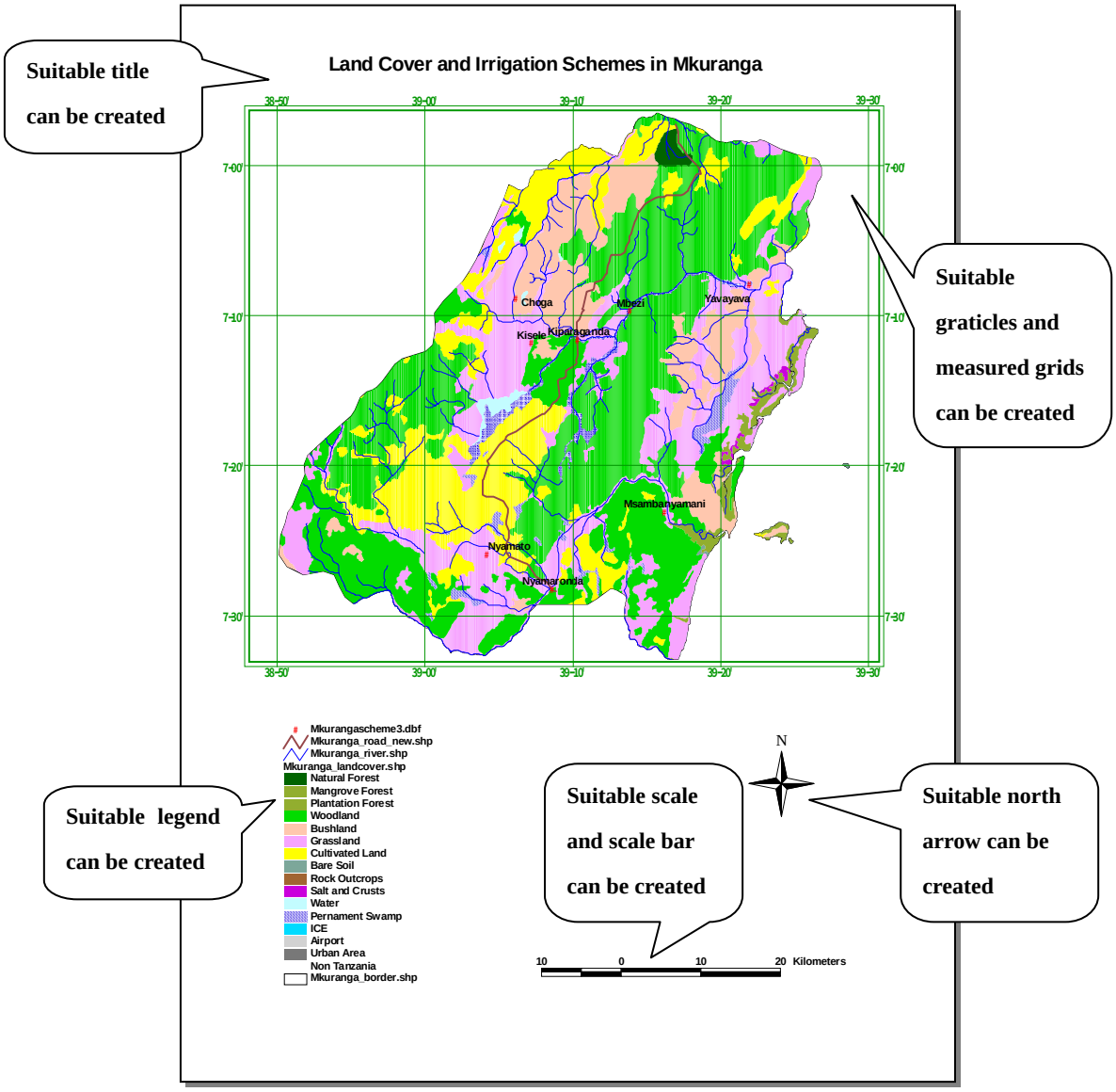
The characteristic of each zone to which the target scheme belongs can instantly be shown on the screen.

(3) Printout of Appropriate Layout

The data obtained through the Irrigation GIS should be properly printed out for distribution to the different central, zonal, regional and district levels. A color printer of ink jet type up to A3 size paper is available for ordinary works. A plotter to be used for large size papers up to A0 is also available for the special display purposes. By adjusting the following elements, a layout appropriate to the requirements can be created.

- Suitable scale can be selected with an adjusted scale bar,
- Suitable legend can be created as per requirements,
- Suitable title and north arrow can be created as per requirements, and

- Suitable graticules and measured grids can be added as per requirements.



Validity

Effectiveness of the Irrigation GIS was evaluated in the following manner.

Validation Procedure of Irrigation GIS

Outputs to be evaluated	Irrigation GIS
Criteria	Effectiveness of the Irrigation GIS in data and information management
Required data	Evaluation of the Irrigation GIS
Data source	Data and Information Management Unit
Data collection method	Questionnaire survey
Timing of data collection	After all the training

As the result of questionnaire, the Irrigation GIS was regarded as essential by the DIMU staff for their successful data and information management works (See Appendix A for detail).

Product 3
Operation Manual for Simple Database and Information System

Purpose

The operation manual for simple database and information system was finally prepared by improving the draft operation manual for the convenience of the operation practice of the database system. This operation manual will be useful for the staff who would like to study the structure and the operation of the database system created under the current Verification Study. It also serves for the staff that will have inquiries regarding the operation of the database system.

Main Users

The operation manual will be used mainly by the staff of the DIMU of DITS in MAFS. The staff of ZIU will also use the operation manual according to the dissemination of the database system to the zonal level.

Development Concept

Based on the **Basic Approach-3: Introduction of User-friendly Guidelines and Database System**, the operation manual was designed so as to be utilized by staff with little experience in operation of the database system. The emphasis was also given to the point that the operation manual was effective when it worked in parallel with the guidelines for the irrigation scheme formulation from the viewpoint of the **Basic Approach-1: Linkage of Guidelines with Database System**.

Functions

The major functions of the operation manual are as follows.

- The general information such as the background, the objective and the composition of the operation manual is given in "1. Introduction" of the operation manual.
- The operation and maintenance of the Irrigation Database are described in "2. Irrigation Database".
- The structure and the operation of the Irrigation GIS together with other GIS data and recommendations are given in "3. Irrigation GIS".

Validity

Effectiveness of the operation manual was evaluated in the following manner.

Validation Procedure of Operation Manual

Outputs to be evaluated	Operation manual
Criteria	Effectiveness of the operation manual in data and information management
Required data	Evaluation of the operation manual

Data source	Data and Information Management Unit
Data collection method	Questionnaire survey
Timing of data collection	After all the training

As the result of questionnaire, the operation manual was regarded as essential by the DIMU staff when they have problems with the operation of simple database and information system (See Appendix A for detail).

Product 4
Training Kit for Simple Database and Information System

Purpose

The training kit was prepared as material for the training activities of the simple database and information system. This training kit will be used for the trainees to cope with the various situations that may happen during the actual operation of the database system in the future. The trainees should understand that the proper database operation could effectively contribute to the irrigation development.

Main Users

The users of this training kit are all the trainees for the simple database and information system development. Those trainees are staff of the DITS, staff of the ZIU and any other staff who are interested in the operation of the simple database and information system.

Development Concept

Based on the **Basic Approach-3: Introduction of User-friendly Guidelines and Database System**, the training kit was designed so as to simulate the various situations that may happen in the future. Various situations described in the training kit coincide with the steps mentioned in the guidelines for the irrigation scheme formulation by taking into account the **Basic Approach-1: Linkage of Guidelines with Database System**.

Functions

The major functions of the training kit for simple database and information system are as follows.

- Various situations are given for the different stages of irrigation scheme formulation such as “before starting irrigation scheme formulation”, “after completion of irrigation scheme formulation”, “upon the request for specific data set” and “maintenance of the system”.
- Some of the situations are given as phone call conversations in order for the trainees to feel as if the given situation is real.
- Some of the situations are given as tasks to be carried out on a computer using the operation manual.

6.1.2 Guidelines for Irrigation Scheme Formulation for DADP

Product 5
Guidelines for Irrigation Scheme Formulation for DADP

Purpose

"Guidelines for Irrigation Scheme Formulation for DADP" was prepared to facilitate irrigation scheme formulation for DADP. The guidelines show how to formulate irrigation scheme development. The guidelines treat district-manageable-small-scaled irrigation schemes such as, gravity irrigation, pump irrigation of which the water source is a river or pond/lake, and rain water harvesting schemes. It does not describe groundwater irrigation and dam irrigation, since those schemes need special study. It is recommended that those kinds of schemes be formulated in consultation with the ZIU.

Main Users

Main users of the guidelines are to be district office staff that are engaged in the agriculture sector. The guidelines are also useful for ZIU staff, since procedures of endorsement and validation by the ZIU on the development plan prepared by District staff, were described.

Development Concept

(1) User Oriented Guidelines

In the guidelines preparation, **Basic Approach-2: Participatory Approach in Guidelines and Database System Preparation** was applied. As described in Clause 5.4.2, the draft guidelines were tested for Mvomero and Mkuranga Districts and rectified according to findings and comments given by end-users (staff of above mentioned model districts and the ZIU). Details of the rectification are shown in Attachment 12.

(2) Provision of Guidance for Users to Communicate with the Database System

Based on the **Basic Approach-1: Linkage of Guidelines with Database System**, data exchange with the simple database and information system was emphasized in the guidelines. The guidelines told how to retrieve information from the database system. It also indicated that district offices should send their planning results to the ZIUs, and then the ZIUs send it to the DITS.

(3) Strengthening of Communication with District Offices and ZIUs

To utilize knowledge and experience accumulated in the ZIUs, the guidelines proposed communication between the ZIUs and district staff. There are two chances for the district staff to communicate with the ZIU in the process (refer to Overall Workflow of the Guidelines presented in this section). One is "Step-4:

Assessment and Endorsement by Zonal Irrigation Unit". Through this step, the district staff can receive technical advice about quick site inspection and screening from the ZIU. The other chance is "Step-10: Validation and Agreement by Zonal Irrigation Unit". In this step, the district staff can also receive technical support on facility development planning and supporting program planning from the ZIU. Those communications also contribute to data and information management at the DITS, since survey and planning results reported to the ZIU are sent to the DITS.

(4) Introduction of User-friendly Format to Explain Procedures

Based on the **Basic Approach-3: Introduction of User-friendly Guidelines and Database System**, a user-friendly format was prepared for the guidelines' description (see sample format in the next page). The main format of the guidelines explains the procedure of the work to users of the guidelines. The format consists of (i) Keywords, (ii) Why is the work required?, (iii) Key for the successful work, (iv) Required inputs, and (v) How is the work carried out?. Especially in the "How is the work carried out?" descriptions were made according to the timetable of the work.

Sample of the Main Format of the Guidelines

(b) Interview Survey with Stakeholders

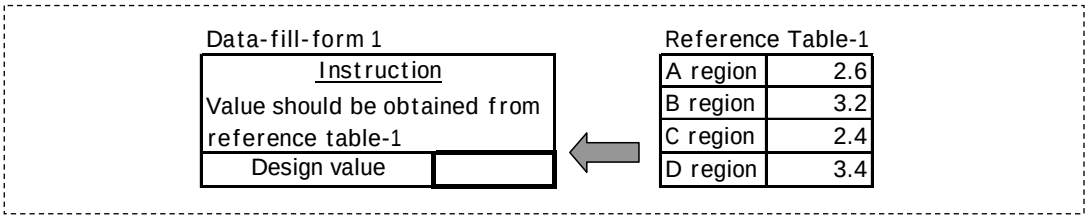
Keywords **Collection of data and information on the present condition of the scheme including agriculture, association, environment and existing irrigation system through interview survey with stakeholders in the scheme.**	
Why is the work required?	
An appropriate irrigation development plan should be established based on the present local conditions. The present conditions in agriculture, association, environment and existing irrigation and drainage system should therefore be assessed properly.	
Key for the successful work	
Interview survey will be carried out with stakeholders by using suitable checklists for effective information collection. This process will be reinforced by the readily available information such as the irrigation GIS data collected from the data and information management unit. Furthermore, the results of interview surveys will be crosschecked through the site inspections that follow.	
Required inputs	
1. District Project Development Team (DPDT) 2. Various information on agriculture and environment obtained through the irrigation GIS 3. Previous related reports on irrigation and drainage 4. Various checklists for interview surveys	
How is the work carried out?	
Explain the purpose of the field survey to the participants	The purpose of the field survey should be explained clearly to the participants along with the general flow of the activities at the beginning of the session. The background information such as the reason why this scheme was selected should be explained. Special attention should also be paid in order for villagers not to expect excessive returns from the future project.
Prepare the group for interview surveys and mapping	The participants will be divided into 2 groups for interview surveys and mapping. Ask village chairperson to choose several suitable personnel who know the area very well as mapping group members. More time will be consumed if the mapping is conducted with too many people. The interview survey group will consist of farmers from different sexes and generations and the group should include at least the village chairperson and the chairperson of association. The village extension officer should take care of both groups. For mapping group: Go to page 3-13

Execute the interview surveys using suitable check list	The interview survey will be executed by using **Form-4** for the following fields; (a) Present condition of Agriculture and Marketing, (b) Present condition of Irrigators' Association, and (c) Present condition of Environment.
Compilation and analysis of the survey results	DPDT will compile and analyze the results of interview survey for the next step.

(5) Introduction of Data-fill-forms with Standard Values

Data-fill-forms with standard values were provided in the guidelines taking into consideration **Basic Approach-3: Introduction of User-friendly Guidelines and Database System** (see sample format in the next page). The guidelines provided standard ready calculated values in reference tables and data-fill-forms. By use of these two, users can choose one of the standard values suitable for their situation and fill those values into the form. It means that users do not have to calculate design values by themselves.

Image of Data-fill-form with Standard Values



(6) Provision of Data-fill-forms with Instruction for Survey and Planning

To avoid confusion on the survey and planning works, data-fill-forms were provided in the guidelines, taking **Basic Approach-3: Introduction of User-friendly Guidelines and Database System** into account (see sample format above). In the data-fill-forms for survey, not only data fill columns, but also procedures for data collection were provided. Since data collection procedure is available in the data-fill-forms, the users do not need to go back to the guidelines on site as far as they have photocopies of data-fill-forms. In the data-fill-forms for planning, data source, calculation formula, etc. were given with the forms. This enables the users to conduct mechanical calculation and to avoid confusion. Using these forms, district staff can prepare appropriate irrigation development plans, even they do not have much experience in irrigation planning. These data-fill-forms have dual functions, such as (i) facilitate easy data collection or planning, and (ii) use of data-fill-forms as a component of planning reports. The following is the list of provided data-fill-forms. A sample of a data-fill-form is shown in the next page.

List of Provided Data-fill-forms

Form No.	Title of the Form
Form-1	List of Irrigation Schemes in the District
Form-2	Survey Sheet for Quick Site Inspection
Form-3	Survey Sheet for Interview Survey with Stakeholders
Form-4	Survey Sheet for Field Condition Confirmation
Form-5	Calculation Sheet for Irrigation Water Requirement
Form-6	Calculation Sheet for Water Balance Study
Form-7	Planning Sheet for Scheme Development Plan
Form-8	Scheme Incremental Benefit Estimation Sheet
Form-9	Planning Sheet for Institutional Development Plan
Form-10	Supplemental Information on Environmental Consideration
Form-11	Check List of the Scheme Development Plan
Form-12	Schemes Prioritization Sheet
Form-13	Scheme Digest
Form-14	Supporting Programme Digest
Form-15	Summary of Proposal for DADPs

Sample of the Data-fill-form of the Guidelines (Planning)

Sub-step 3 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 Planned Date

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 construction cost from size of development area and unit cost.

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

Development Area ha x Unit cost Tsh/ha = 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-5 (7/7)**. The unit cost for rehabilitation scheme can be estimated by multiplying extent of required replacement (1.0(=100%), 0.5 or 0.3) by unit cost for new development and improvement. Minor rehabilitation can be omitted.

b) Contingency (10 % of (i)) (ii) Tsh

c) Construction/rehabilitation cost of the irrigation facilities in the development area (i + ii) Tsh

(7) Maximum Usage of the Data Collected in the Master Plan and the Action Plan Studies

Data and information collected in the Master Plan and the Action Plan Studies

were fully used in the guidelines, based on the **Basic Approach-4: Preparation of Guidelines by Using Data Collected in Master Plan and Action Plan Studies**. The following table shows data and information used for the preparation of the guidelines. Since these data were available in the guidelines, the users do not need to look for the information by themselves.

Applied Data in Guidelines Preparation Collected in the Master Plan and Action Plan Studies

Type of Data	Applied Portion of the Guidelines	
Meteorological data	Step-6(a)	Irrigation water requirement estimation
Rainfall data	Step-6(a)	Irrigation water requirement estimation
Unit construction cost	Step-6(c)	Scheme development planning and cost estimation
Unit yield of crops	Step-6(d)	Estimation of scheme incremental benefits

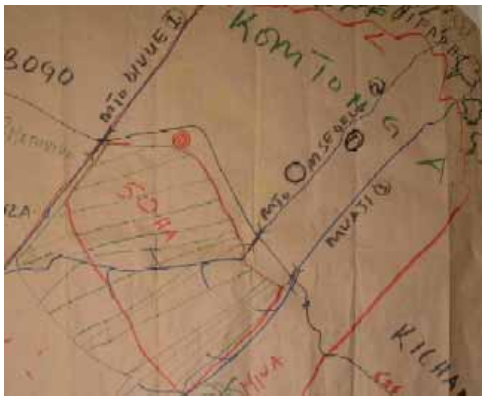
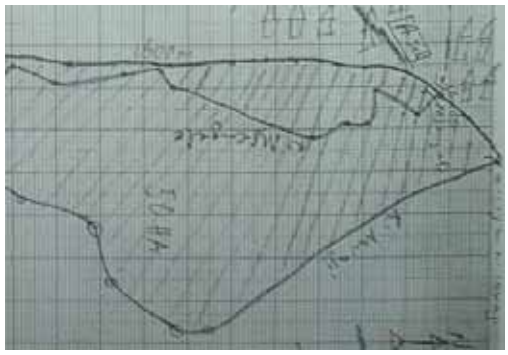
(8) Introduction of Simple and Practical Surveying and Planning Method

It was found that allowable budget and time for district staff to prepare DADPs are very limited. Considering this situation, simple survey methods were introduced in the guidelines as much as possible to reduce the financial and technical burden to the district staff (**Basic Approach-3: Introduction of User-friendly Guidelines and Database System**).

List of Introduced Simplified Survey and Planning Method

Survey Item	Common Method with Equipment	Simplified Method in Guidelines
Survey		
Soil texture test	Soil texture test with soil kit	Soil texture test by hand
River discharge measurement	Measurement by a current meter	Measurement using a leaf.
Topographical mapping	Mapping with contour lines using transit and level	Mapping without contour lines using handheld GPS
Planning		
Irrigation water requirement estimation	Calculation from ETo to net unit water requirement	Provision of standard ready calculated net unit water requirement by region
Economic evaluation (IRR calculation)	Calculation using computer software	Provision of simplified chart for IRR calculation

For example, the following simple mapping method was introduced in the guidelines.

Introduction of Simple Mapping Method (Preparation of resource map in scale)		
Procedure 1	Preparation of village resource map as base map	 Prepared resource map for Komtonga scheme, Mvomero District
Procedure 2	Measure coordinates of important locations shown in the village resource map using handheld GPS	 Measuring coordinates using handheld GPS
Procedure 3	Plot measured coordinates on graph paper	 Plotting
Procedure 4	Information obtained from the prepared map can be used in the preliminary planning (boundary of proposed area, length of canal etc.)	 Prepared map

(9) Introduction of Short Information

To enhance users' knowledge of irrigation, short information was introduced in the guidelines as supplemental information. The following is a sample of the short information used in the guidelines (**Basic Approach-3: Introduction of User-friendly Guidelines and Database System**).

Sample of Short Information

Box

Water and Land

Availability of water and land is the most crucial factor for irrigation development. Irrigation development should be concurrently approached from both sides of water and land resources, not one side only. This approach seeks for well-balance between available water and water demand by crop cultivation on available land, which leads to an appropriate development scale.

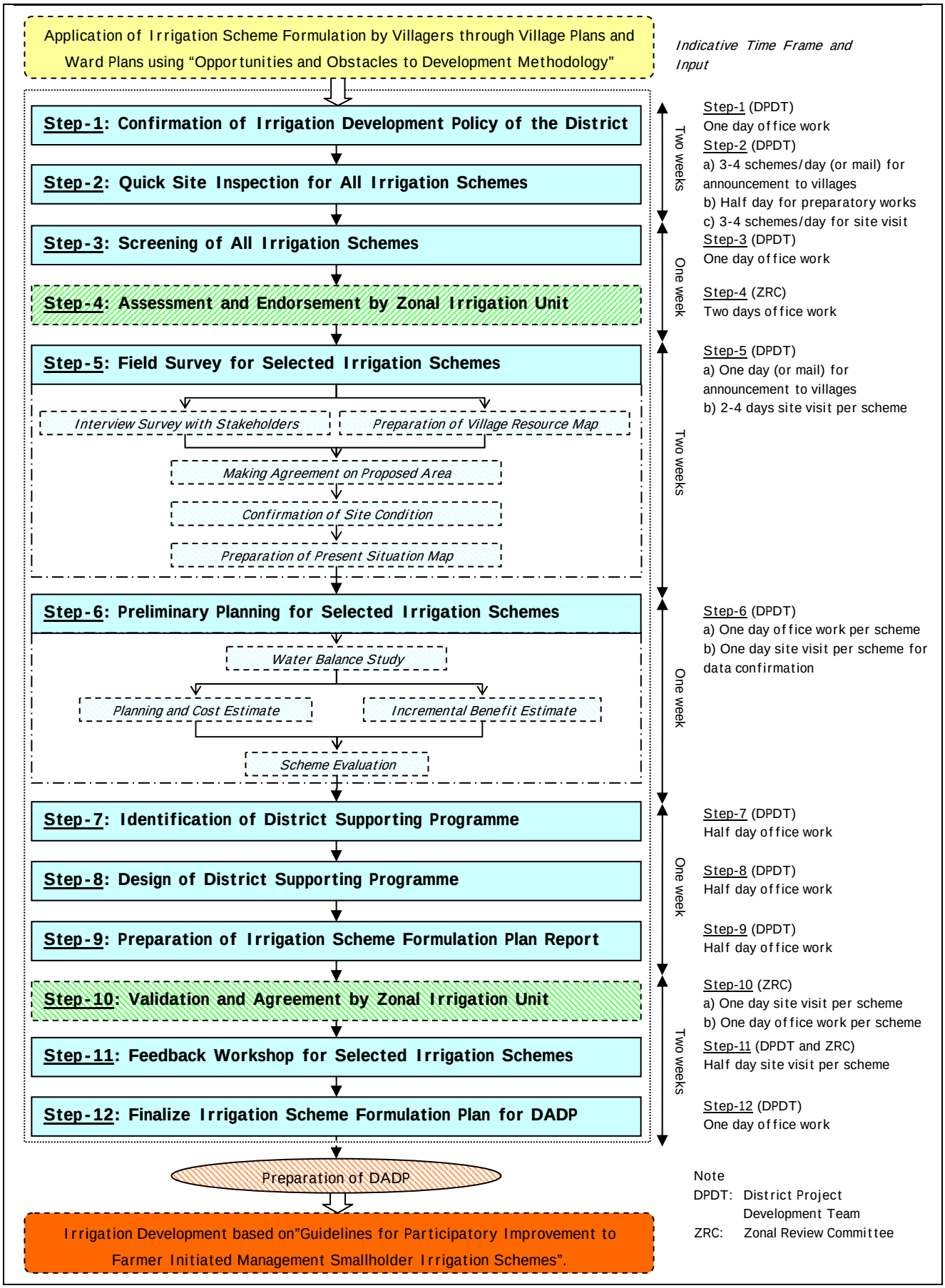
Functions

(1) Contents of Guidelines

Below are the contents of the guidelines.

Introduction
Overall Work Flow
Terminology for the Guidelines
Section 1 : Introduction
Section 2 : Procedure to be taken before DADP stage
Section 3 : Irrigation Scheme Formulation for DADP
Section 4 : Process of Irrigation Development after DADP Stage
Section 5 : Use of the Database System in Irrigation Scheme Formulation
Attachments

In the "Introduction", the purpose, range of description, and users of the guidelines were clearly explained. Section 1 gives an introduction to and background of the guidelines, Section 2 describes the basis of DADP, which is Opportunities and Obstacles to Development (O&OD). This section emphasizes that the O&OD process should be adopted before starting irrigation scheme formulation for DADP. Section 3 is the highlight of the guidelines. In this section, the procedure for irrigation scheme formulation is explained. It consists of 12 steps (see figure in the next page). Ten of the twelve steps are described mainly for DPDT and two steps are explained about endorsement and validation of the district prepared plan which is conducted by the Zonal Review Committees (ZRC: committee specially established in the ZIU to support the DPDT).



Overall Work Flow of Guidelines

In Section 4, the process for irrigation scheme development to be taken after the DADP stage was described. Section 5 gives access to the database and information system at the DITS. This section explained that varied and useful data and information could be obtained from the database system.

(2) Summary of Section 3 (Irrigation Scheme Formulation for DADP)

(a) Screening of Candidate Irrigation Schemes (Step-1 to Step-3)

The guidelines instruct that the DPDT should first visit all the irrigation schemes in the district. Then schemes with a high potential for development are selected through screening. The guidelines introduced a scoring method for the screening. The scoring method can facilitate clear and fair selection of the schemes. It was recommended in the guidelines that the screening results should be endorsed by the ZRC.

(b) Preliminary Planning for Screened Irrigation Schemes and Prioritization (Step-4 and Step-5)

After the screening, the DPDT proceeds to preliminary planning for screened schemes. In Steps-4 and -5, the guidelines explained how to prepare a preliminary plan. It consists of a field survey for data collection and planning works in the office. In these Steps, the necessity of a scientific survey and rational planning were emphasized. However, available equipment, budget and time for the DPDT were found to be very limited, so that simplified but practical survey and planning methods were introduced in the guidelines. After preparation of the preliminary plans, the guidelines instructed the DPDT to evaluate and prioritize the schemes.

(c) Identification and Preparation of District Supporting Programme (Step-7 and Step-8)

The guidelines also introduced procedures to formulate district supporting programme. District supporting programme mean programme for common problems in irrigation development for most schemes, such as training, awareness creation, campaign, and so on.

(d) Finalization of Scheme Formulation Plan and Feedback Results (Step-9 to Step-12)

Finally, the guidelines explained how to finalize irrigation scheme formulation plan and require the DPDT to submit their plan to the ZRC to validate their plan. Furthermore, the guidelines instructed the DPDT to hold feedback meetings for the scheme selected as a final candidate for DADPs and also for the schemes not selected as candidates.

Validity

Effectiveness of the guidelines was evaluated in the following manner.

Validation Procedure for the Guidelines

Outputs to be evaluated	Guidelines for irrigation scheme formulation for DADPs
Criteria	Effectiveness of the guidelines in irrigation scheme formulation
Required data	Evaluation of the guidelines
Data source	1) District Project Development Teams (DPDTs) 2) Zonal Review Committee (ZRC)
Data collection method	Questionnaire survey
Timing of data collection	1) After all the programmes 2) After all the programmes

As the results of the questionnaire, two DPDTs regarded the guidelines as essential for their successful irrigation scheme formulation. Validity of the guidelines was also asked of the ZRC in terms of their responsible works in irrigation scheme formulation, which are endorsement and validation. The ZRC replied that the proper irrigation scheme formulation was difficult without the guidelines. Thus the guidelines were proved to be valid (See Appendix B for detail).

6.2 Effect of Training

Training is one of the important components in this Verification Study. Capacity development of related organizations contributes a huge amount to the achievement of the purpose of the study. This section presents the summary of the training results.

6.2.1 Establishment of Simple Database and Information System

Training was conducted for the DIMU as discussed in Clause 5.4.1. The target was determined as "to acquire the skills to operate the database system in the situations presented in the Training Kit." Achievement of the target was measured and assessed comparing the skills of operation of the database system before and after the training.

(1) Evaluation Method

Effect of the training was evaluated in the following manner.

Validation Procedure for Training Effect on the operation of the Database System

Organization to be evaluated	Data and Information Management Unit (DIMU)
Criteria	Comparison of before/after the training
Required data	Operation skill for the database system in the situations presented in the Training Kit

Data source	1) Data and Information Management Unit 2) JICA Study Team
Data collection method	1) Questionnaire survey 2) Observation of demonstration
Timing of data collection	1) At the first programme/after all the programmes 2) At the demonstration by DIMU after all the programmes

(2) Skills in Database Operation before Training

Since the Irrigation Database and Irrigation GIS were newly established in the Verification Study period, it was obvious that the DIMU, the target organization did not have any experience with the program. The DIMU, therefore, had no skill in database operation before the training.

According to the questionnaire survey, they have some experience in database. Those were learned in some training programmes, but they have little experience in applying database to their jobs. Concerning GIS, at least one of the staff had experience but the other did not have any experience.

(3) Skills of Database Operation after Training

Achievement of the skills required for the database system was measured from two aspects. One is self-assessment by the DIMU and the other is observation by the JICA Study Team. Data on self-assessment was collected using the questionnaires which were conducted after completion of all the training programmes, and the JICA Study Team observed the operation skill of the DIMU through their presentation.

(a) Self-assessment by DIMU

The DIMU answered in the questionnaire that they learned the skill necessary for the situations programmed in the training kit (See Appendix A for detail). It meant that they obtained the skill for the operation of the program from the training.

(b) Assessment by JICA Study Team

After completion of all the programmes, the DIMU gave a demonstration to other DITS staff and the JICA Study Team in a wrap-up presentation. Their performance in the demonstration was evaluated by the JICA Study Team from the following points:

- Proper selection of useful data on irrigation development for participants
- Smooth operation of the database system
- Proper answers to the questions raised during the discussion.
- Motivation for upgrading the system in future.

Consequently, it was recognized that they reached the initial point of “Level

3: Behavior." (See Clause 5.4.1 for the criteria.)

(4) Conclusion

Self-assessment and assessment by the JICA Study Team concluded that the DIMU acquired enough skills to manage the database system as a result of the training.

6.2.2 Support for Irrigation Scheme Formulation for DADP

Training was conducted for the DPDTs for Mvomero and Mkuranga Districts and Morogoro ZRC as shown in Clause 5.4.2. The training targets were (i) "to allow two DPDTs to acquire skill in irrigation scheme formulation for DADP", and (ii) "to allow the ZRC to understand endorsement and validation procedures". Achievement of these targets was measured and assessed by comparing the situations before and after the training.

(1) Evaluation Method

Effectiveness of the training was evaluated in the following manner.

Validation Procedure for Training Effect on DPDT

Organization to be evaluated	District Project Development Team (DPDT)
Criteria	Comparison of before/after the training
Required data	Skill in irrigation scheme formulation in the procedures presented in the guidelines
Data source	1) DPDT (self-assessment) 2) JICA Study Team
Data collection method	Questionnaire survey
Timing of data collection	1) At the first programme/after all the programmes 2) After all the programmes

Validation Procedure for Training Effect on ZRC

Organization to be evaluated	Zonal Review Committee (ZRC)
Criteria	Comparison of before/after the training
Required data	Understanding of endorsement and validation procedure presented in the guidelines
Data source	ZRC
Data collection method	Questionnaire survey
Timing of data collection	After all the programmes

(2) Effect of Training on DPDT

(a) Skills of DPDTs before Training

To grasp the situation before the training, a questionnaire survey was carried out for staff of the DPDTs during the kickoff seminar. They answered the

questionnaire according to their knowledge and experience in irrigation scheme formulation. The results are shown in the comparison table given below.

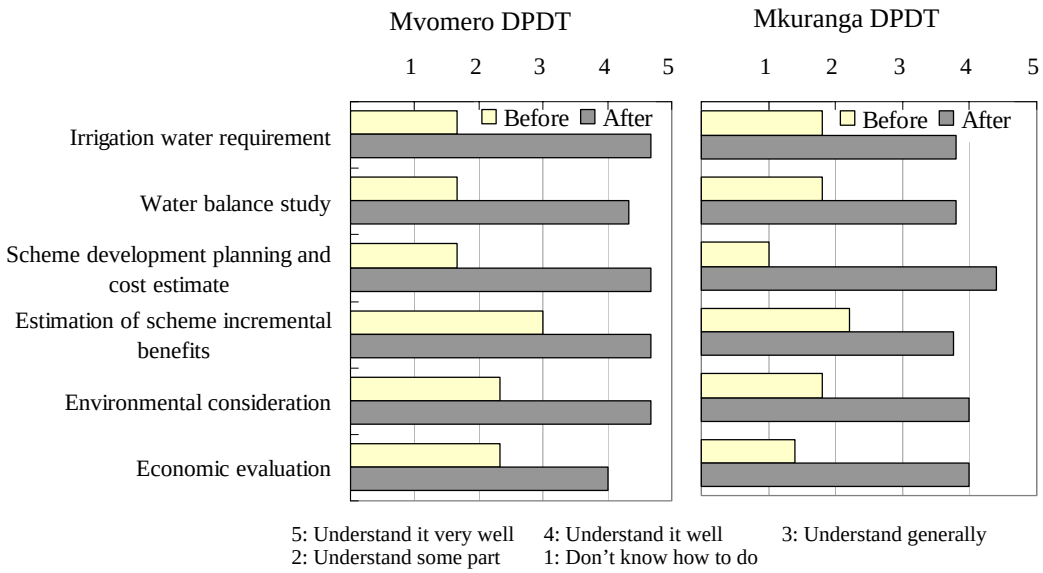
(b) Skills of DPDTs after Training

Achievement of the skills after the training is measured from two aspects. One is a self-assessment by the DPDTs, and the other is an assessment by the JICA Study Team. The self-assessment was conducted through a questionnaire survey at completion of all the programmes, and assessment by the JICA Study Team was also made through a questionnaire survey at the end of every session of the training.

Self-assessment by DPDTs

-Scheme formulation procedures-

The DPDTs assessed their skills by themselves before and after the programme in the questionnaire. The results are summarized in the figure below (See Appendix B for detail).



Comparison of Skills before and after Training

Before the training, their technical knowledge of irrigation scheme formulation was "Don't know how to do" or "Understand generally" in Mvomero, and most of the staff selected "Don't know how to do" in Mkuranga. It meant that they did not have enough knowledge and it was difficult to execute appropriate irrigation scheme formulation. After the training, most of them replied "Understand it well" or "Understand it very well". From this comparison, it could be said that the training highly

contributed to enhancement of their capability in irrigation scheme formulation.

-Self-confidence in Irrigation Scheme Formulation-

The result of the questionnaire survey indicated that both DPDTs could carry out proper irrigation scheme formulation for DADP without any further training.

All members in both DPDTs replied that they were confident of that part of their skills. Among them, 60% of Mkuranga DPDT members and 66% of Mvomero DPDT members said that they had confidence enough to complete this formulation work. It was concluded from these results that both DPDTs acquired adequate skills in irrigation scheme formulation.

Assessment by the JICA Study Team

During the field survey, discussions, and even other activities in the training programme, the JICA Study Team found improvement in their skills from the following viewpoints.

- Monitoring by the questionnaire survey presented that most of the members of DPDTs obtained adequate knowledge on irrigation scheme formulation through the execution of training programme.
- As the programme proceeded, the DPDTs came to understand in depth the importance of previous activities, and they realized relationships among the activities.
- After the training, the DPDTs showed further interest in some fields, such as GPS mapping, economic evaluation and criteria for scheme selection.
- After the training, most of the DPDTs members showed their intention to be involved in the formulation work again, and to be a trainer to other districts as well.
- Some of DPDTs members realized that some activities in irrigation scheme formulation were applicable to other fields.

Consequently, it was recognized that they arrived at the initial point of "Level 3: Behavior." (See Clause 5.4.1 for the criteria.)

(c) Conclusion

Self-assessment and assessment by the JICA Study Team concluded that the DPDTs acquired skills in irrigation scheme formulation for DADP as the results of the training

(2) Effect of Training to ZRC

(a) Understanding of ZRC before Training

The guidelines introduced the new systematic support by the ZRC to the DPDTs into the procedure of irrigation scheme formulation: assessment, endorsement, and validation. The ZRC did not have any previous experience in such support. This meant that the ZRC had no idea about those procedures before the training.

(b) Understanding of ZRC after Training

According to the questionnaire distributed at the end of the training programme, the ZRC concluded that they had full understanding of their support to the DPDTs in irrigation scheme formulation. These were confirmed by the JICA Study Team from the following observations:

- The ZRC members understood their duties and provided proper support for DPDTs during the training programme.
- The ZRC members gave practical suggestions for future training programmes.

(c) Conclusion

It was concluded that the ZRC fully understood the procedure of irrigation scheme formulation and their roles.

6.3 Outcome of Counterparts

Apart from the capacity building, the following actual outcomes contributing to irrigation development were obtained from the counterparts through the systematic on-the-job training.

6.3.1 Data and Information Management with Actual Data

(1) Administrative Changes

Since Mvomero District, which is one of the model districts for the Verification Study, was newly established in the year 2003 (Morogoro District was divided into Mvomero District and Morogoro Rural District), administrative changes in the database system were made by the counterparts. After the operation, Mvomero and Morogoro Rural Districts were registered among the Districts, and name of Morogoro District was removed from the database.

(2) Data and Information Management for Model Districts

The following actual data were input into the irrigation database and are ready to be processed using various formats from the Irrigation Database and Irrigation GIS.

Data Input by DIMU

District	Result of Quick Site Inspection	Result of Irrigation Scheme Formulation
Mvomero	20 schemes	1 scheme
Mkuranga	8 schemes	1 scheme

(3) Assessment of Conducted Data and Information Management

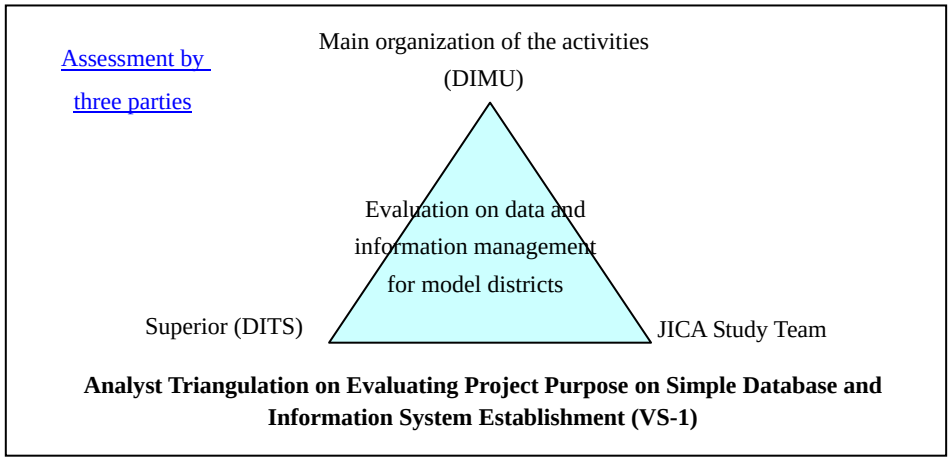
Data and information management for Mvomero and Mkuranga Districts was assessed as tabulated below.

Assessment Procedure for the Project Purpose Achievement for VS-1

Project purpose	Model of effective data and information management is established for Mvomero and Mkuranga District
Criteria	Comparison of before/after the Verification Study
Required data	Opinions on effectiveness of data and information management (data storage and data supply). *Effective data and information management was defined as;* - *The data sent from districts are properly stored in the database system by the DIMU, and* - *The stored data in the database system are properly supplied to the DITS staff with suitable formats by the DIMU.*
Data source	1) DIMU (self-assessment) 2) DITS staff 3) JICA Study Team
Data collecting method	1) Questionnaire survey (self-assessment) 2) Questionnaire survey 3) Review of the data management status
Timing of data collection	1) After completion of all the training 2) At the demonstration by DIMU after all the training 3) After all the training

Note: DIMU (Data and Information Management Unit)
DITS (Division of Irrigation and Technical Services)

In consideration of the importance of the assessment, an analyst triangulation method was applied to assess it.



Analyst Triangulation on Evaluating Project Purpose on Simple Database and Information System Establishment (VS-1)

The DIMU themselves evaluated their work by comparing it with activities done in previous years. The DITS staff evaluated data and information management done by the DIMU using the database system. The JICA Study Team also mainly evaluated the process of data and information management.

As a result, the DIMU recognized that their data management system using the database system was highly improved from the status in previous years. The DITS staff evaluated that data obtained from the database system through the DIMU were very useful for their work. The JICA Study Team therefore confirmed that data could be sent from the districts and managed properly by the DIMU staff.

In conclusion, all three parties evaluated and agreed that data and information management was successfully completed for Mvomero and Mkuranga Districts.

6.3.2 Irrigation Scheme Formulation for DADP

(1) Morogoro ZIU

The following technical support activities were made by the Morogoro ZRC organized in the Morogoro ZIU.

- Screening endorsement for Mvomero District in 2004-2005,
- Screening endorsement for Mkuranga District in 2004-2005,
- Validation and agreement for Mvomero District in 2004-2005,
- Validation and agreement for Mkuranga District in 2004-2005.

(2) Mvomero District

(a) Irrigation Scheme Formulation Plan Prepared by Mvomero District

The following reports were submitted to the Morogoro ZRC and then basically validated by them.

- Quick Site Inspection and Screening Report for Mvomero District in 2004-2005, and
- Irrigation Scheme Formulation Report for Mvomero District in 2004-2005.

Finally the Mvomero DPDT proposed the development of Komtonga Irrigation Scheme for DADP in 2004-2005. Below are the general features of the Komtonga Irrigation Scheme.

Salient Features of the Komtonga Scheme Formulation Plan

Prepared by Mvomero DPDT

Ward	Sungaji
Village	Komtonga
Water Source	River Divue

Development area	50 ha
Crops to be cultivated	Rainy season Paddy Dry season Paddy
Irrigable area	Rainy season 50 ha Dry season 50 ha
Irrigation type	Gravity
Required works	Improvement
Development cost	Tsh. 171,109,000
Annual incremental benefit	Tsh. 43,604,000
Preliminarily estimated IRR	26 %

In addition, the following district support programme was proposed by the Mvomero DPDT.

Proposed District Support Programme

Title	Cost
Improvement of farmers skills and knowledge in irrigation practices	Tsh. 2,070,000

(b) Assessment of Proposed Irrigation Formulation Plan

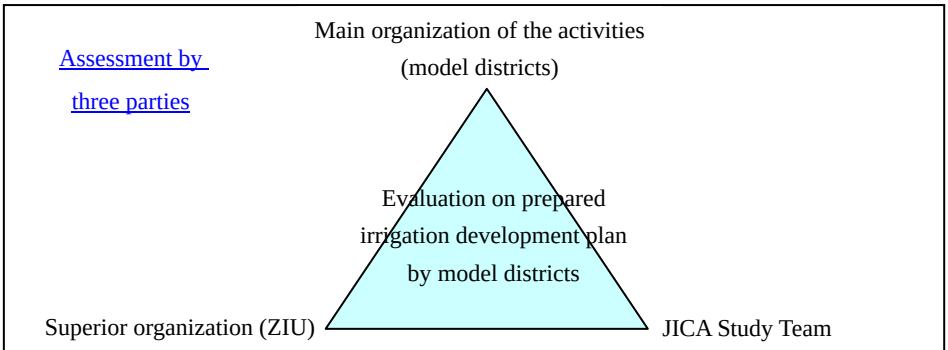
The irrigation formulation plan for the Mvomero District was assessed by three parties as shown below.

Assessment Procedure for the Project Purpose Achievement for VS-2

Project purpose	Model of appropriate irrigation scheme formulation plan process for DADPs is established in Mvomero and Mkuranga District
Criteria	Comparison of before/after the Verification Study
Required data	Opinions on appropriateness of district prepared irrigation formulation plan. *Appropriate irrigation scheme formulation plan was defined as;* - *All the survey and planning sheets are properly filled in by the DPDT, and* - *The candidate irrigation scheme is logically selected by the DPDT*
Data source	1) DTDP (self-assessment) 2) ZRC staff 3) JICA Study Team
Data collecting method	1) Questionnaire survey (self-assessment) 2) Questionnaire survey 3) Review of the irrigation scheme formulation status
Timing of data collection	1) After all the training 2) After all the training 3) After all the training

Note: DPDT (District Project Development Team)
ZRC (Zonal Review Committee)

The analyst triangulation method was also applied for the assessment.



Analyst Triangulation on Evaluating Project Purpose on Support on Irrigation scheme formulation for DADPs (VS-2)

The DPDT themselves evaluated their prepared plan by comparing it with the status in previous years. The ZRC evaluated DPDTs' prepared plan mainly from a technical viewpoint for endorsement and validation. The JICA Study Team mainly evaluated the process of their planning.

As a result, the DPDT evaluated that their plan in this year was largely improved from the previous one. The ZRC's evaluation indicated that the DPDT prepared the irrigation scheme formulation plan to satisfy the requirements stipulated in the guidelines. The JICA Study Team confirmed that the DPDT executed a proper planning process using the guidelines under technical support from the ZRC.

In conclusion, all the parties agreed that the prepared scheme formulation plan was appropriate.

(3) Mkuranga District

(a) Irrigation Scheme Formulation Plan Prepared by Mkuranga District

The following reports were submitted to Morogoro ZRC and then basically validated by them.

- Quick Site Inspection and Screening Report for Mkuranga District in 2004-2005, and
- Irrigation Scheme Formulation Report for Mkuranga District in 2004-2005.

Finally, the Mkuranga DPDT proposed the development of Yavayava Irrigation Scheme for DADP by the irrigation scheme formulation report in 2004-2005. Since some facilities for Yavayava Irrigation Scheme were already funded by other financial source, construction of remaining facilities was proposed in this report.

Salient Features of Yavayava Phases-2 and -3 Scheme Formulation Plan

Prepared by Mkuranga DPDT

Ward	Vikindu
Village	Yavayava and Kisayani
Water source	Kogaminba River
Development area (under development by Phase-1)	54 ha
Crops to be cultivated	Rainy season Paddy Dry season Paddy
Irrigable area	Rainy season 54 ha Dry season 54 ha
Irrigation type	Gravity
Required works	Remaining works of phase-1
Development cost (for Phases-2 and -3 only)	Tsh. 179,525,000
Annual incremental benefit	Tsh. 72,013,000
Preliminarily estimated IRR (for all phases)	23 %

In addition, the following district support programmes were proposed by the Mkuranga DPDT.

Proposed District Support Programme

Title	Cost
Capacity building for DPDT and farmers	Tsh. 6,660,000
Detailed study of Kisele basin	Tsh. 906,000
Institutional support in terms of office equipment and working tools	Tsh. 810,000

(b) Assessment of the Proposed Irrigation Scheme Formulation Plan

As well, the irrigation formulation plan for Mkuranga District was evaluated in the same manner as that for Mvomero District. The DPDT themselves evaluated their plan by comparing it with the status in previous years. The ZRC evaluated DPDTs' prepared plan mainly from technical viewpoints for endorsement and validation. The JICA Study Team mainly evaluated the process of their planning.

As a result, the DPDT evaluated that their plan in this year was largely improved from the previous one. The ZRC‘s evaluation indicated that the DPDT prepared the irrigation scheme formulation plan to satisfy the requirements stipulated in the guidelines. The JICA Study Team confirmed that the DPDT executed a proper planning process using the guidelines under technical support from the ZRC.

In conclusion, all the parties assessed and agreed that the prepared scheme formulation plan was appropriate.

6.4 Results of the Verification

As mentioned in Clause 5.4.3, the objectives of the Verification Study are to prove the hypotheses:

- DITS could properly manage data and information by establishing a database system including the operation manual.
- Irrigation scheme formulation for DADP could be fulfilled by district staff using the appropriate guidelines and with support of ZIU.

The following clauses show results of the evaluation on whether those assumptions were verified or not.

6.4.1 Establishment of Simple Database and Information System

Verification of the VS-1 (Establishment of Simple Database and Information System) was made using the matrix below. The matrix shows a part of PDM for VS-1 and the column "Result of the Verification" was added at the right end. Based on this matrix, the following evaluation results were obtained.

- All the outputs (outputs of the JICA Study Team) were validated, and
- Project purpose (outcome of the counterparts) was achieved.

The results derived indicated that project purpose was achieved because validated outputs were available. In conclusion, the assumption of VS-1, which was "*DITS could properly manage data and information t by establishing a database system including the operation manual*" was verified.

Verification Results for Establishment of Simple Database and Information System (VS-1)

	Project Summary	**Verifiable Indicators**	**Means of Verification**	***Results of Verification***
Project Purpose	1) Model of effective data and information management is established for the model Districts	1) Useful data and information for model Districts are properly stored in the database and information system by DIMU staff by August 2004	1) Monitoring and evaluation questionnaire	*1) Assessed at* achieved *in Clause 6.3.1* achieved by validated outputs
Output	1) Effective database program 2) Effective operation manual for the database program 3) Capable DIMU staff in the program operation 4) Information transmission between DITS, model ZRC, and model DPDTs 5) Monitoring and evaluation results	1) The database program is evaluated as effective by DIMU in August 2004 2) The operation manual is evaluated as effective by DIMU in August 2004 3) Operation skills in the program are acquired by DIMU staff by August 2004 4) Data exchange is made between DIMU, model ZRC, and model DPDTs 5) Monitoring and evaluation results are available by August 2004	1) Monitoring and evaluation questionnaire 2) Monitoring and evaluation questionnaire 3) Monitoring and evaluation questionnaire 4) Record of data transmission of respective offices 5) Monitoring and evaluation questionnaire	*1) Validated in Clause 6.1.1* *2) Validated in Clause 6.1.1* *3) Validated in Clause 6.2.1* *4) Confirmed by JICA Study Team* *5) Presented in Appendix A*

6.4.2 Support for Irrigation Scheme Formulation for DADP

Verification of the VS-2 (Support for Irrigation Scheme Formulation for DADP) was made in the same manner as VS-1. Based on this matrix, the following evaluation results were obtained.

- All the outputs (outputs of the JICA Study Team) were validated, and
- Project purpose (outcome of the counterparts) was achieved.

The results showed that the project purpose (outcome of the counterparts) was achieved because validated outputs were available (outputs of the JICA Study Team). In conclusion, assumption of VS-2, which was "*Irrigation scheme formulation for DADP could be fulfilled by district staff using the appropriate guidelines and with support of ZIU*" was verified.

Verification Results for Support for Irrigation Scheme Formulation for DADP (VS-2)

	Project Summary	**Verifiable Indicators**	**Means of Verification**	***Results of Verification***
Project Purpose	1) Model of appropriate irrigation scheme formulation process for DADP is established in the model Districts	1) Appropriate irrigation scheme formulation plans for DADP are prepared by model DPDTs for fiscal year 2004-2005 by August 2004	1) Irrigation scheme formulation report 2) Monitoring and evaluation questionnaire	*1) Assessed at* ***achieved*** *in Clause 6.3.2* achieved by validated outputs
Output	1) Effective guidelines for irrigation scheme formulation for DADP	1) The guidelines are evaluated as effective by DPDTs in the model Districts in August 2004	1) Monitoring and evaluation questionnaire	*1)* ***Validated*** *in Clause 6.1.2*
	2) Capable DPDT in irrigation scheme formulation for DADP in the model Districts	2) DPDTs in the model Districts acquire skill in irrigation scheme formulation for DADP by August 2004	2) Monitoring and evaluation questionnaire	*2)* ***Validated*** *in Clause 6.2.2*
	3) Capable ZRC in endorsement and validation in the model ZIU	3) ZRC in model ZIU understand procedures for endorsement and validation by August 2004	3) Monitoring and evaluation questionnaire	*3)* ***Validated*** *in Clause 6.2.2*
	4) Monitoring and evaluation results	4) Monitoring and evaluation result is available by August 2004	4) Monitoring and evaluation questionnaire	*4)* ***Presented*** *in Appendix B*

Chapter 7

Lessons Learned from the Verification Study

Plotting of coordinates surveyed by GPS, Mvomero District, Morogoro Region

CHAPTER 7 LESSONS LEARNED FROM THE VERIFICATION STUDY

7.1 Important Notice on the Use of Guidelines

The draft guidelines for irrigation scheme formulation for DADPs were finalized by fully incorporating the results of trial use. In the use of guidelines, however, careful attention should be paid to the following:

Training on Use of Handheld GPS, Mvomero District

- Change handheld GPS settings from the degree-minute system to the UTM system, because GPS makers adopt different systems. Users, especially ZIU as a trainer should carefully check that this has been done prior to use.
- Term “area”, since there are lots of “area” types used in the guidelines, such as potential area, proposed area, development area, irrigable area in rainy season, and irrigable area in dry season.
- Unit of crop yield, because measuring method/system of crop yield is different from place to place.

7.2 Unforeseen Benefits of Activities for the Verification Study

7.2.1 Process of Data and Information Management

(1) Great Importance of Irrigation Development Monitoring by the Irrigation Database

Through the activities of the Verification Study, it was found that use of the database system in regular monitoring works could contribute to strengthening of sustainability of the system, since the data stored in the system will be updated periodically in order to conduct the monitoring works.

(2) Effectiveness of Searching for the Required Topographic Map in the Database prior to Attempting to Retrieve the Original Sheet

Even though most of the topographic maps are scanned and stored in the database system, confirmation of irrigation scheme locations on original sheets of the topographic maps will be required sometimes. However, since the size of an

irrigation scheme is very small on the index map, it is difficult to identify the required sheet on which the scheme is located. It forces the users to engage in difficult work, such as searching for required maps through trial and error by handling large papers. Through the Verification Study, it was found that the database system could alleviate this difficulty. The users can find the required sheet using the database system and then approach the original sheets, without such tough work

(3) Importance of Confirming Protected Area Boundaries by Utilizing the Irrigation GIS

Through the Verification Study, it was found that district offices had no information on boundaries of protected areas. In this connection, an Irrigation GIS that could show protected areas in the country was evaluated as more useful than expected.

(4) Impact on Strengthening Collaboration with Related Organizations

Effective management of data and information system requires the collaboration of other related organizations such as soil conservation and land use planning sections and the research department. Through the activities of the Verification Study, the staff of these organizations participated and provided valuable ideas. It adequately contributed to strengthening of the system as expected.

7.2.2 Process of Irrigation Scheme Formulation

(1) Great Significance of Quick Site Inspection

The quick site inspection identified that the expected site was incorrect. This was because the district staff had never visited the real scheme site because of lack of transportation. Consequently, the significance of the quick site inspection was recognized to be higher than expected.

(2) Effectiveness of Applying Screening Criteria with Transparency, Objectivity and Ownership

The screening procedure introduced in the guidelines was worked out considering the objectivity, transparency and district's ownership. This was highly appreciated by the district staff since it would prevent any bias to their scheme selection, and also could be adjusted by the district staff independently in consideration of the district development policy.

(3) Advantages of Preparation of Present Situation Maps in a Simple Way

No large-scaled maps are available in district offices. The guidelines explain how to prepare a preliminary map with a handheld GPS. This was appreciated

by the district staff, as it enabled him to prepare their development plan using a scientific approach.

(4) Identification of the Importance of District Supporting Programme

Participants of the training programme indicated the importance of district support programmes, such as dissemination activities, which will enable them to understand the effect and need of irrigation development. This indication was made from participants who were not familiar with irrigated agriculture. From this, it was recognized that such programmes should be taken into consideration depending on the level of irrigated agriculture in the districts.

Feedback workshop at Digoma scheme, Mvomero District

(5) Need for Feedback Workshop

The importance of feedback workshop was recognized through the activities of the Verification Study, especially for declaration of the final selection of priority schemes to the village people. It seemed that district staff were worried about how to explain their results to the village where the proposed scheme was not selected. In the workshop, however, their explanation was generally accepted by the village people. Surprisingly, the awareness of village people was conversely raised, and motivation for their bottom-up activity was enhanced due to enthusiasm for the next opportunity. After the workshop, the district staff keenly told the JICA Study Team that the most important things were transparent process and sincere explanation to the village people.

Even for the feedback workshop for the selected scheme, there was a noteworthy result that villagers will take necessary action towards obtaining water rights.

From such experiences, the feedback workshop is recognized to be essential for the irrigation scheme formulation process.

(6) Recognition of Diligent Use of Guidelines by District Staff

District staff was very sincere about the use of the guidelines. The guidelines should therefore be prepared from the viewpoint of district staff. In other words, the guidelines should be practical and simple, not sophisticated and complicated. There is no doubt that if the guidelines are very practical, they will highly contribute to successful irrigation scheme formulation.

(7) Effectiveness of a Participatory Approach to Guidelines Finalization

In rectification of the guidelines, a participatory approach was effective, or rather, essential. The application of a participatory approach would highly result in preparation of more practical guidelines by full use of users' knowledge and suggestions, socio-economic background and culture. The participatory approach brought about more fruitful results than expected.

(8) Insufficient Consideration of Technical Aspects by District Staff

It was observed that technical aspects of irrigation development were hardly considered by the district staff as compared with social aspects. They often pointed out that social or participatory approaches were very important. However, they did not realize the importance of technical aspects before starting the training. There is no doubt that social and participatory approaches are essential for successful irrigation development, but technical aspects should not be ignored.

(9) Importance of Useful Technical Support from the ZIU

In the Verification Study, the ZIU formed the ZRC, and the ZRC took part in the irrigation scheme formulation process, as an evaluator. The ZRC provided the district staff with progressively technical support through active discussion. From this desirable relationship between the ZRC and the district staff, it could confidently be said that the ZRC could play the role of trainer to district staff in this work.

(10) Hesitation to Intervene in Villagers Activities by District Staff

Generally, the development plans prepared by the villagers were very poor. Nevertheless, district staff hesitated to provide guidance to the villagers, since such kind of intervention would be regarded as pressure to them. Suitable mechanism to give proper guidance to villagers should be established.

(11) Ignorance of Ensuring Required Budget for Irrigation Scheme Formulation

It was realized that district staff were not familiar with budgeting. In fact, at the initial stage of the training, they did not comprehend that necessary cost for equipment and traveling for irrigation scheme formulation needed to be included in their DADP. Thus, proper instructions on budgeting to districts are required.

(12) Impact on Creating a Human Resources Network

In this Verification Study, many persons such as the ZRC members, district staff and village people, were related with one purpose, which is the proper irrigation scheme formulation. Under such circumstance, a human resources network was developed among them as one of the training effects. It is highly expected that

the network will facilitate smooth implementation of irrigation development in the district.

7.2.3 Process of the Verification

(1) Need of Completing a Retrospective Evaluation after Completion of Training

To evaluate participants' understanding of the skills they were trained in, they were requested to write down keywords of the skills leaned at the end of each training session. Initially, it was planned that effects of the training would be evaluated by those keywords only. However, it was realized from some participants' suggestions that they understood more deeply the meaning of the skills after completion of all the training. In fact, participants themselves revised the keywords once selected for each training session. This pointed out the importance of a backward evaluation after completion of the training. This was one of the important lessons learned through evaluation for each session.

Selection of priority area using resource map at Kisele scheme, Mkuranga District

7.3 Procedures for DADP Preparation

7.3.1 Difficulty in Irrigation Scheme Formulation without an O&OD Process

The DADP guidelines suggest the use of the O&OD methodology as a bottom-up approach. The guidelines for irrigation scheme formulation for DADP therefore were prepared based on this suggestion.

Nevertheless, the quick site inspection found that O&OD process has not been employed in either Mvomero or Mkuranga Districts. The Verification Study was thus embarrassed due to non-application of O&OD process. A good example was the Kisele scheme in Mkuranga District, with a proposed potential area of 14,000 ha covering eight villages. This is obviously beyond the manageable extent of DADP. Firstly, the Mkuranga DPDT was obliged to know how to determine the priority area from such a large potential area. However the DPDT came to know the difficulty of this activity, because he did not know who the proper person to discuss with was. Finally, villagers managed to reach a consensus on the priority area, regrettably, without adequate discussions among them.

From this lesson learned, it is advisable that the O&OD process should be urgently disseminated.

7.3.2 Need for Overall Justifications of the Village Proposed Plan

Through the activities of the Verification Study, it was confirmed that the quality of the village proposed plans was poor and unsuitable for DADP. Their proposed plans were not studied from economic, social, technical, or environmental viewpoints at all. This means that if district offices decide to invest without these studies, they might not reach their development goals. Thus, the Mvomero and Mkuranga districts might face very serious problems because of the poor development plans as well as non-application of O&OD process. Since village government has no capacity to make appropriate development plans, it is essential for the district office to provide proper support to them from overall viewpoints, in cooperation with the ZIU.

Interviewing with village proposed plan at Dihinda scheme, Mvomero District

7.3.3 Anticipation of Proper Planning for Other Agricultural Sub-sectors

As far as communications with district staff went, it was deemed that the quality of other agricultural sub-sectors' planning for DADP might not reach a satisfactory level. It was unlikely that other sub-sector district staff would apply proper planning methods or processes from technical, economic, environmental or sociological points of view. Application of a participatory approach was also doubtful because of lack of execution of O&OD methodology in almost all districts.

Proper planning of other agricultural sub-sectors is very crucial for irrigation development, since they are mutually closely related. In particular, extension services, institutional improvement and micro credit system strengthening are essential factors for successful development of the irrigation sub-sector.

7.3.4 Need for Prioritization Criteria for Agricultural Sub-sectors' Development

At the district offices, it was found that there were many development plans for other sub-sectors as well as the irrigation sub-sector, although the quality of them were at different levels as mentioned above. DADP has a limited budget and could not take them all at one time. In the Verification Study activities, it was found that district offices suffered from inappropriate prioritization of scheme development. Proper criteria for prioritization are thus indispensable for

reasonable selection with objectivity and transparency, and also to reject poor development plans.

7.3.5 Need for Concrete Guidelines to Avoid Conflict of Prioritization between National and District Levels

Problems with conflicts in prioritization between national and district levels were observed in the activities of the Verification Study. In the DADP guidelines, the district office is expected to be a mediator of national policy and villagers proposed plan. However, procedures to harmonize them are not clearly mentioned in the DADP guidelines. This work would be a knotty-job for a district office.

Discussion on conflict of priority between national and district levels by Morogoro ZRC

7.4 Subsequent Irrigation Development Stages

7.4.1 Need for Technical Support

After completion of training in the Verification Study, district staff asked the JICA Study Team about the technical support for subsequent development stages such as feasibility studies, detailed design, construction and O & M. Since district staff has limited experience in these issues, the DITS should therefore consider the need for proper technical support for district offices through the ZIU, in order to realize sustainable irrigation development.

7.4.2 Need for Collection of Basic Data

Basic data such as hydrology, cropped area, etc. are essential for proper irrigation scheme formulation. In the Verification Study activities, it came to light that such basic data is very limited in district offices. In the guidelines for irrigation scheme formulation for DADP, some simplified methods to obtain such data were introduced to overcome this situation. However, the accuracy of the data obtained by this simplified method is still at a preliminary level. There is no doubt that more accurate basic data are helpful for proper irrigation development. Thus, it is expected that the DITS should provide the district offices with technical support to collect the proper basic data through the ZIUs.

Chapter 8

Conclusion and Recommendations

Feedback workshop on Digoma irrigation scheme at Mvomero District, Morogoro Region

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

The Verification Study was carried out for two items; VS-1: Establishment of Simple Database System and VS-2: Support for Irrigation Scheme Formulation for DADPs.

The database system was established at the DIMU of DITS, MAFS, and then two staff in-charge were assigned. Through execution of ten training programs for them and with the operation manual, they become very familiar with how to manage the system. It was thus verified that DIMU could make proper management of a simple database system with a practical operation manual.

On the other hand, irrigation scheme formulation was also done by the DPDTs for Mkuranga and Mvomero Districts with the guidelines and support of Morogoro ZIU. The scheme formulation was successfully executed along the guidelines and in thorough discussions among them. As a result, Yavayava Irrigation Scheme (Phases-2 and -3: 54ha) and Komtonga Irrigation Scheme (50ha) were selected for Mkuranga District and Mvomero District as the candidate schemes for their DADP, respectively. These irrigation schemes are now ready for DADP. It was therefore verified that the appropriate irrigation scheme formulation was satisfactorily conducted by the district staff with the guidelines and support of the ZIU.

Judging from the results of the Verification Study mentioned above, it was concluded that MAFS should disseminate the full use of the database system and the irrigation scheme formulation process to all district offices to realize successful implementation of irrigation development as stipulated in the NIMP.

8.2 Recommendations

8.2.1 Distribution of Guidelines for Irrigation Scheme Formulation to District Offices

As mentioned above, practical guidelines have been produced as the result of the Verification Study for the irrigation scheme formulation, and are now available in MAFS. It is thus recommended that MAFS should distribute the guidelines to all districts in the country immediately after a new version is available, to disseminate the established irrigation scheme formulation, and also to lead to more effective irrigation development at the district level.

8.2.2 Ensuring Sustainability of the Verification Study Effect

(1) Preparation of Annual Monitoring Report of Irrigation Development

As a result of the Verification Study, the DIMU is ready for operation and management of the database system. Now, the important question is how to carry on the system continuously. In order to maintain the system well, roles and duties of the DIMU should be clarified as early as possible. As one effective way, it is recommended that the MAFS should impose a requirement for the submittal of the annual monitoring report on the DIMU. This annual monitoring report will be very useful and helpful for the MAFS to grasp the current conditions of irrigation development in the country.

(2) Updating and Modification of the Guidelines for Irrigation Scheme Formulation for DADPs

The guidelines should always follow the prevailing circumstances in irrigation development, especially the district development policy. In addition, much use of the guidelines for other district offices might require further rectification to satisfy the various demands of sociological and natural conditions. Thus, it is recommended that the guidelines should be updated and rectified at any time necessary.

(3) Training System for Supporting Irrigation Scheme Formulation for DADP

In the process of training the district staff, the Morogoro ZIU staff has also learned from the JICA Study Team how to train others, and now the ZIU has adequate knowledge of methods and processes to train the district staff in irrigation scheme formulation for DADPs. It is therefore recommended that the Morogoro ZIU should transfer his knowledge to the other six ZIUs under direction of DITS, and then all ZIU staff, as trainers, should train staff of other districts in their territorial area.

(4) Introduction of a Certificate Issuance System

As mentioned above, the ZIU should become a trainer to train the district staff in irrigation scheme formulation. This system is very effective to disseminate the proposed irrigation scheme formulation process since seven ZIUs cover all districts. In order to promote this system, it is recommended that the ZIU, on behalf of Director of the DITS, should issue a certificate to the relevant staff of the districts after completion of training in irrigation scheme formulation for DADP. It is deemed that this system will give a high incentive to the district staff as well as the ZIU staff.

8.2.3 Improvement of DADP Procedures

(1) Strengthening of O&OD Process

During the procedure of verification of all irrigation schemes, it was learned that the bottom-up approach, say the O&OD process has not been used by the district offices, in spite of the fact that the DADP guidelines suggested the use of it. In the Mkuranga District, there were problems in the village on selection of a priority irrigation scheme because of lack of application of the O&OD process. The main reasons for not applying the O&OD process are lack of knowledge and budget. It is therefore recommended that the DADP guidelines should further stress the application of the O&OD process and its budget arrangement.

(2) Proper Assessment of Village/Ward Plans by District Offices

In the irrigation scheme formulation, it was found that the district offices have never conducted any proper assessment of development schemes submitted by Village Governments through the Ward Development Committees. The DADP guidelines do not mention how to assess the development schemes technically, economically, or environmentally. Without such an approach, it is difficult, or rather, impossible to expect a workable DADP.

Thus, it is recommended that the DADP guidelines should give a more clear description of proper assessment of village/ward plans by district staff.

(3) Precise Explanation on Harmonization of Top-Down and Bottom-up Approaches

The ZIU takes part in the process of irrigation scheme formulation. The role of ZIU is to provide assessment, endorsement, validation and agreement for the study results by district staff. In attempting to fulfill that role in Mvomero District, the Morogoro ZIU was unable to make a definitive decision due to some differences in development priorities between the district level and National level.

The DADP guidelines only mention that a district office shall function as a Mediator between the top-down approach and the bottom-up approach. However, even the ZIU does not have adequate capacity to mediate between them. It somehow needs to be said that the district office has further less capacity. It is therefore necessary that the DADP guidelines should approach a better practical way considering the actual situation of district offices.

(4) Application of Similar Processes for Other Related Sub-sectors

So far, no activities similar to the irrigation sub-sector have been taken for the other sub-sectors in the agricultural sector. Thus, accuracy of the development

schemes of other sub-sectors/sectors in the district office is varies greatly from those of the irrigation sub-sector if the proposed irrigation scheme formulation is employed. This would bring about unfair selections for the DADP in the limited DADP budget. It is thus recommended that the other sub-sectors should apply similar processes to scheme formulation for the DADP.

Besides, the Master Plan Study strongly recommended that infrastructure (Scheme-wise Development) and supporting programs (Subject-wise Improvement) should be well harmonized in implementation, to achieve sustainable irrigation development. In this sense, it is recommended that other sub-sectors should steadily contribute to the irrigation sub-sector without delay.

(5) Need of Selection Criteria for DADP

Lots of development schemes will come from Village Governments through Ward Development Committees. Meanwhile, the DADP have limited budget, and thus not all of them can be incorporated into the DADP. Nevertheless, most, or rather all, district offices have no definite criteria on selection of priority schemes from amongst those proposed. In order to make smooth selections with transparency, urgent preparation of selection criteria is highly recommendable.

(6) Need of Budget Arrangements for Irrigation Scheme Formulation Works in DADP

As mentioned previously, the DPDT for Mvomero and Mkuranga Districts have successfully carried out the irrigation scheme formulation works using the guidelines under support of the ZRC of ZIU. They also came to know the importance of those works for preparation of a workable DADP. With These results, it is recommended that district offices should appropriate the necessary budget for those works including operation cost of ZRC in the DADP.

8.2.4 Acceleration of Subsequent Stages of Irrigation Development

(1) Urgent Implementation of Irrigation Schemes Formulated for DADP

As concluded in the Master Plan Study, the required irrigation development areas would be 265,200 ha by 2007, 324,900 ha by 2012 and 405,400 ha by 2017. This would contribute to achievement of rice self-sufficiency at the national level by 2017. In order to attain these targets, it is recommended that the selected irrigation schemes should be implemented under the DADP as planned.

(2) Preparation of Practical Guidelines for Subsequent Development Stages

The MAFS has the guidelines for participatory improvement for farmer initiated and managed smallholder irrigation schemes. The guidelines present the

procedure for the feasibility studies, detailed design, construction and operation and maintenance. In addition, The MAFS has some manuals, such as project planning manuals, irrigation design manuals, rainwater harvesting design manuals for irrigated agriculture in marginal areas and irrigation water management field handbooks for extension staff, which are currently kept at the DIMU. As far as the lesson learned from the Verification Study were concerned, it is however, deemed that these guidelines and manuals are not suitable for district staff with little experience. It is therefore recommended that simple and practical guidelines/manuals for subsequent development stages should be prepared for district staff. In addition, it is recommended that the guidelines for operation and maintenance should contain the training programme which will be prepared in cooperation with the relevant organization like Kilimanjaro Agriculture Training Center (KATC).

(3) Collection of Basic Data for Irrigation Development

Needless to say, irrigation schemes should be planned, designed and constructed based on reliable data and information. If it is not done in this manner, it is difficult to realize successful irrigation development. The simple database system established at the DIMU of DITS, the MAFS is helpful for the above. Thus, it is indispensable for respective district offices to show an active attitude towards collecting the basic data and information, and then to send them to the DIMU on time.

Chapter 9

Feedback to the Action Plan

Feedback of participants' comment to the training programme

CHAPTER 9 FEEDBACK TO THE ACTION PLAN

9.1 General

As mentioned in Section 4.1, the Verification Study took up the two objective items as bottleneck problems for smooth irrigation development as the results of the Action Plan Study. These are (i) VS-1: Establishment of Simple Database and Information System and (ii) VS-2: Support for Irrigation Scheme Formulation for DADPs. These objective items are regarded as cores for the following two programmes out of the 18 priority programmes:

- Code No.C7: Establishment of DADP Formulation Guideline for Irrigated Agriculture Development Programme
- Code No.D3: Information and Database Improvement

Thus, the results of the Verification Study were fed back to the contents of these two priority programmes.

9.2 Modification of Time Framework for Priory Programmes of Subject-wise Improvement Programme

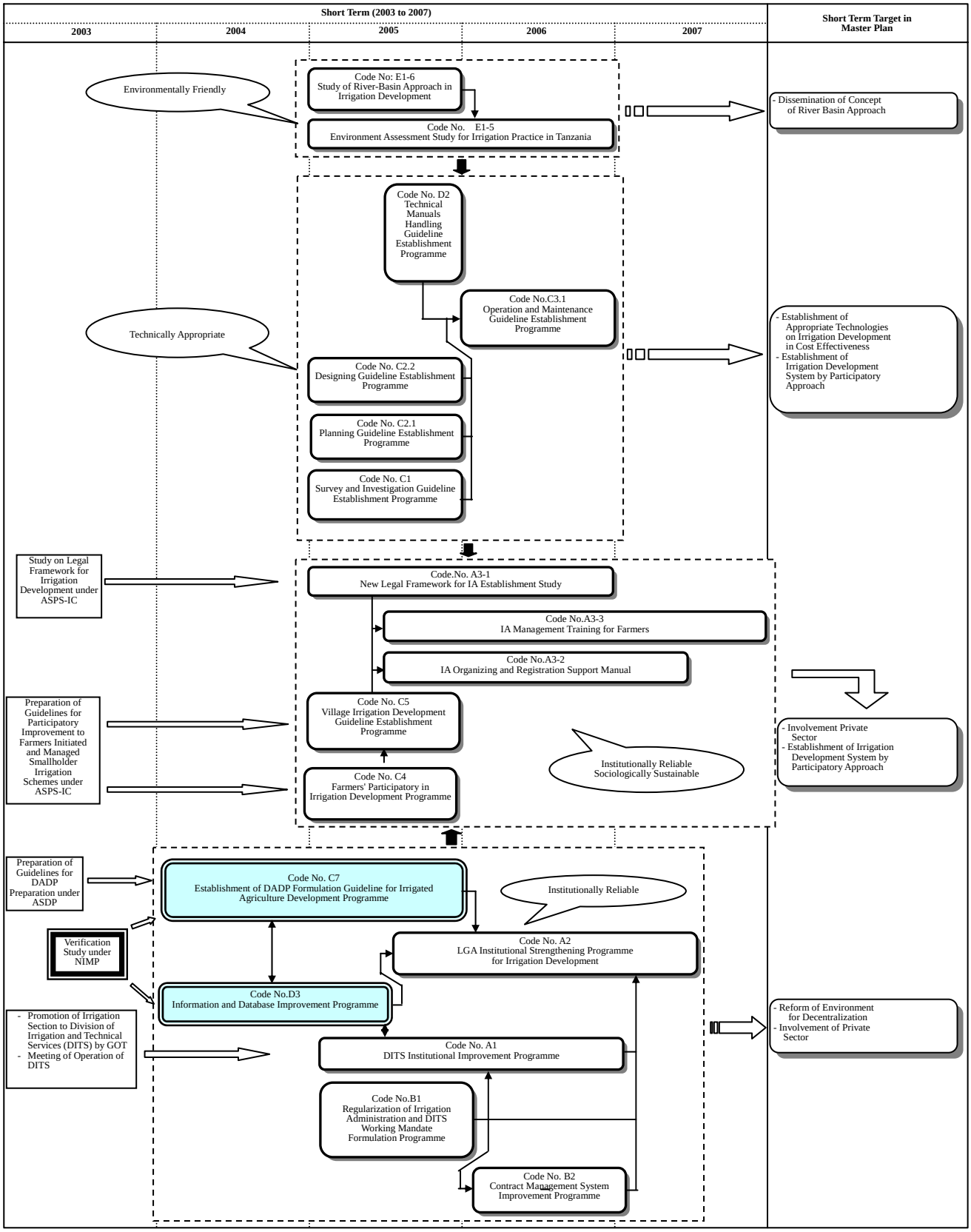
The time framework for the priority programmes was modified based on the results of actual activities for the Verification Study.

The Verification Study was commenced in January 2004, and completed in December 2004 with the submittal of the final version of the Verification Study Report with the guidelines for irrigation scheme formulation for DADP and the operation manual for simple database and information system. In this connection, starting time of Code No.C7: Establishment of DADP Formulation Guideline for Irrigated Agriculture Development Programme and Code No.D3: Information and Database Improvement were changed from July 2004 to January 2004. As for completion time, Code No.C7: Establishment of a DADP Formulation Guideline for Irrigated Agriculture Development was modified to be in December 2005, since it will need to be disseminated to the remaining six zones for successful DADP formulation. Code No.D3: Information and Database Improvement was also changed to be in June 2005, and the remaining six months after completion of the Verification Study would be used for system management by DIMU of DITS, MAFS.

All the remaining 16 priority programmes were rearranged to be started six months behind the date proposed in the original plan in consideration of the actual situations for implementation of Action Plan.

The modified time framework for priority programmes of the Subject-wise Improvement Programme is given on the next page.

Illustrated Time Framework for Priority Programmes of the Subject-wise Improvement Programme (Modified)



9.3 Code No.C7: Establishment of DADP Formulation Guideline for Irrigated Agriculture Development Programme (Modified)

The project proposal and project design matrix modified based on the results of the Verification Study is given below:

(1) Project Proposal (partially modified as shown in italic bold style)

<table>
<tr><td>(1) Title of Programme</td><td>Establishment of DADP Formulation Guideline for Irrigated Agriculture Development Programme (Code No.:C7)</td></tr>
<tr><td>(2) Location</td><td>Mainland</td></tr>
<tr><td>(3) Objectives</td><td>This programme aims to prepare proper guidelines for DADP formulation for irrigated agriculture in terms of technical, economical, environmental and institutional aspects. This programme contains execution of site inspection, trial use, rectification of the guideline, and formulation of appropriate irrigation schemes by district staff. This programme also contains a seminar to disseminate the procedure of irrigation scheme formulation for DADP. The guideline should be simple and practical in view of the working experience and capability of district staff.
Deployment of the guidelines in good order and establishment of a proper handling system for the guidelines will also be mentioned in the programme. Proper training of district staff should be included within the programme. The training of district staff will be done by the Zonal Irrigation Units (ZIUs).In this connection, roles and duties of ZIU should be clarified.
Through properly utilizing the results of the programme, it is expected to attain the overall objectives of NIMP.</td></tr>
<tr><td>(4) Programme Description</td><td>The ASDS, which currently struggles, notwithstanding the full support of the GOT, is a part of the operational response to a set of policies, strategies and initiatives designed to re-orientate and re-invigorate the national economy. The programme is underpinned by national policies supporting, in particular, the decentralization of many public sector responsibilities to LGAs. The LGAs will increasingly be involved through the participatory formulation of District Agricultural Development Plans (DADP). Presently, formulating modalities of the DADP are mostly highlighted. Putting forward the decentralization in agriculture, including irrigated agriculture, the guideline of DADP formulation has to be prepared urgently. This programme is to prepare the proper guidelines for irrigation scheme formulation for DADP through actual operation for the selected model districts.
As the DADP guidelines on its clerical procedures are going to be prepared in another channel, the guidelines prepared by this programme implementation are regarded as a part of DADP guidelines.</td></tr>
<tr><td>(5) PDM for the Programme</td><td>See the attached PDM.</td></tr>
<tr><td>(6) Contents of Programme</td><td>The proposed contents of the Programme are as follows:
<table>
<tr><th>Activities</th><th>Procurement</th><th>Provision of manpower and training</th><th>Remarks</th></tr>
<tr><td>To select model Districts.</td><td>Selection criteria</td><td>- Consultants having required ability and faculty</td><td></td></tr>
<tr><td>To Prepare the draft guidelines for irrigation development.</td><td>Not specified</td><td>- Consultants having required ability and faculty</td><td></td></tr>
</table></td></tr>
</table>

	To make the first trial usage based on the draft guidelines in on-the job training in two model districts.	***GPSs and leveling instruments***	- Consultants having required ability and faculty	
	To rectify the draft guidelines.	***Not specified***	- Consultants having required ability and faculty	
	To make a second trial usage based on the rectified guidelines in the on-the job training in two model districts.	***GPSs and leveling instruments***	- Consultants having required ability and faculty	
	To formulate the irrigation scheme in two model districts.	***Not specified***	- Consultants having required ability and faculty	
	To verify the results of activities for irrigation scheme formulation in two model irrigation schemes.	***Not specified***	- Consultants having required ability and faculty	
	To make a seminar to disseminate the guidelines to the districts superintended by Morogoro ZIU.	***Not specified***	- Consultants having required ability and faculty	
	To train the staff of the remaining six ZIUs.	***GPSs and leveling instruments***	- Consultants having required ability and faculty	
	To make a seminar to disseminate the guidelines to the Districts superintended by respective ZIU.		- Consultants having required ability and faculty	
	To train the district staff by six Zonal Irrigation Units in the on-the job-training.	***GPSs and leveling instruments***	***- Zonal Irrigation Units***	
(7) Required Cost	***US$ 970 thousand***			
(8) Executing Agency	Division of Irrigation and Technical Services (DITS), MAFS			
(9) Implementation Schedule	***Two years for study and implementation of the Programme (January 2004 – December 2005)***			
(10) Assessment of Possible Problems and Bottlenecks in Implementation	***District staff strictly observes the guidelines. Thus, the guidelines should be so prepared as to enable district staff to understand them easily. To do so, the guidelines should be prepared in a participatory manner.*** At this moment special attention should be given to small-scale irrigation schemes with a view to introduce a variety of simple technologies. However, in some cases, simple and low-cost irrigation may not be always sustainable, therefore it should ensure the applicability and sustainability of introduced irrigation technology under the qualified technical support from the DITS of MAFS.			
(11) Special Arrangements	***In ASDP***, Working Group 2 under TF-1 of DADP preparation has worked to formulate proper modality of irrigation development, especially concerning DADP formulation. ***The programme should be made in such framework of ASDP.***			

(2) Project Design Matrix (Totally modified)

Establishment of DADP Formulation Guideline for Irrigated Agriculture Development (DADP-IA) under NIMP

Project Title: The National Irrigation Master Plan
Project Term: Two years (Jan. 2004 – Dec. 2005)
Project Area: All Districts and Zonal Irrigation Units
Prepared Date: August 20, 2004

Project Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal			
1.1 Sustainable irrigation development is achieved	1.1 Achievement of 405,000ha of irrigation development by year 2017 and stable crop production.	1.1 Annual irrigation development monitoring report	-
Overall Goal			
2.1 Appropriate irrigation scheme formulation process for DADPs is established for all the Districts in the mainland.	2.1 More than 70% of prepared irrigation scheme formulation plans for DADPs in all the Districts are evaluated as appropriate in year 2007	2.1 Irrigation scheme formulation plans in DADPs	(a) No change in basic policies of Tanzania such as decentralization (b) Implementation of irrigation development according to the plan
Project Purpose			
3.1 Establishment of appropriate irrigation scheme formulation process for DADPs is established in Districts	3.1 All districts understand appropriate irrigation scheme formulation plan for DADPs by December 2005	3.1 Irrigation scheme formulation reports 3.2 Monitoring and evaluation questionnaires	(a) Execution of training to non-model organizations (b) Distribution of enough guidelines to all the District offices (c) Timely allocation of required budget for irrigation scheme formulation in DADPs
Outputs			
4.1 Effective guidelines for irrigation scheme formulation for DADPs	4.1 The guidelines are evaluated as effective by DPDTs in the model Districts in August 2004	4.1 Monitoring and evaluation questionnaire	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the study period (b) Continuous assignment of counterparts in DITS, the remaining ZIUs, and District offices by April to December 2005
4.2 Capable DPDT in irrigation scheme formulation for DADPs in the model Districts	4.2 DPDTs in the model Districts acquire skill in irrigation scheme formulation for DADPs by August 2004	4.2 Monitoring and evaluation questionnaire	
4.3 Capable ZRC in endorsement and validation in the model ZIU	4.3 ZRC in model ZIU understand procedure for endorsement and validation by August 2004	4.3 Monitoring and evaluation questionnaire	
4.4 Verification results	4.4 Verification results is available by August 2004	4.4 Monitoring and evaluation questionnaire	
4.5 Capable ZRC in endorsement and validation in the remaining ZIUs	4.5 ZRC in the remaining ZIUs understand procedure for endorsement and validation by November 2005	4.5 Monitoring and evaluation questionnaire	
4.6 Capable DPDT in irrigation scheme formulation for DADPs in the remaining Districts	4.6 DPDTs in the remaining Districts acquire skill in irrigation scheme formulation for DADPs by December 2005.	4.6 Monitoring and evaluation questionnaire	
Activities			
5.1 Select model Districts 5.2 Prepare the draft guidelines for irrigation development 5.3 Make the first trial usage based on the draft guidelines in on-the job training in two model districts 5.4 Rectify the draft guidelines. 5.5 Make second trial usage based on the rectified guidelines in on-the job training in two model districts 5.6 Formulate the irrigation scheme in two model districts 5.7 Verify the results of activities for irrigation scheme formulation in two model irrigation schemes 5.8 Hold a seminar to disseminate the guidelines to the districts	*Inputs from donor* (a) Foreign experts (b) Equipment for training (c) Traveling cost for foreign experts, counterparts (d) Field allowance for counterparts	*Inputs from the government of Tanzania* (I) DITS of MAFS (a) Counterparts (b) Office space (c) Printing cost of the guidelines (II) All ZIUs (a) Zonal Review Committee (ZRC)	(a) Continuous assignment of counterparts in DITS, all ZIUs, and District offices within from May 2004 to December 2005 *Pre-conditions* (a) Good understanding of related organizations of the importance of appropriate planning in DADPs (b) High need for irrigation development at District offices

superintended by Morogoro ZIU 5.9 Train the staff of the remaining six ZIUs 5.10 Hold a seminar to disseminate the guidelines to the Districts superintended by respective ZIU 5.11 Train the district staff by six ZIUs in on-the job-training.	(III) All District offices (a) District Project Development Team (DPDT) (b) Meeting space	

(3) Implementation Schedule

Code No.C7: Establishment of DADP Formulation Guideline for Irrigated Agriculture Development (DADP-IA) under NIMP (Modified)

Activities		Expected Results	Schedule																						Person in- charge	Implementer	Equipment	Cost (Thousand US$)
			2004												2005													
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
5.1	To select model Districts																								DITS	Consultants		170
5.2	To Prepare the draft guidelines for irrigation development	Draft guidelines																							DITS	Consultants		
5.3	To make the first trial usage based on the draft guidelines in the on-the job training in two model districts	Comments on draft guidelines																							DITS	Consultants Staff of model district offices and ZIU	GPS	250
5.4	To rectify the draft guidelines	Rectified guidelines																							DITS	Consultants		
5.5	To make second trial usage based on the the rectified guidelines in the on-the job training in two model districts																								DITS	Consultants Staff of model district offices and ZIU	GPS	
5.6	To formulate the irrigation scheme in two model districts	Formulated irrigation scheme																							DITS	Staff of model district offices and ZIU		
5.7	To verify the results of activities for irrigation scheme formulation in two model irrigation schemes	Verification results																							DITS	Consultants Staff of model district offices and ZIU		
5.8	To make a seminar to disseminate the guidelines to the districts superintended by Morogoro ZIU	Understanding of relevant district staff on the guidelines																							DITS	Consultants Staff of model district offices and ZIU		50
5.9	To train the staff of the remaining six ZIUs	Enhancement of capability of staff of ZIUs																							DITS	Staff of model district offices and ZIU		500
5.10	To make a seminar to disseminate the guidelines to the Districts superintended by respective ZIU	Understanding of relevant district staff on the guidelines																							DITS	Staff of remaining district offices and ZIU		
5.11	To train the district staff by six ZIUs in the on-the job-training	Enhancement of capability of staff of district offices																							DITS	Staff of remaining district offices and ZIUs	GPS	

9.4 Code No.D3: Information and Database Improvement (Modified)

The project proposal and project design matrix revised based on the results of the Verification Study is given below:

(1) Project Proposal (partially modified as shown in italic bold style)

(1) Title of Programme	Information and Database Improvement Programme (Code No.: D3)
(2) Location	Mainland and Zanzibar
(3) Objectives	***This programme aims to establish information systems and databases related to irrigation development at the DITS of MAFS***. These are definitely necessary for monitoring the progress of irrigation development. Although some useful information presently exists, it are not known or effectively used by other people. In order to achieve successful irrigation development, interdisciplinary information and data are required for many related fields. Irrigation potential maps prepared under the Master Plan Study are a good example for indicating clear success of high-qualified utilization of existing data and information. Furthermore, it could be said that leaving useful data and information unused is a great loss of national assets. Through effective use of established databases on irrigation development, it is expected to attain the objectives of NIMP.
(4) Programme Description	One major mission of the DITS is to "Promote the use of information communication technology and develop an irrigation data bank". This mission is even more highlighted corresponding to enhancing government's attention to irrigation development. The programme is to contribute to this important DITS mission directly. The programme consists of three major significant tasks. The first important task is to properly design an information system and database that meet actual needs now and in the near future. The second important task is to establish a real information system and database as it is designed. The third important task is to build up a reliable operation system, and update the established database on time, so that it is maintained appropriately. The programme should fulfill these important tasks successfully through procuring necessary equipment and assigning staff, pursuing specified activities, and testing. ***The database system consists of an Irrigation Database and Irrigation GIS. The Irrigation Database has three functions: (i) irrigation development monitoring function, (ii) reference documents function, and (iii) topographic maps function. The Irrigation GIS has also three functions: (i) plotting of location of proposed irrigation scheme in GIS, (ii) superposition of thematic maps in GIS, and (iii) printout of appropriate layout.*** ***The prototype database system is firstly prepared, and then rectified through the first trial operation with an operation manual, aiming at establishment of a user-friendly system. Thereafter, the second operation is made using the rectified system and operation manual, and also by exchanging the actual irrigation scheme data with model districts.*** The requisites of the programme are to start the collection of data and information, and to compile them using the computer system. The data on progress of irrigation development in each District shall be collected from the District Offices.
(5) PDM for the Programme	See the attached PDM.

<table>
<tr><td>(6) Contents of Programme</td><td>The proposed contents of the Programme are as follows:
<table>
<tr><th>Activities</th><th>Procurement</th><th>Providing of manpower and training</th><th>Remarks</th></tr>
<tr><td>To establish the prototype database system.</td><td>Computers
Plotter
Printer
Scanner
Arc View
Microsoft-Access</td><td>Consultants</td><td>Suitable space for establishment of database system</td></tr>
<tr><td>To prepare the draft operation manual.</td><td>Not specified</td><td>Consultants</td><td></td></tr>
<tr><td>To run first operation of prototype database system.</td><td>Not specified</td><td>Consultants
Staff of Data and Information Management Unit (DIMU) of DITS</td><td></td></tr>
<tr><td>To rectify the prototype database system and draft operation manual.</td><td>Not specified</td><td>Consultants</td><td></td></tr>
<tr><td>To manage actual data using Model Districts and ZIU.</td><td>Not specified</td><td>Staff of DIMU of DITS, Model ZIU and Model Districts</td><td></td></tr>
<tr><td>To verify the results of actual data management.</td><td>Not specified</td><td>Consultants
Staff of DIMU of DITS</td><td></td></tr>
<tr><td>To hold a seminar to disseminate database system to all ZIUs and selected districts.</td><td>Not specified</td><td>Consultants
Staff of DIMU of DITS</td><td></td></tr>
<tr><td>To inform all districts of the importance and need for a database system</td><td>Not specified</td><td>Staff of Data and Information Management Unit of DITS, ZIUs and Districts</td><td></td></tr>
<tr><td>To monitor and evaluate above mentioned activities</td><td>Not specified</td><td>Staff of DIMU of DITS, ZIUs and Districts.</td><td></td></tr>
</table></td></tr>
<tr><td>(7) Required Cost</td><td>US$ 220 thousand</td></tr>
<tr><td>(8) Executing Agency</td><td>Division of Irrigation and Technical Services (DITS), MAFS</td></tr>
<tr><td>(9) Implementation Schedule</td><td>One and half years for study and implementation of the Programme (January 2004 – June 2005)</td></tr>
<tr><td>(10) Assessment of Possible Problems and Bottlenecks in Implementation</td><td>As the DITS of MAFS is not familiar with the establishment and management of database systems, the system should be as simple and practical as possible.
In order to maintain the sustainability of the database system, a key point is that MAFS should recognize the importance and need for the database system for smooth irrigation development.
The database should be periodically updated based on the latest data. Monitoring works should be regularly carried out by the DIMU of DITS.</td></tr>
<tr><td>(11) Special Arrangements</td><td>The information systems and databases are established for the situation of the Mainland. However, it is useful even in Zanzibar. The databases should be contrived to be convenient for both the Mainland and Zanzibar.</td></tr>
</table>

(2) Project Design Matrix (Totally modified)

(Information and Database Improvement Programme) under NIMP

Project Title: The National Irrigation Master Plan, Verification Study
Project Term: Two years (Jan. 2004 – Jun. 2005)
Project Area: All Districts
Prepared Date: August 20, 2004
Target Group: Staffs in DIMU, ZRCs, and DPDTs in charge of data and information management

Project Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal			
1.1 Sustainable irrigation development is achieved	1.1 Achievement of 405,000ha of irrigation development by year 2017 and stable crop production.	1.1 Annual irrigation development monitoring report	-
Overall Goal			
2.1 Data and information on irrigation development in the Mainland are properly managed by the DITS	2.1 Annual irrigation development monitoring report is prepared 2.2 Operation record of the database system is reported	2.1 Annual irrigation development monitoring report 2.2 Operation record of the simple data and information management system	(a) No change in basic policies of Tanzania such as decentralization (b) Implementation of irrigation development according to the plan
Project Purpose			
3.1 Effective data and information management is executed for the DITS and all Districts	3.1 Data and information for Districts are properly managed in the database and information system by the DIMU staff by December 2005	3.1 Monitoring and evaluation questionnaire	(a) Timely allocation of required budget for O&M of the system (b) Provision of required communication infrastructures (c) Required data for the system are collected on time
Outputs			
4.1 Effective database program	4.1 The database program is evaluated as effective by the DIMU in August 2004	4.1 Monitoring and evaluation questionnaire	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the study period
4.2 Effective operation manual for the database program	4.2 The operation manual is evaluated as effective by DIMU in August 2004	4.2 Monitoring and evaluation questionnaire	
4.3 Capable DIMU staff in the program operation	4.3 DIMU staff acquire skill to operate the database system by August 2004	4.3 Monitoring and evaluation questionnaire	
4.4 Information transmission between DITS, model ZRC, and model DPDTs	4.4 Data exchange is made between DIMU, model ZRC, and model DPDTs by August 2004	4.4 Record of data transmission of respective offices	
4.5 Information transmission between DITS, ZRC of all ZIU, and DPDTs of all Districts	4.5 Data exchange is made between DIMU, ZRC of all ZIU, and DPDTs of all Districts by December 2004	4.5 Record of data transmission of respective offices	
4.6 Verification results	4.6 Verification results are available by June 2005	4.6 Monitoring and evaluation questionnaire	
Activities 5.1 Select model Districts 5.2 Establish the prototype database system 5.3 Prepare the draft operation manual 5.4 Complete the first operation of prototype database system in the on-the-job training to the DIMU 5.5 Rectify the prototype database system and draft operation manual 5.6 Manage actual data for two model districts (second operation	**Inputs** *Inputs from donor* (a) Database and GIS software (b) Foreign experts	*Inputs from the government of Tanzania* ***(I) DITS of MAFS*** (a) Staff for data and information management unit (DIMU) (b) Room for the DIMU ***(II) All ZIUs including model ones*** (a) Zonal Review Committee (ZRC) ***(III)All District offices including model ones***	(a) Continuous assignment of counterparts in DITS, model ZIU, and model District offices within the study period (b) Continuous assignment of counterparts in DITS, all ZIUs, and all District offices. ***Pre-conditions*** (a) Good understanding of MAFS in needs of information management on irrigation development (b) Good understanding of related

	of the database system) in the on-the-job training to the DIMU 5.7 Verify the results of actual data management for two model districts 5.8 Hold a seminar to disseminate the database system to all ZIUs and selected districts. 5.9 Inform all districts of the database system through ZIUs 5.10 Collect data from Districts through ZIUs		(a) District Project Development Team (DPDT)	organizations on sharing information about irrigation development (c) High need for irrigation development at model District offices

(3) Implementation Schedule

Code No.D3: Information System and Database Improvement (Modified)

Activities		Expected Results	Schedule 2004 1 2 3 4 5 6 7 8 9 10 11 12	Schedule 2005 1 2 3 4 5 6 7 8 9 10 11 12	Person in- charge	Implementer	Equipment	Cost (Thousand US$)
5.1	To select model Districts				DITS	Consultants		
5.2	To establish the prototype database system	Database system			DITS	Consultants	Computers printers plotter scanner Arc view Microsoft-office	*100
5.3	To prepare the draft operation manual	Draft operation manual			DITS	Consultants		
5.4	To make the first operation of prototype database system in the on-the-job training to the DIMU	Comments on prototype database system and draft operation manual			DITS	Consultants Staff of DIMU		
5.5	To rectify the prototype database system and draft operation manual	Rectified database system and operation manual			DITS	Consultants		100
5.6	To make actual data management for two model districts (second oepration of the database system) in the on-the-job training to the DIMU				DITS	Staff of DIMU		
5.7	To verify the results of actual data management for two model districts	Successful system management			DITS	Consultants Staff of DIMU		
5.8	To hold a seminar to disseminate database system to all ZIUs and selected districts	Understanding of importance and need of detabase system by MAFS			DITS	Consultants Staff of DIMU		10
5.9	To inform all districts of the database system through ZIUs	Understanding of importance and need of detabase system by Districts			DITS	Staff of DIMU and ZIUs		10
5.10	To collect data from Districts through ZIUs	Proper management of database system by MAFS			DITS	Staff of DIMU and ZIUs		

*: excluding cost of computer system.

Chapter 10

Technology Transfer

Technology transfer on the Irrigation Database and Irrigation GIS operation to

Data and Information Management Unit

CHAPTER 10 TECHONOLOGY TRANSFER

10.1 Overall Verification Study

10.1.1 List of Counterparts Attended the Training Programme

The following counterparts attended the training programme for the overall Verification Study.

Name	Position
Mr. A. H. Simba	Senior Irrigation Engineer
Ms. R. A. Kweka	Soil Scientist
Mr. Simkanga A. L	Environmental Expert

10.1.2 Technology Transferred

Counterparts during the overall Verification Study joined in the activities for both the (i) operation of the Irrigation Database and GIS, and (ii) irrigation scheme formulation. They understood the objectives and relationship of both the activities.

10.2 Irrigation Database and GIS Operation

10.2.1 List of Counterparts Attended the Training Programme

The following counterparts attended the training programme for operation of the Irrigation Database and Irrigation GIS.

Name	Position
Mr. January R. L. Kayumbe	Agriculture Engineer
Mr. Amandus David Lwena	Agriculture Engineer

10.2.2 Technology Transferred

The overall training programme is presented in Clause 5.4.1. The technology transferred through the training programmes is summarized below.

(1) Operation of the Irrigation Database

A systematic on-the-job training system was applied for training on the Irrigation Database (see Clause 5.2.6 for details of the systematic on-the-job training system). The training was conducted based on the situation set in the training kit for simple database and information

Kickoff seminar on the Irrigation Database

management system (see Clause 6.1.1 for details of the training kit). The training kit gave realistic situations to the counterparts. They tried to find how to obtain requested output referring to the operation manual of the simple database and information system (see Clause 6.1.1 for details of the operation manual). The training programme was conducted, not only to the counterparts, but also to other officers from the DITS, since they are very keen to know and learn about the database system. Transferred skills on the irrigation database operation to the counterparts through the training programme are as follows.

(a) Supply of pre-information to the district prior to their survey
(b) Receiving of information from the district and input data into the database
(c) Supply of annual irrigation development monitoring reports
(d) Change of administrative boundaries in the irrigation database
(e) Data input and inquiry data on reference documents
(f) Data input and inquiry data on topographic maps

(2) Operation of the Irrigation GIS

Training on the Irrigation GIS operation was also carried out using the training kit. Throughout the programmed on-the-job training period, the following operation skills on the Irrigation GIS were successfully transferred to the counterparts by the JICA Study Team.

Training on the Irrigation GIS by using the training kit

(a) Supply of pre-information to the district prior to their survey
(b) Receiving of geographical information of the irrigation schemes and plotting them into the GIS
(c) Supply of annual irrigation development monitoring reports
(d) Change of administrative boundaries in the Irrigation GIS

10.3 Irrigation Scheme Formulation for DADP

10.3.1 List of Counterparts Attended the Training Programme

The following counterparts attended the training programme on irrigation scheme formulation.

(1) Mvomero District

Name	Organization	Position
Mr. Oman S. Omari	Mvomero District Office	SMS for irrigation
Mr. Remijo J. Mpagama	Mvomero District Office	SMS for crop
Ms. Mdule Kidawa Omari	Mvomero District Office	SMS for extension

Note: SMS; Subject Matter Specialist
Mr. Joseph Mchau was assigned as a counterpart initially but it was canceled due to other assignments

(2) Mkuranga District

Name	Organization	Position
Mr. Donald S. Ndesaiya	Mkuranga District Office	SMS for crop production
Mr. Jackson. A. R. Sange	Mkuranga District Office	SMS for food and nutrition
Mr. Yahya Mtongori	Mkuranga District Office	SMS for irrigation
Mr. Constantine P. Mboya	Mkuranga District Office	Extension officer
Mr. Joseph Luaga	Mkuranga District Office	SMS for information

Note: SMS; Subject Matter Specialist

(3) Morogoro Zonal Irrigation Unit

Name	Organization	Position
Ms. Eliamani Nnyiti	Morogoro Zonal Irrigation Unit	Senior agriculture officer
Mr. David N. Chemka	Morogoro Zonal Irrigation Unit	Senior executive engineer
Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit	Senior executive engineer

10.3.2 Technology Transferred

A systematic on-the-job training system was applied for the training on the irrigation scheme formulation (see Clause 5.2.6 for detail).

(1) Preparatory Works for Field Activities

The necessity and importance of preparatory works for smooth and effective field activities were clearly explained to the counterparts.

(2) Interview Survey with Well Prepared Questionnaire

Training on interview surveys was conducted for the counterparts. In the training, the JICA Study Team emphasized that well prepared questionnaires is essential. The JIC Study Team also explained that weight of the bag for crops should be

Interview Survey at Yavayava scheme, Mkuranga District

carefully confirmed, since they are different for each scheme.

(3) Resource Mapping

Skills on how to make resource maps were transferred to the counterparts. The JICA Study Team made the counterparts understand that a prepared resource map could be a base map of GPS mapping activity.

Resource mapping with guidance of District staff at Digoma scheme, Mvomero District

(4) Simple Soil Texture Test

Simple and practical techniques on soil texture testing were introduced to the counterparts. The introduced technique does not require any equipment. The JICA Study Team explained that the result of the soil texture tests would be used in the irrigation water requirement estimation.

Simple soil texture test at Kisele scheme, Mkuranga District

(5) Simple River Discharge Measurement

Simple and practical techniques on river discharge measurement were transferred to the counterparts. The introduced method does not require specific equipment such as current-meters. The JICA Study Team also explained that length could be measured by foot steps or a part of the body if there was no measuring tape. It was also emphasized that periodic measurement of the river discharge was essential for further development planning. It is important for the DPDT to ask some farmers to keep records of it.

Simple river discharge measurement at Digoma scheme, Mvomero District

(6) Simple Water Quality Test

A simple water quality test using a handheld EC meter was introduced to the counterparts. The JICA Study Team explained that water quality testing was essential, especially in arid or semi-arid areas. It was also explained that if the EC value was too high, it might indicate salinity problems.

Simple water quality test at Komtonga scheme, Mvomero District

(7) Simple GPS Mapping

To make resource maps in scale, a simple mapping method using a handheld GPS was introduced to the counterparts. The JICA Study Team gave guidance on (i) setting of a GPS, (ii) measuring coordinates on site by handheld GPS, (iii) plotting of measured coordinates on section papers, etc.

GPS mapping at Digoma scheme, Mvomero District

(8) Simple Water Balance Study

A simple water balance method with available data in the DADP stage was introduced to the counterparts. The JICA Study Team emphasized that more detailed analysis was required in the feasibility study stage.

Explanation on planning methodology, Mvomero District

(9) Scheme Development Planning and Cost Estimate

A scheme development planning procedure and cost estimate method for DADPs were explained to the counterparts. The counterparts tried to make development plans and estimate costs for selected irrigation schemes by themselves. The work was successfully done.

Scheme development planning by Mkuranga District staff

(10) Incremental Agricultural Benefit Estimate

Skills on incremental agricultural benefit estimation were transferred to the counterparts. It was also explained that if data obtained through the interview survey seemed to be unreliable, such kinds of data should be reconfirmed on site.

Explanation on incremental agricultural benefit estimation, Mvomero District

(11) Scheme Evaluation

A scheme evaluation method from various points of view such as (i) adequacy, (ii) efficiency, (iii) dependability, and (iv) equity was explained to the counterparts. To evaluate the efficiency of the scheme, a simple method to obtain an economic indicator, which was the Internal Rate of Return (IRR), was introduced to the counterparts.

Explanation on scheme evaluation method, Mkuranga District

(12) Selection of High Priority Irrigation Schemes

A logical selection procedure for selecting high priority irrigation schemes was introduced to the counterparts. In the selection, scoring and ranking methods were used. Scoring was made based on the scoring criteria determined by the counterparts.

Setting scoring criteria for screening, Mvomero District

(13) Feedback Workshop

In the feedback workshop, the DPDT should explain how they came to the final result to villagers in selected schemes and also in non-selected schemes. Knowledge of the necessary explanations in the feedback workshop was passed to the counterparts.

Feedback Workshop for Kisele scheme, Mkuranga District

Chapter 11

Voices of Counterparts

Preparation of present situation map for Kisele scheme, Mkuranga District, Coast Region

CHAPTER 11 VOICES OF COUNTERPARTS

11.1 DITS of MAFS

11.1.1 Opinion regarding the Verification Study

Topic 1 Themes of the Verification Study

Question

Do you think there is a relationship between both of the Verification Study themes, which are database establishment and guidelines preparation?

Answer

Yes. There are the guidelines which can be used to obtain data. Likewise data will be used during the application of the guidelines in irrigation scheme formulation.

Topic 2 Monitoring Achievement of the Master Plan Target

Question

After setting the targets for irrigation development by the National Irrigation Master Plan Study, how are you going to monitor the achievement?

Answer

In collaboration with the district staff, the DITS will follow-up to ensure that the set target is achieved.

Question

What kind of intervention in district offices is required to achieve the target of the National Irrigation Master Plan under the decentralization policy?

Answer

- The MAFS and local governments should work together and reach an agreement.
- Training of extension staff is required.
- Evaluation of the capacity of district offices to conduct technical works is necessary.
- Training of district staff is required, especially for areas in which they do not have enough skill, if there are any.
- Training may be both inside and outside of the country as needed.

Topic 3 Guidelines for Irrigation Scheme Formulation

Question

When you distribute the guidelines to all the districts in the future, are you going to give additional guidance to them? If so, what kind of guidance are you going to give?

Answer

Presently, "Guidelines for Participatory Improvement to Farmers Initiated and Managed Smallholder Irrigation Scheme" prepared under ASPS have been given to ZIUs and they have been asked to distribute them to the districts. These guidelines and "Guidelines for Irrigation Scheme Formulation for DADP" prepared under the NIMP are rather different from each other, because the ASPS guidelines explain more about administrative processes without showing how to implement the scheme. While the NIMP guidelines explain technically how to implement technical issues such as water balance, and cost estimate. This difference should be clearly explained to the districts. The DITS also should instruct districts to use such guidelines complementarily to each other.

Topic 4 Technical Support to District Offices

Question

What kind of technical support is required for district offices on irrigation scheme formulation for DADP?

Answer

Training by the ZIU is necessary. Facilities like computers and other equipment/material also need to be provided.

Question

What kind of technical support is required to district offices for irrigation development after DADP stage?

Answer

Regulatory and supervision from the MAFS is required.

Topic 5 Activity of DIMU

Question

What kind of activity do you expect the DIMU to engage in?

Answer

- To feed data from the districts into the computer and to provide data when required by the different stakeholders.
- Data collection from all irrigation schemes. The data may include information on crops, areas, yield, O&M, water sources, water quality/quantity, soil, and socio-economy.

Topic 6 Roles of ZIUs

Question

What kind of roles do you expect the ZIU to play?

Answer

-Their roles are to provide support and information to districts and to send necessary data to the DITS. The ZIU have to collect data from all the irrigation schemes under their area of control.

Topic 7 Other opinions

The JICA Study Team should continue support the DIMU to expand the database system.

11.2 DIMU of DITS

11.2.1 Products and Training of the JICA Study Team

Topic 1 Operation manual of simple database and information system

Question

Do you feel that the operation manual is useful for the data and information management unit?

Answer

Yes. Actually it is a very important reference material for this purpose. Its simplicity in nature makes it suitable as a teaching guide.

Topic 2 Training Kit

Question

Do you feel that the training kit is useful for the data and information management unit?

Answer

Yes. Because it is a step-by-step training module and its approach is impressive. It will also be useful for training of ZIU staffs.

Topic 3 Training by JICA Study Team

Question

What did you feel about the training?

Answer

The training was very useful for irrigation development and its planning.

Question

Which part of the training was the most difficult?

Answer

Changing administrative boundaries in the Irrigation Database and GIS was the most difficult.

11.2.2 Data and Information Management in the Future

Topic 4 Data and Information Management by DIMU

Question

How do you think the DIMU can support the DITS?

Answer

The DIMU can support the DITS through supplying information on present conditions and the latest development plans for irrigation schemes from the database system. Since responding to questions by presenting an outline of the irrigation development situation in the country is one of the major tasks of the DITS, the DIMU can assist such works.

Question

How do you think the DIMU can support district offices?

Answer

To supply data on present conditions and the latest development plans for the irrigation schemes is the most helpful for district offices, since districts are

responsible for scheme planning, development and management. Therefore data on present conditions and the latest developments are the vital elements in the development process, and it should rest with districts.

Topic 5 Constraints in the Future

Question

What is the biggest constraint for you to continue the data and information management in the future?

Answer

Funds to conduct the country-wise data and information collection exercise, as the exercise needs a committed financial plan to accomplish its goals within a planned time frame.

Topic 6 Proposal to Director of DITS

Question

Do you have any proposal on the use of the database system to the director of DITS?

Answer

- The DIMU must have one vehicle for full establishment, operation and management of the “Irrigation Database” and “Irrigation GIS”.
- Provision of the latest model of two desktop and two laptop computers (probably with Pentium IV computers) to run the DIMU.
- Provision of quarterly budget to run the DIMU, otherwise the Unit will remain defunct.
- There should be further training on 1) design of the database to expand the system and 2) operation, maintenance and management of GIS

Topic 7 Other opinions

We appreciate, admire and respect the heartfelt contribution made by the JICA Study Team for NIMP and establishment of DIMU under the DITS.

11.3 Mvomero District Office

11.3.1 Products and Training of the JICA Study Team

Topic 1 Guidelines

Question

Do you think that the guidelines adequately meet the requirements for irrigation scheme formulation for DADP?

Answer

Yes. The guidelines came to meet requirements after making various corrections based on the experiences we got during the actual work.

Question

Do you want to recommend other district staff to use the guidelines in preparation of irrigation scheme formulation for DADP?

Answer

Yes. We recommend them to apply the guidelines, since some of the important processes in planning might be overlooked if they do not use the guidelines.

Topic 2 Training by JICA Study Team

Question

What did you feel about the training?

Answer

The training was good, however the time spent on it was very short.

11.3.2 Findings in the Process of Irrigation Scheme Formulation

Topic 3 First Experienced Planning Method

Question

Did you experience any new method of planning through the training?

Answer

The following are the methods that we experienced for the first time.

- Screening,
- Economic evaluation, and
- Scheme evaluation.

Topic 4 Important Step in Irrigation scheme formulation for DADP

Question

Which steps do you think are the most important and why did you choose them?

Answer

Step-3 Screening of All Irrigation Schemes

This is important, since only reliable irrigation schemes should be selected to make implementation easy.

Step-5 Field Survey for Selected Irrigation Schemes

It is important to observe important features which can be observed in the field.

Step-5 (b) Interview Survey with Stakeholders

It is also important to get information from farmers, which is a key factor for irrigation scheme formulation.

Topic 5 Enjoyable Step in Irrigation Scheme Formulation for DADP

Question

In which steps did enjoy your work and why did you choose them?

Step-3 Screening of All Irrigation Schemes

The screening needed careful procedures in order to select reliable schemes. Criteria/standards were set for that purpose.

Step-5 (c) Preparation of Village Resource Map

Farmers' participation was very interesting.

Step-11 Feedback Workshop

The reaction/response from farmers was very enjoyable since it was different in the selected and the non-selected schemes.

Topic 6 Difficulty Faced in Irrigation Scheme Formulation for DADP

Question

In which steps did you face the most severe difficulties and why did you choose them?

Answer

Step-3 Screening of All Irrigation Schemes

It was a bit difficult to set the criteria for the screening. The setting of the criteria may influence the performance of a certain scheme if it is not done

properly.

Step-5 Field Survey for Selected Irrigation Schemes

Time allocated for field survey (for preparing present situation map) was not enough. The exercise was performed with a low precision.

Step-8 Design of District Support Programme

It was difficult to design district support programme.

Step-11 Feedback Workshop

Before holding the feedback workshop for Digoma scheme (non-selected scheme as the first candidate), it seemed to be difficult to explain the result to farmers.

Question

How did you solve the problem?

Answer

Step-3 Screening of All Irrigation Schemes

General performance of the schemes should be taken into account when you set the selection criteria.

Step-5 Field Survey for Selected Irrigation Schemes

To solve the problem, more time is needed during the exercise, two days per scheme.

Step-11 Feedback Workshop

There was a positive reaction from the Digoma scheme farmers after the DPDT explained the results sincerely.

Question

What kind of support or training by ZIU is necessary to solve the above difficulties?

Answer

Step-8 Design of District Support Programme

Training on how to design district support programme should be given by the ZIU.

Question

What do you want to recommend to other district staff in conducting the above difficult steps?

Answer

Step-3 Screening of All Irrigation Schemes and Step-11 Feedback Workshop

They have to be careful to avoid bias before setting the criteria for the screening.

Step-5 Field Survey for Selected Irrigation Schemes

They have to consider the distance to the selected scheme when they prepare the survey schedule.

Topic 7 Problems in the Overall Development Process (such as ASDP, DADP, and O&OD)

Question

Did you find any problems other than in the irrigation sub-sector, such as ASDP, DADP, and O&OD?

Answer

In most cases top down approaches were applied.

11.3.3 Irrigation Scheme Formulation in the Future

Topic 8 Constraints in the Future

Question

What will be the biggest constraint for you to conduct irrigation scheme formulation for DADP in the next year?

Answer

The biggest constraint will be insufficient budget.

Question

What is the biggest constraint for you to implement irrigation development after the DADPs stage?

Answer

Transportation to visit and observe performance of the scheme is the biggest constraint, since the district (DALDO) has no facilities.

Question

What do you do to solve the constraint?

Answer

Transport facilities need to be provided by the district council.

Topic 9 Needs for Support in Other Agricultural Sub-sectors

Question

Do you feel that the same kind of guidelines for DADP preparation are necessary for other agricultural sub-sectors, such as livestock, institution, extension, and marketing?

Answer

Yes. Problems in these sub-sectors will be dealt with by preparation of the guidelines.

Topic 10 Proposal for the Zonal Irrigation Unit or DITS

Question

Do you have any proposal for the ZIU or DITS?

Answer

There should be frequent communication between the DPDT and the ZIU or DITS.

11.4 Mkuranga District Office

11.4.1 Products and Training of the JICA Study Team

Topic 1 Guidelines

Question

Do you think that the guidelines adequately meet the requirements for irrigation scheme formulation for DADP?

Answer

Certainly, after rectification of the draft guidelines by DPDTs of Mkuranga and Mvomero, the guidelines came to adequately meet the requirements for irrigation scheme formulation for DADP.

Question

Do you want to recommend that other district staff use the guidelines in preparation of irrigation scheme formulation for DADP?

Answer

Yes. We recommend other district staff use the guidelines in irrigation scheme formulation for DADP since the guidelines adequately meet the requirements for irrigation scheme formulation.

Topic 2 Training by JICA Study Team

Question

What did you feel about the training?

Answer

It was very interesting and useful.

11.4.2 Findings in the Process of Irrigation Scheme Formulation

Topic 3 First Experienced Planning Method

Question

Did you experience any new method of planning through the training?

Answer

The following are the methods that we experienced for the first time.

- Screening
- Irrigation water requirement estimation
- Water balance study
- Scheme development planning
- Cost estimate
- Calculation of scheme incremental benefits
- Institutional development
- Environmental consideration
- Economic evaluation
- Scheme evaluation

Topic 4 Important Step in Irrigation Scheme Formulation for DADP

Question

Which steps do you think are the most important and why did you choose them?

Answer

Step-2 Quick Site Inspection for All Irrigation Schemes

Without the quick site inspection, the DPDT could not have an idea of the present situation of the proposed sites.

Step-5 (b) Interview Survey with Stakeholders

In the interview survey, necessary data could be obtained from the stakeholders.

Step-7 Identification of District Support Programme

Prior to the implementation of the irrigation scheme, identification of the district support programme is the key point to have sustainable irrigation development.

Topic 5 Enjoyable Step in Irrigation Scheme Formulation for DADPs

Question

In which steps did enjoy your work and why did you choose them?

Answer

Step-2 Quick Site Inspection for All Irrigation Schemes

Through the quick site inspection the DPDT could have an overview of almost all the potential basins for irrigation.

Step-5 (c) Preparation of Village Resource Map

In preparation of the village resource map, participants were involved and almost everyone was eager to contribute.

Step-11 Feedback Workshop

By proper approach, feedback to both candidates was enjoyable. For the selected candidate scheme (Yavayava scheme) farmers were happy and showed their thankfulness. For the candidate (Kisele scheme), which was asked to wait for the next year, farmers looked unhappy initially but eventually they appreciated the situation.

Topic 6 Difficulty Faced in Irrigation Scheme Formulation for DADP

Question

In which steps did you face the most severe difficulties and why did you choose them?

Answer

Step-3 Screening of All Irrigation Schemes

In the initial scoring, it was impossible to find the difference among the schemes. It was also found that some answers of farmers were not very accurate.

Step-5 (c) Preparation of Village Resource Map

It was very difficult to prepare village resource map with a large number of villagers.

Step-6 (b) Water Balance Study

At Kisele scheme, the river (Mbezi) was completely dried and the DPDT could not measure the river flow.

Question

How did you solve the problem?

Answer

Step-3 Screening of All Irrigation Schemes

Since almost all the eight proposed schemes have the same visual appearance, some additional indicators, such as accessibility to the site and distance to the market were considered in the scoring.

Step-5 (c) Preparation of Village Resource Map

Preparation of the village resource map was carried out by a few villagers and then it was presented to all the villagers for confirmation.

Step-6 (b) Water Balance Study

Most of the water sources in the district are seasonal and rivers were almost dried when the DPDT visited for the field survey. Therefore river discharge was estimated assuming the water depth and flow velocity based on the information obtained from villagers.

Question

What kind of support or training by ZIU is necessary to solve the above difficulties?

Answer

Step-6 (b) Water Balance Study

Training on calculating the amount of other water sources, such as ponds or rainfall water harvesting is required.

Question

What do you want to recommend to other district staff in conducting the above difficult steps?

Answer

Step-3 Screening of All Irrigation Schemes

Present conditions of the sites may differ from one district to another. Therefore, different scoring indicators can be applied.

Step-5 (c) Preparation of Village Resource Map

The village resource map should be prepared by a limited number of the stakeholders and then confirmed by all the participants.

Topic 7 Problems on Overall Development Processes (such as ASDP, DADP, and O&OD)

Question

Did you find any problems other than in the irrigation sub-sector, such as ASDP, DADP, and O&OD?

Answer

Yes. Since O&OD together with DADPs were new for farmers and district staff. Therefore, much time is needed for practicing them in order to gain experience.

11.4.3 Irrigation Scheme Formulation in the Future

Topic 8 Constraints in the Future

Question

What will be the biggest constraint for you in conducting irrigation scheme formulation for DADP in the next year?

Answer

The following are the biggest constraints:

- Insufficient tools and equipments for preliminary surveying,
- Lack of knowledge in water harvesting techniques,
- Lack of transportation, and
- Lack of funds (allowances)

Question

What can you do to solve the constraint?

Answer

Try to attain the limited budget for the next DADPs.

Question

What is the biggest constraint for you to implement irrigation development after DADPs stage?

Answer

None.

Topic 9 Needs of Support for Other Agricultural Sub-sectors

Question

Do you feel that the same kind of guidelines for DADPs preparation are necessary for other agricultural sub-sectors, such as livestock, institution, extension, and marketing?

Answer

Yes.

Topic 10 Proposal to Zonal Irrigation Unit or DITS

Question

Do you have any proposal for the ZIU or DITS?

Answer

Yes. Linkage with the ZIU, DITS and district offices should be strengthened.

Topic 11 Others opinions

Training should include a study tour to the operational schemes to greatly increase our experience.

11.5 Morogoro ZIU

11.5.1 Products and Training of the JICA Study Team

Topic 1 Guidelines

Question

Do you think that the guidelines adequately meet the requirements for irrigation scheme formulation for DADP?

Answer

Yes. They have been tested and found to be working satisfactorily.

Question

Do you feel that distribution of the guidelines is useful for ZIU in supporting the districts in irrigation scheme formulation for DADP?

Answer

Yes.

Topic 2 Training by the JICA Study Team

Question

What did you feel about the training?

Answer

The training was effective and very satisfactory.

11.5.2 Findings in the Process of Irrigation Scheme Formulation

Topic 3 First Experienced Planning Method

Question

Did you experience any new method of planning through the training?

Answer

No. The methods are not new for the ZIU because they were used during the feasibility studies.

Topic 4 Required Support for District Offices (Proposal on Training Program to District Offices, etc.)

Question

In which steps should the district staff be improved, based on your observation and why did you choose them?

Answer

Step-1 Confirmation of District Irrigation Development Policy

It seems that irrigation development policy is not known to the DPDT.

Step-5 (a) Preparatory Works

The preparatory works are crucial for the subsequent steps.

Step-6 Preliminary Planning for Selected Irrigation Schemes

Collection and analysis of the data to estimate the scheme development cost requires proper understanding of the methodology.

Question

What kind of training program should be given to district staff considering the limited budget condition?

Answer

Capacity building for the DPDT in irrigation scheme formulation consisting of i) training seminars and ii) study tours should be given by the ZIU.

The training will also include scheme monitoring and evaluation during the course of implementation, water management, and O&M. In this case, an aim of the training can be set as to produce a well skilled DPDT in total irrigation management.

Topic 5 Difficulties Faced in Endorsement or Validation of District Prepared Irrigation Scheme Formulation Plans

Question

Did you face any difficulties in the endorsement or validation of the district prepared irrigation scheme formulation plans?

Answer

Yes. The DPDT had selected a scheme that needed new development though such scheme is given lower priority in the national agriculture (irrigation) development policy.

Question

How did you solve the problem?

Answer

The problem was solved at the prioritization stage where adequacy, dependability, equity, and efficiency were evaluated. Through the evaluation of these factors, the scheme that required new development was placed in the second selection and is not going to be proposed in the next DADP. To avoid this kind of problem, DPDT should adhere to the national policy.

Topic 6 Problems in Overall Development Processes (such as ASDP, DADP, and O&OD)

Question

Did you find any problems other than in the irrigation sub-sector, such as ASDP, DADP, and O&OD?

Answer

The following problems were found through the training.

1. O&OD was not carried out in the districts where this training has been carried out.
2. In DADP, there is stiff competition in budget allocation between irrigation and other sub-sectors. In some districts, the irrigation sub-sector is given less priority.
3. These programmes (ASDP, DADP, and O&OD) are not known to most of the stakeholders.

11.5.3 Technical Support to Districts in the Future

Topic 7 Constraints in the Future

Question

What is the biggest constraint for you to conduct endorsement or validation work in the future?

Answer

1. There might be constraints with budget to visit sites.
2. It might be difficult to get reports that meet the requirements, especially for those districts which do not attend the training.

Question

What is the biggest constraint for you to give technical support or training to district staff in the future?

Budget is the biggest constraint. There is no budget allocated for that activity in the ZIU.

Topic 8 Proposal for DITS

Question

Do you have any proposal for the DITS?

Answer

1. ZIU should be well facilitated with budget/facilities to be able to assist the DADP.
2. The ZRC in Morogoro ZIU should be facilitated to carry out training programmes on scheme formulation in other ZIU.
3. To carry out the O&OD as required, cooperation with other departments is required.
4. The DITS should ensure that ASDP is well known to other department staff including ZIU staff.

Topic 9 Other opinions

We request to be more informed in O&OD and ASDP.

Chapter 12

Seminar for the Verification Study

Opening address for the seminar for the Verification Study

CHAPTER 12 SEMINAR FOR THE VERIFICATION STUDY

12.1 Objective

The seminar aims to disseminate to the staff of other districts under territory of the Morogoro Zonal Irrigation Unit the experience of the staff of DITS, Morogoro Zonal Irrigation Unit, Mvomero District and Mkuranga District that were obtained through the execution of the Verification Study together with the JICA Study Team.

12.2 Schedules and Presenters

The seminar was conducted over two days, the 28th and 29th of September, 2004 at Dar es Salaam. The detailed schedule and presenters are mentioned below:

Time	Contents	Presenters
28th Day		
09:00	Opening address	Mr.M.Futakamba, MAFS
09:10	Welcome speech	Mr.T.Obata, Resident Representative of JICA
09:20	Self-introduction of Participants	All Participants
09:50	Session 1: Agenda for seminar	Mr.M.Futakamba, MAFS
10:00	Session 2: National Irrigation Master Plan (M/P & A/P) (Explanation)	Mr.A.H. Simba, MAFS
10:30	Session 3: Verification Study (Explanation)	Ms.R.A.Kweka, MAFS
11:00	Tea Break	
11:30	Session 4: Outline of Database System (Explanation, Questions , Answers)	Mr.J.R.L.Kayumbe, MAFS
12:30	Lunch	
14:00	Session 5: Introduction of Irrigation Database (Explanation, Questions , Answers)	Mr.A.D.Lwena, MAFS
15:00	Tea Break	
15:30	Session 6: Introduction of Irrigation GIS (Explanation, Questions , Answers)	Mr. A.D Lwena, MAFS
16:30	Closing Address for 1st Day	Mr.M.Futakamba, MAFS
29th Day		
09:00	Opening address	Mr.G.M.Kalinga, MAFS
09:05	Session 7: Procedure for Irrigation Scheme Formulation in DADP (Explanation, Questions ,Answers)	Ms.E.Nnyiti, Mr.D.N.Chemka, and Mr.R.Ishengoma, Morogoro ZIU
10:00	Session 8: Findings of Irrigation Scheme Formulation in DADP (Explanation, Questions ,Answers)	M.O.S.Omari, Mr.R.J.Mpagama,and Ms.M.K.Omari, Mvomero District Office
11:00	Tea Break	
11:30	Session 9: Findings of Irrigation Scheme Formulation in DADP (Explanation, Questions ,Answers)	Mr.D.SNdesaiya, Mr.J.A.R.Sange, Mr.Y.Mtongori, and Mr. C.P.Mboya, Mkuranga District Office
12:30	Lunch	
14:00	Session 10: Role of Zonal Irrigation Unit in DADP (Explanation, Questions ,Answers)	Mr.A.G.Ruhangisa, Morogoro Zonal Irrigation Unit

14:30	Session 11: Recommendations from the Verification Study	Mr.H.Ohnuma and Mr.J.Tsurui, JICA Study Team
15:00	Tea Break	
15:30	Session 12: Direction of Future Irrigation Development in Tanzania (Explanation, Questions ,Answers)	Mr.M.Futakamba, MAFS
16:30	Closing Address	Mr.M.Futakamba, MAFS

12.3 Participants

Participants at the seminar are as follows:

- DITS, MAFS including ZIUs: 25 nos.
- Mvomero District: 3 nos.
- Mkuranga District: 4 nos.
- Bagamoyo District: 2 nos.
- Kibaha District: 1 no.
- Kisarawe District: 2 nos.
- Rufiji District: 2 nos.
- Ilala District: 2 nos.
- Kinondoni District: 2 nos.
- Temeke District: 2 nos.
- Kilombero District: 2 nos.
- Kilosa District: 2 nos.
- Ulanga District: 2 nos.
- JICA Monitoring Team: 2 nos.
- JICA Tanzania Office: 2 nos.
- JICA Study Team 3 nos.

Total **58 nos.**

12.4 Outline of the Seminar

On the 28th, the seminar was carried out, mainly for the database and information system. At first, an outline of the system was explained by staff of the Data and Information Management Unit of DITS, MAFS. The explained contents were the objectives, composition and need of the system, and also how to collect and supply the data. In succession, the contents of Irrigation Database and Irrigation GIS were elucidated, using some examples, to enable the participants to understand them easily.

On the 29th, the seminar focused on the explanation of the irrigation scheme formulation activities, which was presented by the staff of Morogoro ZIU,

Mvomero District and Mkuranga District. In the presentation of the Morogoro ZIU staff, stress was put on the process of irrigation scheme formulation. On the other hand, the Mvomero and Mkuranga staff emphasized the lessons learned from the irrigation scheme formulation process.

In the seminar on the 29th, the DITS of MAFS explained the direction of Future Irrigation Development in Tanzania in consideration of the results of the Master Plan Study and Action Plan Study. The conclusion in this theme was as follows:

"Rural development has become synonymous with agricultural development. The close linkage becomes more apparent every time drought strikes an agriculturally predominant area or Country when the whole rural economy comes to a grinding halt. This shows that ***Irrigated agriculture should be given top priority so that production is not outpaced by population and the economy can absorb the shock of the vagaries of weather.***"

12.5 Major Discussions at the Seminar

In the seminar, major discussed matters were as follows:

(a) Database System
- Need for database system at Zonal and District Offices
- Budget arrangement for data collection
- Availability of GPS

(b) Irrigation Scheme Formulation Process for DADP
- Treatment of O & OD methodology
- Importance of farmers' participatory approach
- Composition of District Project Development Team, especially the need for a sociologist
- Budget and time required for irrigation scheme formulation process

12.6 Impressions of the Seminar

In the seminar, all the presenters gave good explanations of their themes. In reply to these presentations, participants contributed highly to the seminar by means of valuable comments. After fruitful discussion, most of the participants acknowledged that the seminar was significant for understanding that the Verification Study, and the database system established and the irrigation scheme formulation process worked out in the Verification Study were extremely useful for smooth irrigation development.

Attachments

Attachment 1

Scope of Work

SCOPE OF WORK

FOR

THE STUDY

ON

THE NATIONAL IRRIGATION MASTER PLAN

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

THE MINISTRY OF AGRICULTURE AND FOOD SECURITY

THE UNITED REPUBLIC OF TANZANIA

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY

Dar Es Salaam, 10, April, 2001

Mr. Wilfred Ngirwa
Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania

Mr. Norio KUNIYASU
Leader
The Preparatory Study Team
Japan International Cooperation Agency

Mr. P. J. Ngumbulu
Permanent Secretary
Ministry of Finance
The United Republic of Tanzania

I. INTRODUCTION

In response to the request of the Government of The United Republic of Tanzania (hereinafter referred to as "GOT"), the Government of Japan has decided to conduct the Study on National Irrigation Master Plan (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.
Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of GOT.
The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are as follows:

2.1 To formulate the Master Plan in line with the prevailing policy, strategy and program of GOT, in particular, Agricultural Sector Development Strategy and Agricultural Sector Program;

2.2 To formulate the Implementation Plan in accordance with the priority which will be set in the Master Plan;

2.3 To conduct the Verification Study, aiming at capacity building for irrigation development; and

2.4 To carry out technology transfer to Tanzanian counterpart personnel through on-the-job training in the course of the Study.

III. STUDY AREA

3.1 The Master Plan Study will be carried out at national level for the whole country.

3.2 The Implementation Plan and the Verification Study will be examined in the area(s) prioritized in the Master Plan.

IV. SCOPE OF THE STUDY

In order to achieve the objectives above, the study shall consist of the following activities.

4.1 Phase 1

4.1.1 Data collection

(a) To collect and review the existing information and/or data mainly on the following aspects;

(i) Natural, social and economic conditions.
(ii) National, regional and district development policy/strategy/ plan.
(iii) Agricultural and social infrastructure.
(iv) Water and land resources allocation.
(v) Operation and maintenance of existing agricultural facilities.
(vi) Water management.
(vii) Farming system.
(viii) Agricultural extension and credit.
(ix) Post harvesting and marketing.
(x) Environmental issues.
(xi) Others.

(b) To conduct field surveys for supplementary data collection.

4.1.2 Formulation of the Master Plan

(a) The Master Plan will mainly cover the following aspects;
(i) Irrigation and drainage development.
(ii) Institutional building.
(iii) Water management.
(iv) Monitoring and evaluation.
(v) Others.

(b) To select the priority area(s) in accordance with the social, economic, physical and environmental conditions.

4.2 Phase 2

4.2.1 Formulation of the Implementation Plan.

The Implementation Plan in the priority area(s) will be studied in response to the recommendation and content of the Master Plan.

4.3 Phase 3

4.3.1 Implementation of Verification Study.

To carry out the Verification Study among the Implementation Plan(s) for aiming at capacity building of stakeholders in irrigation development. The detail content of the Verification Study will be examined in Phase 2.

V. STUDY SCHEDULE

The Study will be carried out in accordance with the Tentative Schedule attached as Annex.

VI. REPORTS

JICA shall prepare and submit the following reports, written in English, to the GOT;

(i) Inception Report for Phase 1:
Thirty (30) copies at the commencement of the Study.
(ii) Progress Report for Phase 1:
Thirty (30) copies in the process of first work in Tanzania.
(iii) Draft Master Plan Report:
Thirty (30) copies at the end of first work in Tanzania.
(iv) Master Plan Report:
Fifty (50) copies at the beginning of second work in Tanzania.
(v) Inception Report for Phase 2:
Thirty (30) copies at the beginning of second work in Tanzania.
(vi) Progress Report for Phase 2:
Thirty (30) copies in the process of second work in Tanzania.
(vii) Draft Implementation Plan Report:
Thirty (30) copies at the end of second work in Tanzania.
(viii) Implementation Plan Report:
Fifty (50) copies at the beginning of third work in Tanzania.
(ix) Inception Report for Phase 3:
Thirty (30) copies at the beginning of third work in Tanzania.
(x) Progress Report for Phase 3:
Thirty (30) copies in the process of third work in Tanzania.
(xi) Draft Verification Study Report:
Thirty (30) copies at the end of third work in Tanzania.
(xii) Verification Study Report:
Fifty (50) copies at the fourth work in Tanzania.

Tanzanian side shall submit the comments on each Report at the

meetings/workshops to be held in the process of work in Tanzania.

VII. UNDERTAKING OF THE GOT

7.1 To facilitate the smooth conduct of the Study, GOT shall take necessary measures:

(i) To secure the safety of the Study Team:
(ii) To permit the members of the Study Team to enter, leave and sojourn in Tanzania for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees:
(iii) To exempt the members of the Study Team from taxes, duties and other charges on equipment, machinery and other materials to be brought into and out of Tanzania for the conduct of the Study in accordance with the laws and regulations existing in Tanzania.
(iv) To exempt the members of the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study;
(v) To provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced into Tanzania from Japan in connection with the implementation of the Study;
(vi) To secure permission for the Study Team to enter private properties or restricted areas for the implementation of the Study;
(vii) To secure permission for the Study Team to take all data and documents, including photographs and maps, relevant to the Study out of Tanzania to Japan for the purpose of the Study, and
(viii) To provide medical services as needed. Its expenses will be chargeable to members of the Study Team.

7.2 The GOT shall bear claims, if any arises, against members of the Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study Team.

7.3 The Ministry of Agriculture and Food Security (hereinafter referred to as MAFS) shall act as a counterpart agency to the Study Team and

also as a coordinating and guiding body in relation with other governmental organizations and non-governmental organizations concerned for smooth implementation of the Study.

7.4 MAFS shall, at its own expense and in cooperation with other organizations concerned, provide the Study Team with the following;
(i) Available data and information related to the Study,
(ii) Counterpart personnel,
(iii) Suitable office space with necessary equipment in Dar Es Salaam, and
(iv) Credentials or identification cards.

VIII. UNDERTAKING OF JICA

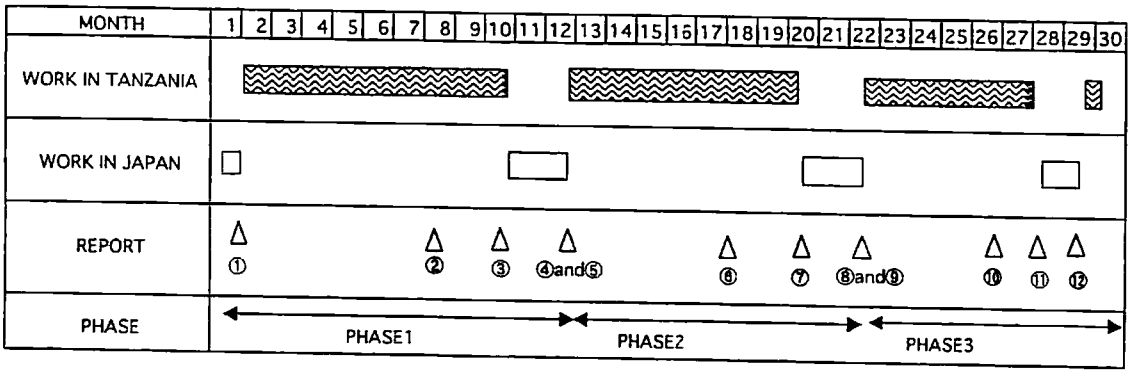
For the implementation of the study, JICA shall take the following measures;
(i) To dispatch, at its own expense, study teams to Tanzania, and,
(ii) To pursue technology transfer to the Tanzanian counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and MAFS shall maintain constant communication and consult with each other in respect of any matters that may arise from or in connection with the Study.

ANNEX

TENTATIVE SCHEDULE



① Inception Report for Phase 1
② Progress Report for Phase 1
③ Draft Master Plan Report
④ Master Plan Report
⑤ Incepion Report for Phase 2
⑥ Progress Report for Phase 2
⑦ Draft Implementation Plan Report
⑧ Implementation Plan Report
⑨ Inception Report for Phase 3
⑩ Progress Report for Phase 3
⑪ Draft Verification Study Report
⑫ Verification Study Report

Attachment 2

Minutes of Meeting for the Study
On the National Irrigation Master Plan

AT2 - 1

MINUTES OF MEETINGS
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

THE MINISTRY OF AGRICULTURE AND FOOD SECURITY

THE UNITED REPUBLIC OF TANZANIA

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY

Dar Es Salaam, 10, April, 2001

Mr. Wilfred Ngirwa	Mr. Norio KUNIYASU
Permanent Secretary	Leader
Ministry of Agriculture and Food Security	The Preparatory Study Team
The United Republic of Tanzania	Japan International Cooperation Agency

In response to the request of the Government of The United Republic of Tanzania (hereinafter referred to as "GOT"), the Preparatory Study Team (hereinafter referred to as "the Team") headed by Mr. KUNIYASU Norio was sent to The United Republic of Tanzania by the Japan International Cooperation Agency from 18th March, to 11th April, 2001.
The Team held a series of discussions in relation to the Scope of the Study on National Irrigation Master Plan (hereinafter referred to as "the Study") with representatives of the Ministry of Agriculture and Food Security of GOT (hereinafter referred to as "MAFS") and other relevant organizations. The list of participants in the series of meetings is attached as ANNEX 1. The following were agreed upon by both Tanzanian and Japanese sides in relation to the Study.

1. Title of the Study

Both sides agreed that the title of the study should be changed from "The Master Plan Study on National Irrigation Development Promotion" to "The Study on National Irrigation Master Plan".

2. Undertakings

Refer to the undertakings of the GOT written in the Scope of Works, MAFS expressed difficulties in providing vehicle(s), a photocopy machine, a personal computer, an air conditioner, a facsimile and an electric generator by its own expense to the Study Team and requested JICA to make the arrangements of such equipment. The Team promised to convey the requests to the Government of Japan.
JICA requested MAFS to make necessary arrangement in providing temporary office space(s) in Dar Es Salaam preferably within the proximity of the Irrigation Section office and in the respective zonal irrigation unit office in the prioritized area(s) which will be decided in the course of the Study. MAFS promised to undertake this responsibility.

3. Counterpart Agency

Both sides confirmed that MAFS acts as a counterpart agency to the Study Team and also as a coordinating and guiding body in relation with other governmental and non-governmental organizations and donors concerned for the smooth implementation of the Study. Both sides also confirmed that

the Study will be implemented under the cooperative manner between both sides, with respect of the ownership of GOT.

4. Target Year

MAFS requested that the duration of the Master Plan should be set forth 15 years, taking into consideration of the existing irrigation master plan (National Irrigation Development Plan) target year as 2014.

5. Steering Committee

For the smooth and effective implementation of the Study, both sides agreed upon the need for establishment of a steering committee consisting of representatives from the following ministries and organizations before the commencement of the Study.

(1) Ministry of Agriculture and Food Security
(2) President's Office, Planning and Privatization Commission
(3) President's Office, Regional Administration and Local Government
(4) Vice President's Office, Environment Department
(5) Prime Minister's Office
(6) Ministry of Finance
(7) Ministry of Water and Livestock Development
(8) Ministry of Natural Resources and Tourism
(9) Ministry of Energy and Minerals
(10) Ministry of Lands and Human Settlement Development
(11) JICA Tanzania Office
(12) Embassy of Japan (as an observer)
(13) Any other co-opted members

6. Counterpart Personnel

MAFS promised to assign the necessary number of counterpart personnel for the Study Team from the organizations concerned. The member list of counterpart personnel is attached as ANNEX 2.
MAFS expressed difficulties in providing travel allowance for them and requested JICA to make necessary arrangements, because of the budget limitation.

7. Counterpart Training in Japan

MAFS requested the training of counterpart personnel on specific relevant subjects in Japan for the efficient implementation of the Study. The Team promised to convey it to the Government of Japan.

8. Workshop/Stakeholder Meeting

Both sides agreed to hold the workshops and/or stakeholder meetings for recognizing the process and outputs of the Study among related actors.

9. Data Base

The Tanzanian side requests to establish an irrigation data base. The Japanese side promised to examine the matter in the course of the Study in consultation with the Tanzanian side.

ANNEX 1

(A) LIST OF MAFS STAFF MET BY THE JICA PREPARATORY STUDY TEAM

1. Mr. W. NGIRWA	Permanent Secretary
2. Dr. N. P. SICILIMA	Director of Crop Development
3. Mrs. J. BITEGEKO	Director of Policy and Planning
4. Eng. G. M. KALINGA	Assistant Director for Irrigation
5. Eng. A. H. SIMBA	Irrigation Engineer
6. Eng. D. B. E. URASSA	Civil Engineer
7. Mr. P. MAFURU	Agricultural Economist, Head of Monitoring and Evaluation Unit
8. Mr. A. L. SIMUKANGA	Environmental Engineer
9. Eng. F. MBOGO	Irrigation Engineer
10. Eng. I. MASENZA	Water Resources Engineer
11. Mrs. E. NNYITI	Soil Scientist, Zonal Irrigation Unit, Morogoro
12. Eng. C. K. CHIZA	National Project Coordinator, Rehabilitation of Traditional Irrigation Project
13. Eng. A. E. R. ISSAE	Civil Engineer
14. Dr. J. NOZAKA	Irrigation Advisor(JICA expert)

(B) LIST OF PARTICIPANTS FOR STAKEHOLDERS MEETING ON THE NATIONAL IRRIGATION MASTER PLAN STUDY

1. Mr. W. NGIRWA	Permanent Secretary, MAFS
2. Dr. N. P. SICILIMA	Director of Crop Development, MAFS
3. Eng. R. J. MTEMU	Head of Technical Advisory Unit, ASPS
4. Mr. P. J. ZOUTEWELLE	Irrigation Advisor, ASPS, DANIDA
5. Dr. S. LUGEYE	Agricultural Advisor, Ireland Aid
6. Mr. E. OCLEIRIGH	Programme Officer, Ireland Aid
7. Mr. J. SALMON	Rural Livelihoods Advisor, DFID
8. Mr. G. S. NGAREYA	Assistant Director, Prime Minister's Office
9. Dr. I. K. ALOO	Senior Forest Officer, Ministry of Natural Resources & Tourism
10. Ms. M. TAKADA	Programme Officer, WFP
11. Mr. J.K. KABYMERA	Programme Officer, FAO
12. Mr. H. V. PEDERSEN	Chief Technical Advisor, ASPS, DANIDA
13. Eng. G. M. KALINGA	Assistant Director for Irrigation, MAFS
14. Eng. A. H. SIMBA	Irrigation Engineer, MAFS
15. Dr. J. NOZAKA	Irrigation Advisor, MAFS
16. Mr. N. ITO	Second Secretary, Embassy of Japan
17. Mr. I. RUGEMALILE	Economist, Embassy of Japan
18. Mr. Y. SASAOKA	Special Advisor, JICA
19. Mr. R. SASAKI	Advisor, JICA
20. Mr. Y. AIZAWA	Advisor, JICA
21. Mr. S. OKUBO	Advisor, JICA

(C) List of the Preparatory Study Team, JICA

1. Mr. KUNIYASU Norio	Leader,Irrigation Policy
2. Mr. MITSUGI Hiroto	Member, Donor Coordination
3. Dr. YOSHIDA Koji	Member, Farming
4. Mr. JITSUHIRO Noboru	Member, Water Resources
5. Mr. FURUDONO Seigo	Member, Irrigation/Agricultural Infrastructure
6. Mr. AZEGAMI Naoya	Member, Agricultural Organization/Management
7. Mr. HAYASHI Kenji	Member, Project Planning

AT2 - 3

ANNEX 2

LIST OF PROPOSED COUNTERPART PERSONNEL

1. Eng. A. H. SIMBA	Irrigation/Civil Engineer (Irrigation HQ)
2. Mr. P. F. MAFURU	Agricultural Economist (Irrigation HQ)
3. Mr. H. MEDADI	Irrigation Agronomist (Irrigation HQ)
4. Mrs. E. NNYITI	Soil Scientist (Morogoro Zonal Irrigation Unit)
5. Mr. I. MASENZA	Water Resources Engineer/Hydrologist (Irrigation HQ)
6. Mr. R. KOMANGA	Sociologist (Morogoro Zonal Irrigation Unit)

AT2 - 4

Attachment 3

Minutes of Meeting on Inception Report

MINUTES OF MEETING
ON
INCEPTION REPORT
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

The Study Team arrived in Tanzania on November 5, 2001, for commencement of the 1st field work in Phase I of the Study on the National Irrigation Master Plan (hereinafter referred to as "the Study"), and submitted thirty (30) copies of the Inception Report to the Ministry of Agriculture and Food Security (hereinafter referred to as "MAFS"), in accordance with the Scope of Work for the Study signed between MASF and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001.

Meetings on the Report were held twice, namely with officials of MAFS and the Steering Committee on November 6, 2001. In the meetings, the Study Team explained the contents of the Report and further highlighted the outline, basic concept and basic approach of the Study. Thereafter, a series of discussions was made among them. As a result of the discussions, in principle the Report was agreed by both sides. The main issues discussed by the both sides and the list of participants are shown in ANNEXES attached hereto.

AT3 - 1

Mr.Wilfred Ngirwa
Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: November 9, 2001

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: November 9, 2001

Mr.Nobuyuki Kobayashi
Leader
The Advisory Team
Japan International Cooperation Agency
Date: November 9, 2001

(ANNEX I)

Main Issues Confirmed and Agreed at the Meetings

1. Technical Issues

Both sides agreed to:

(1) Preparation of selection criteria on existing irrigation projects for problem analysis

(2) Re-consideration of screening criteria for inventory survey for existing irrigation schemes, especially for elimination of smaller irrigation schemes (10 ha to 50 ha)

(3) Consistency with Agriculture Sector Development Program (ASDP)

(4) Establishment of data base and Web site for information sharing

(5) Review of NIDP in cooperation with other donor(s)

(6) Establishment of appropriate irrigation development level for Master Plan Study

(7) Execution of IEE

(8) Methodology on data and information collection on irrigation schemes by interview and questionnaire

2. Operational Issues

(1) Provision of counterpart personnel

It was confirmed that MAFS would provide the Study Team with the counterpart personnel in the light of the assignment schedule of the Study Team.

(2) Travel allowance for counterpart personnel

In reply to the payment request of travel allowance for counterpart personnel by MAFS, the JICA Advisory Team explained that it would be discussed with the Study Team.

(3) Steering Committee

Both sides confirmed that a Steering Committee should function as a final decision making board for the Study.

(4) Stakeholder Meeting

Both sides confirmed that a Stakeholder Meeting should be a place where the opinions were exchanged on the matters related to the Study.

(5) Office for the Study Team

MAFS agreed to arrangement of adequate office spaces for the Study Team in MAFS building.

3. Other Issue

MAFS requested the Japanese side to hold conferences related to the Study in the course of the Study.

(ANNEX II)

List of Participants

1. Tanzanian Side

(1) Ministry of Agriculture and Food Security

(a)	Mr.A.Ngondo	Acting Permanent Secretary
(b)	Ms.S.E.Kaduma	Acting Director of Policy and Planning
(c)	Mr.A.H.Simba	Acting Assistant Director of Irrigation Services
(d)	Mr.A.A.Mbwele	Assistant Director, Agricultural Machinery and Inputs
(e)	Mr.E.D.M.Mlay	Acting Director of Training Institutes
(f)	Mr.Mbogo Futakamba	Irrigation Engineer
(g)	Mr.B.K.Nkuba	Irrigation Engineer
(h)	Mr.P.Mafuru	Agriculture Economist
(i)	Mr.A.D.Lwena	Agricultural Engineer
(j)	Mr.R.R.Komanga	Sociologist
(k)	Mr.P.H.I.Assenga	Irrigation Engineer
(l)	Mr.M.Z.Lumbadia	Acting National Project Coordinator, Agricultural Sector Program Support
(m)	Mr.A.L.Simukanga	Environmental Engineer
(n)	Mr.R.I.Rushomesa	Land Use Planner
(o)	Ms.R.A.Kweka	Soil Scientist
(p)	Mr.P.Zoutewelle	Irrigation Advisor, Agricultural Sector Program Support
(q)	Dr.Jiro Nozaka	Irrigation Advisor

(2) Steering Committee

(a)	Mr.A.Ngondo	Acting Permanent Secretary, MAFS
(b)	Ms.S.E.Kaduma	Acting Director of Policy and Planning, MAFS
(c)	Mr.A.H.Simba	Acting Assistant Director of Irrigation Services, MAFS
(d)	Mr.Mbogo Futakamba	Irrigation Engineer, MAFS
(e)	Mr.B.K.Nkuba	Irrigation Engineer, MAFS
(f)	Mr.P.Mafuru	Agriculture Economist, MAFS
(g)	Mr.A.D.Lwena	Agricultural Engineer, MAFS
(h)	Mr.A.L.Simukanga	Environmental Engineer, MAFS
(i)	Mr.E.W.Ndikilo	Director of Planning, RUBADA
(j)	Mr.A.L.Masanja	Senior Planning Officer, RUBADA
(k)	Mr.Richard Musingi	Principal Planning Officer, RALG/DPP, Presidents' Office
(l)	Mr.F.D.N.Mukome	Senior Forestry Officer, Ministry of Natural Resources & Tourism
(m)	Ms.B.A.Kibano	Land Officer, Ministry of Lands and Human Settlements
(n)	Mr.E.S.Maponde	Economist, Planning and Privatization, Presidents' Office
(o)	Dr.Jiro Aikawa	Senior Scientist, SOFRAIP
(p)	Dr.A.Sugimoto	Rural Development Advisor, RALG/DPP, Presidents' Office

2. Japanese Side

(1) JICA Advisory Team

(a)	Mr. Nobuyuki Kobayashi	Leader
(b)	Mr. Kenji Hayashi	Staff

(2) JICA Tanzania Office

(a)	Mr. Hiroyuki Kinomoto	Deputy Resident Representative

(3) JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Mr. Shuichi Matushima	Staff
(c)	Mr. Eiji Maeda	Staff

Attachment 4

Minutes of Meeting on Progress Report 1

MINUTES OF MEETING
ON
PROGRESS REPORT 1
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Progress Report 1 to the MAFS. The Report presents the results of field work executed for about 3 months from beginning of November 2001 to end of January 2002.

In connection with the Progress Report 1, the Steering Committee Meeting was held on January 24, 2002 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Report, focusing on findings, basic concept for formulation of Master Plan and preliminary identification of irrigation development potential. This was followed by discussions on the contents of the Report among the Participants. As a result of the discussions, the contents of the Report were accepted by the Steering Committee. The main issues discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT4 - 1

Mr.Wilfred Ngirwa
Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: January 26, 2002

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: January 26, 2002

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) The 3 prioritized irrigation schemes stipulated in the NIDP, which are (i) Priority 1: Rehabilitation or Upgrading of Traditional Irrigation Schemes, (ii) Priority 2: Schemes based on Water Harvesting Technology, and (iii) Priority 3: New Smallholder Schemes, should be followed by the NIMP.

(2) The NIMP should be formulated giving consideration to environmental aspects.

(3) The NIMP should take into consideration the concept of river basin management in order to minimize water conflict among water users.

(4) Gender issues related to irrigation development should be incorporated in the NIMP.

(5) Availability of skilled farmers should be considered for sustainable irrigation development.

(6) Maps prepared in the study should be checked by relevant agency.

(7) Irrigation schemes aiming at settlement, if taken up by local governments considering domestic needs, should also be studied in the NIMP.

(8) Data base should be established for effective use of collected information.

(9) Further comments on the Report if any, will be sent to the Study Team.

(ANNEX II)

List of Participants

1. Steering Committee Member

(1) Dr.N.P.Sicilima	Director of Crop Division (for Permanent Secretary), MAFS
(2) Ms.Beatha O.Swai	Director of Disaster Management, PMO
(3) Eng.A.H.Simba	Acting Assistant Director of Irrigation Section, MAFS
(4) Eng.E.H.Masija	Project Coordinator, RBMSIP, MAFS
(5) Mr.Rawson P.Yonazi	Assistant Director, VPO
(6) Mr.P.Mafuru	Agricultural Economist, MAFS
(7) Ms.H.Kikeke	Agricultural Officer, MAFS
(8) Mr.G.G.Kanza	Senior Town Planner of Human Settlement Divisions, MLHUD
(9) Mr.J.D.Mtamakaya	Land Surveyor, MLHUD
(10) Mr.Itunda Mbwambo	Agricultural Officer, RUBADA, DSM
(11) Mr.Ronald Komanga	Sociologist, MAFS
(12) Dr.J.Nozaka	Irrigation Advisor, MAFS
(13) Mr.Peter Zoutewelle	Irrigation Advisor for ASPS, MAFS

2. Japanese Side

(1) Embassy of Japan	
(a) Mr. Naoki Ito	Secretary
(2) JICA Tanzania Office	
(a) Ms. Kaori Matsushita	Assistant Resident Representative
(3) JICA Study Team	
(a) Mr. Hitoshi Shimazaki	Leader
(b) Dr. Shuichi Matushima	Staff
(c) Dr. Mamoru Osada	Staff
(d) Mr. Hiroyasu Onuma	Staff
(e) Mr. Yoshikazu Ando	Staff

AT4 - 2

Attachment 5

Minutes of Meeting on Progress Report 1

MINUTES OF MEETING
ON
DRAFT MASTER PLAN REPORT
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as the "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as the "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Draft Master Plan Report to the MAFS (hereinafter referred to as the "Report").

In connection with the Report, the Steering Committee Meeting was held on August 29, 2002 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Report, focusing on the framework for irrigation development plan, development scenario and development programme up to the year 2017 including basic plans of institutional development and agricultural development. This was followed by discussions on the contents of the Report among the Participants. As a result of the discussions, the contents of the Report were in principle accepted by the Steering Committee. The main issues discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT5 - 1

Mr.Wilfred Ngirwa
Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: September 2, 2002
PERMANENT SECRETARY
MINISTRY OF AGRICULTURE & FOOD SECURITY
P. O. Box 9192
DAR ES SALAAM

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: September 2, 2002

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) The Master Plan Study should be formulated taking into consideration decentralization policy and build-up of ownership of government and farmers.

(2) Need for inter-sectoral collaboration should be stressed to ensure sustainable utilization of water resources necessary for irrigation through watershed management e.g. afforestation to conserve water resources.

(3) Further description should be made for the analysis results on the identification of irrigation development potential area, especially estimated potential areas.

(4) Irrigation development potential area map should be re-examined and updated using supplementary information like location of major roads.

(5) A study on cost contribution by farmers to irrigation scheme development should be carried out as a component of the Subject-wise Improvement Programme in the next field work.

(6) The 10 candidate schemes for the Implementation Plan which are mentioned in the Report should be confirmed and finalized through site inspection by the Study Team together with the counterpart personnel in the next field work as earlier as possible. If inappropriate schemes are found from technical, socio-economic and environmental viewpoints, those should be replaced with the candidate schemes requested in the official letter dated August 22, 2002. In this connection, the MAFS requested to take as many schemes as possible.

(8) Tables and figures in the Report should be given with their sources of information.

(9) The present legal framework should be further examined, and suggestions should be put forward to harmonize the registration process for Water Users Association/Cooperatives.

(10) Further comments on the Report if any, will be sent to the Study Team by the end of September 2002, through the Irrigation Section of MAFS.

(ANNEX II)

List of Participants

1. **Tanzanian Side**

(1) **Steering Committee Member**

(a)	Mr.Wilfred Ngirwa	Permanent Secretary, MAFS
(b)	Prof. A.M.Hayuma	Special Assistant to Permanent Secretary, Ministry of Lands
(c)	Mr.D.S.Poka	Deputy Permanent Secretary, PORALG
(d)	Dr. John Soi	PVO for DLD, MWLD
(e)	Ms.A.E.Madete	Acting Director of Environment, VPO
(f)	Mr.C.K. Chiza	Assistant Director of Irrigation Section, MAFS
(g)	Mr. G.S.Ngaleya	Assistant Director, PMO
(h)	Mr.Nicodemus A.Ngala	Planning Officer, MEM
(i)	Mr. Eliyuko Y. Mmbanga	Senior Economist, POPP
(j)	Mr.Ezekiel Mpanda	Economist for CME, MOF
(k)	Mr.Fabian Mukome	Senior Forest Officer, MNRT
(l)	Mr.Clifford Tandari	Agricultural Economist, VPO

(2) **MAFS Staff**

(a)	Mr. E.H.Masija	Project Coordinator, RMMSIIP, MAFS
(b)	Mr.A.H.Simba	Senior Irrigation Engineer (Chief counterpart), MAFS
(c)	Mr.Mbogo Futakamba	Irrigation Engineer (Counterpart), MAFS
(d)	Ms.R.A.Kweka	Soil Scientist (Counterpart), MAFS
(e)	Mr.Ronald Komanga	Sociologist (Counterpart), MAFS
(f)	Mr.I.A.Masenza	Water Resources Engineer (Counterpart), MAFS
(g)	Mr.P.M.Mafuru	Agricultural Economist (Counterpart), MAFS
(h)	Mr.R.Rushomesa	Land Use Planner (Counterpart), MAFS
(i)	Mr.E.W.Siyame	Zonal Irrigation Officer, Mwanza, MAFS
(j)	Mr.N.J.Chikoleka	Zonal Irrigation Officer, Mtwara, MAFS
(k)	Mr.A.G.Ruhangisa	Zonal Irrigation Officer, Morogoro, MAFS
(l)	Mr.R.L.Daluti	Zonal Irrigation Officer, Kilimanjaro, MAFS
(m)	Mr.P.F.Kweka	Zonal Irrigation Officer, Mbeya, MAFS
(n)	Mr.P.M.Gukurra	Zonal Irrigation Office Staff, Tabora, MAFS
(o)	Mr.A.A.Mbwele	For DCD, MAFS
(p)	Mr.Amandus Lwena	Agricultural Engineer, MAFS
(q)	Dr.J.Nozaka	Irrigation Advisor, MAFS
(r)	Mr.Peter Zoutewelle	Irrigation Advisor for ASPS, MAFS

2. **Japanese Side**

(1) JICA Tanzania Office

(a)	Ms.Debora Sungusia	Senior Programme Officer

(2) JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Dr. Shuichi Matushima	Staff
(c)	Dr. Mamoru Osada	Staff
(d)	Mr. Hiroyasu Onuma	Staff
(e)	Mr. Takuya Igawa	Staff
(f)	Mr. Takeshi Kuroda	Staff

Attachment 6

Minutes of Meeting on Inception Report 2

MINUTES OF MEETING
ON
INCEPTION REPORT 2
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

The thirty (30) copies of the Inception Report were submitted to the Ministry of Agriculture and Food Security (hereinafter referred to as "MAFS"), in accordance with the Scope of Work for the Study signed between MAFS and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001.

A meeting on the Report was held with the Steering Committee on December 17, 2002. In the meeting, the Study Team explained the contents of the Report and further highlighted the basic approaches to the Action Plan and Verification Study. Thereafter, a series of discussions were made. As a result of the discussions, in principle the Report was agreed by the Steering Committee. The main issues discussed in the meeting and the list of participants are shown in ANNEXES attached hereto.

AT6 - 1

Dr.N.P. Sikilima
for Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: December 23, 2002

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: December 23, 2002

Mr.Hitoshi Fujiie
Project Programme
Japan International Cooperation Agency
Date: December 23, 2002

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) The Irrigation Sub-sector's staff shall explain the concept of NIMP to the local government authorities for their conversance with irrigation development.

(2) The Action Plan should be prepared taking into consideration the river basin management approach as recommended in the Master Plan Report.

(3) Irrigation Sub-sector stakeholders should be involved in discussion on the proposed Water Act before it is enacted.

(4) Policy environment should be so revised as to enable the private sector to take part in irrigation development as mentioned in the Master Plan Report.

(5) Other sub-sectors in the Agriculture Sector should be advised to urgently prepare their development plans in the same manner with the NIMP, to realize the inter-sectoral coordination.

(6) The "Candidate Schemes" termed in the Inception Report 2 should be changed into the "Model Scheme" to avoid any misunderstanding by other government agencies.

(7) MAFS shall send counterpart personnel to the Model Scheme sites where the JICA Study Team will not properly visit according to the latest JICA Security Guideline, to collect further data and information necessary for preparation of the Action Plan.

NB

(ANNEX II)

List of Participants

1. Tanzanian Side

(1) Steering Committee

(a)	Dr.N.P. Sicilima	Director for Crop Development, MAFS
(b)	Eng..C.K.Chiza	Assistant Director of Irrigation Services Section, MAFS
(c)	Eng. E.H.Masija	Project Coordinator, RBMSIIP, MAFS
(d)	Eng. A.H.Simba	Senior Irrigation Engineer (Chief counterpart), MAFS
(e)	Eng. Mbogo Futakamba	Irrigation Engineer (Counterpart), MAFS
(f)	Ms.R.A.Kweka	Soil Scientist (Counterpart), MAFS
(g)	Mr.Ronald Komanga	Sociologist (Counterpart), MAFS
(h)	Eng. I.A.Masenza	Water Resources Engineer (Counterpart), MAFS
(i)	Mr.P.M.Mafuru	Agricultural Economist (Counterpart), MAFS
(j)	Mr.R.Rushomesa	Land Use Planner (Counterpart), MAFS
(k)	Mr.Washington Mutayoba	Project Coordinator, (for P/S of Ministry of Water and Livestock Development)
(l)	Mr.A.E.Madetei	Assistant Director, VPO-Division of Environment
(m)	Mr.G.S.Ngaleya	Assistant Director, PMO-Coordination of Government Business
(n)	Mr.J.F.Kanyasi	PORALG
(o)	Dr.J.Nozaka	Irrigation Advisor, MAFS

(2) Ministry of Agriculture and Food Security

(a)	Ms.Margaret Ndaba	Senior Economist
(b)	Mr.A.D.Lwena	Agricultural Engineer
(c)	Mr.E.W.Siyame	Zonal Irrigation Engineer, Mwanza
(d)	Mr.Rajabu Libuhi	Acting Zonal Irrigation Engineer Mtwara
(e)	Mr.A.G.Ruhangisa	Zonal Irrigation Engineer, Morogoro
(f)	Mr.R.L.Daluti	Zonal Irrigation Engineer, Kilimanjaro
(g)	Mr.M.J.Ndonde	Representative of Zonal Irrigation Engineer, Mbeya
(h)	Mr.J.L.Bayaga	Zonal Irrigation Engineer, Tabora

(3) Other

(a)	Mr.F.I..W.Oslen	Chief Advisor, DANIDA

2. Japanese Side

(1) JICA Monitoring Team

(a)	Mr. Hitoshi Fujiie	Project Management

AT6 - 2

(2) JICA Tanzania Office

(a)	Ms. Debora Sungusia	Senior Programme Officer

(3) JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Mr. Shuichi Matushima	Staff
(c)	Mr. Takuya Igawa	Staff

Attachment 7

Minutes of Meeting on Draft Action Plan Report

MINUTES OF MEETING
ON
DRAFT ACTION PLAN REPORT
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as the "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as the "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Draft Action Plan Report to the MAFS (hereinafter referred to as the "Report").

In connection with the Report, the Steering Committee Meeting was held on August 4, 2003 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Report, focusing on the objectives of Action Plan, analysis of Model Irrigation Schemes and selection of Priority Components, special study on major issues identified in problem analysis, Action Plans for Priority Components and Model Irrigation Schemes, and selection of objective items for Verification Study. This was followed by discussions on the contents of the Report among the Participants. As a result of the discussions, the contents of the Report were in principle accepted by the Steering Committee. The main issues raised and discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT7 - 1

Mr.Simon A.N.Muro
Acting Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: August 5, 2003

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: August 5, 2003

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) Issues Raised and Replies

(a) Role and entry point of private sector are not clear in the Draft Action Plan Report.

The Master Plan Report states that the private sector plays important roles for realizing the self-reliant irrigation development through the Public Private Partner and investment by the private companies at the Long Term stage. There is no restriction of involvement of private sector in area size. At the Short Term stage, involvement of private sector is focused on irrigator groups and private contractors.

(b) Environmental matter is not included in the selection criteria on Model Irrigation Schemes.

Study purpose of Model Irrigation Scheme is to grasp problems envisaged with the irrigation schemes. Environmental concerns are treated as problems to be addressed when developing irrigation schemes. At this stage, they cannot be taken as criteria for selecting irrigation schemes. However, the follow up stage (feasibility study) must consider environmental concerns.

(c) How does the Master Plan address the ASDS/ASDP?

The purpose of Master Plan is to make sustainable irrigation development through effective use of national resources for supporting ASDS' objective which is to create an enabling and favorable environment for improving productivity and profitability of agricultural sector.

(d) How does the Master Plan follow the River Basin concept?

The Master Plan is a continuation of NIDP which was prepared on the River Basin concept in 1994.

(e) Are the Model Irrigation Schemes included in DADPs?

Some Model Irrigation Schemes are included in DADPs, but some schemes are not included, because Model Irrigation Schemes are not priority ones as mentioned in the Draft Action Plan Report. Using the Model Irrigation Schemes, a workable Action Plan can be developed for other projects and the selected components in the Master Plan can be confirmed.

(f) Confusion of WUA

The Master Plan Report clearly mentions that WUA is an organization of irrigator groups.

(g) Any training programme is not seen in the Draft Action Plan.

The Draft Action Plan Report proposes the training programme of LGA staff and farmers.

(h) How does the Action Plan accommodate the interest of WUA?

In the Action Plan study, RRA was conducted for selected Model Irrigation Schemes by inviting beneficial farmers, to grasp their opinions and intentions on the Schemes. At the RRA, most of farmers actively took part in group discussions. These discussion results were duly incorporated in the Action Plan.

(i) In course of the study, was the water source assessed?

Water source for the Model Irrigation Schemes was assessed, and results were shown in the project proposal.

(2) The MAFS should arrange the staff and space enough to keep data collected in the Master Plan and Action Plan Studies, which will be crucial for the coming Verification Study on the establishment for simple database and information system in MAFS, if the proposed Verification Study in the Report is accepted by the JICA Headquarters.

(3) Chapter 8 Selection of Objective Item for Verification Study should be deleted in final version of the Action Plan Report, and mentioned in the coming Verification Study Report.

(4) Further comments on the Report if any, will be sent to the Study Team by August 31, 2003, through the Irrigation and Technical Services Division of MAFS.

AT7 - 2

(ANNEX II)

List of Participants

1. **Tanzanian Side**

(1) Steering Committee Member

(a)	Mr. Simon A.N.Muro	Acting Permanent Secretary, MAFS
(b)	Mr. C.K. Chiza	Director of Technical and Irrigation Services Division, MAFS
(c)	Mr. Julius F. Kanyasi	Senior Planning Officer, PORALG
(d)	Prof. A.M. Hayuma	Special Assistant to Permanent Secretary, Ministry of Lands
(e)	Mr. S. Nkondokaya	Senior Environmental Officer, Division of Environment Vice President Office
(f)	Ms. Amina Akida	Senior Officer of MIS, MNRT
(g)	Mr. Washington Mutayoba	Project Coordinator, RBMSIIP, MAFS
(h)	Mr. Clifford Tandari	Agricultural Economist, VPO
(i)	Mr. Ezamo Maponde	Economist, POPP
(j)	Mr. Fabian Mukome	Senior Forest Officer, MNRT
(k)	Mr. Nicodemus A. Ngwala	Planning Officer, MEM
(l)	Mr. Mbogo Futakamba	Assistant Director (Counterpart), MAFS

(2) MAFS Staff

(a)	Mr. E.H. Masija	Project Coordinator, RBMSIIP, MAFS
(b)	Mr. A.H. Simba	Senior Irrigation Engineer (Chief counterpart), MAFS
(c)	Mr. M.N.W Mnzava	Irrigation Agronomist, MAFS
(d)	Ms. R.A. Kweka	Soil Scientist (Counterpart), MAFS
(e)	Mr. Ronald Komanga	Sociologist (Counterpart), MAFS
(f)	Mr. I.A. Masenza	Water Resources Engineer (Counterpart), MAFS
(g)	Mr. P.M. Mafuru	Agricultural Economist (Counterpart), MAFS
(h)	Mr. R. Rushomesa	Land Use Planner (Counterpart), MAFS
(i)	Mr. E.W. Siyame	Zonal Irrigation Engineer, Mwanza, MAFS
(j)	Mr. N.J. Chikoleka	Zonal Irrigation Engineer Mtwara, MAFS
(k)	Mr. A. G Ruhangisa	Zonal Irrigation Engineer, Morogoro, MAFS
(l)	Mr. R.L. Daluti	Zonal Irrigation Engineer, Kilimanjaro, MAFS
(m)	Mr. J.W. Kaduma	Zonal Irrigation Engineer, Mbeya, MAFS
(n)	Mr. J. Bayaga	Zonal Irrigation Engineer Tabora, MAFS
(n)	Mr. L.A.G. Gallet	Project Coordinator of PIDP, MAFS
(o)	Mr. O.M. Wahure	Sociologist, MAFS
(p)	Mr. Amandus Lwena	Agricultural Engineer, MAFS
(q)	Mr. R.I.M. Temu	Technical Advisor, ASPS MAFS

(r)	Dr. J. Nozaka	Irrigation Advisor, MAFS
(s)	Mr. Peter Zoutewelle	Irrigation Advisor for ASPS, MAFS

2. Japanese Side

(1) Embassy of Japan

(a)	Mr.Naoki Ito	Second Secretary

(2) JICA Tanzania Office

(a)	Ms.Kaori Matsushita	Assistant Resident Representative

(2) JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Dr. Shuichi Matushima	Staff
(c)	Dr. Mamoru Osada	Staff
(d)	Mr. Hiroyasu Onuma	Staff
(e)	Mr. Takuya Igawa	Staff
(f)	Mr. Yuki Ishikawa	Staff

AT7 - 3

Attachment 8

Minutes of Meeting on Inception Report 3

MINUTES OF MEETING
ON
INCEPTION REPORT 3
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as the "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as the "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Inception Report 3 to the MAFS (hereinafter referred to as the "Report").

In connection with the Report, the Steering Committee Meeting was held on January 14, 2004 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Report, focusing on the results of Phase 1 and Phase 2 works and plan of operation of Phase 3 work (Verification Study). This was followed by discussions on the contents of the Report among the Participants. As a result of the discussions, the contents of the Report were in principle accepted by the Steering Committee. The main issues raised and discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT8 - 1

Mr.Wilfred Ngirwa
Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: January 16, 2004

Mr.Hiroshi Shimazaki
Leader
The Study Team
Date: January 16, 2004

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) Review of Minutes of Meeting for Draft Action Plan Report

Before presentation and discussion of the Report, the minutes of meeting for Draft Action Plan Report were reviewed among the Participants. As a result, all the Participants accepted the minutes of meeting although the supplemental explanation was given to the following matters, which have been already incorporated in the Master Plan and/or Action Plan Reports:

(a) Need of preparation of favorable and attractive legal and institutional framework for the private investors

The Action Plan Report states that the investment of private companies will be one of important alternatives for realization of self-reliant irrigation development, so that the MAFS in cooperation with relevant government agencies need to prepare favorable and attractive legal and institutional frame work for private investors.

(b) Need of environmental assessment for developing irrigation schemes

The Action Plan study covered the preliminary environmental assessment for Model Irrigation Schemes. Based on the assessment results, the Action Plan Report relates the focal points that need environmental consideration for the irrigation development, and suggests the supporting programme of "Environmental Assessment Study for Irrigation Development in Tanzania" in the Subject-wise Improvement Programme.

(c) Introduction of river basin concept to irrigation scheme development

The Development Scenario prepared in the Master Plan study shows the dissemination of concept of river basin approach as one of strategic approach in the Short Term from 2003 to 2007. Following this Scenario, the Action Plan study raises the "Study of River-Basin Approach in Irrigation Development as one of Priority Programmes.

(d) Fund arrangement for implementation of NIMP

In the Master Plan study, the funding mechanism for implementation of NIMP has been studied based on the past budget and donors' assistance for irrigation development and the assumed future GDP growth rates, through sensitivity analysis.

(e) Purpose of Model Irrigation Schemes

Model Irrigation Schemes were selected to grasp problems envisaged with the irrigation schemes and to show workable Action Plan for five irrigation types taking into account suitable application time of the specific subject programmes.

(2) Verification Study

(a) Irrigators Association

Irrigators Association instead of Water Users Association should be referred to as the farmers organization aiming at operation and maintenance of irrigation system.

(b) Administrative Boundary

The newly formed administrative region of Manyara should also be taken on board.

(c) Screening Criteria

The screening criteria should be finalized through discussion with DITS of MAFS, focusing the farmers' intention.

(d) Establishment of Database System

The data to be used for database system should be real and updated.

(e) Guidelines for Irrigation Scheme Formation

The guidelines for Irrigation Scheme Formation should include the environmental matters.

(f) Capacity Building to District and ZIU Staff

Supplementary information on capacity building to district and ZIU staff should be given within the extent of verification study on the irrigation scheme formation and the simple database system preparation.

(3) The MAFS agreed to the revised work schedule and assignment schedule of the Study Team for the Phase 3 Verification Study mentioned in the Report, which are deviated from those in the Scope of Work.

(4) Further comments on the Report if any, will be sent to the Study Team by January 31, 2004, through the DITS of MAFS.

In this connection, the MAFS received the written comments from the Ministry of Land on the Report on January 16, 2004. The replies to these comments are as follows:

Comments from the Ministry of Land.

(a) Mapping Components

- Comments
  Given in *ANNEX III*.
- Reply
  It is quite correct that maps are basic tools for planning the irrigation development. In this Verification Study, the existing map will be used as much as possible. In case of so small-scaled irrigation scheme, a very preliminary mapping will be prepared using the GPS and leveling instruments taking into consideration accuracy of required plan for DADP. For the subsequent definite planning and design for the scheme listed in DADP, the District Office will prepare the map

preferentially, and the required budget should be allocated accordingly.

(b) Land Ownership

- Comments
  Given in *ANNEX III*.
- Reply
  According to the government policy, the irrigation facilities completed belong to the Irrigators' Association, not to the specific persons since the irrigation facilities are public ones, except those developed by private investigators. The private lands collapsed by construction of facilities like canal and road, will be compensated by the government.

List of Participants

1. Tanzanian Side

(1) Steering Committee Member

(a)	Mr. B.A.S.Luhumnika	Director, Ministry of Water and Livestock Development
(b)	Mr. F.E.Mbonde	Director of Planning and Administration, PORALS
(c)	Mr. R.Muyingi	Acting Director of Environment, Vice President Office
(d)	Mr. E.M.Achayo	Acting Director of Policy and Planning, MAFS
(e)	Mr. Kamaka J.Kamaka	Assistant Director, Ministry of Lands
(f)	Mr. Mbogo Futakamba	Assistant Director, MAFS
(g)	Mr. K.H.Lyoba	Acting Assistant Director of Land Use Planning, MAFS
(h)	Ms. Y.N.Malisa	Senior Economist, PMO
(i)	Mr. L.E.Mndeme	Economist, PO-Planing

(2) MAFS Staff

(a)	Mr. E.H. Masija	Project Coordinator, RBMSIIP, MAFS
(b)	Mr. A.H. Simba	Senior Irrigation Engineer (Chief counterpart), MAFS
(c)	Mr. R.Temu	ASPS, MAFS
(d)	Mr. M.N.W Mnzava	Irrigation Agronomist, MAFS
(e)	Ms. R.A. Kweka	Soil Scientist (Counterpart), MAFS
(f)	Mr. Ronald Komanga	Sociologist (Counterpart), MAFS
(g)	Mr. E.W. Siyame	Zonal Irrigation Engineer, Mwanza, MAFS
(h)	Mr. N.J. Chikoleka	Zonal Irrigation Engineer Mtwara, MAFS
(i)	Mr. A. G Ruhangisa	Zonal Irrigation Engineer, Morogoro, MAFS
(j)	Mr. R.L. Daluti	Zonal Irrigation Engineer, Kilimanjaro, MAFS
(k)	Mr. P.F.Kweka	Zonal Irrigation Engineer, Mbeya, MAFS
(l)	Mr. J. Bayaga	Zonal Irrigation Engineer Tabora, MAFS
(m)	Mr. S.P.Luswema	Senior Executive Engineer, MAFS
(o)	Mr. H.Medadi	Principal Agricultural Field officer, MAFS
(p)	Dr. J. Nozaka	Irrigation Advisor, MAFS

2. Japanese Side

(1) JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Dr. Shuichi Matushima	Staff
(c)	Ms.Wakana Yamamoto	Staff

COMMENTS ON THE INCEPTION REPORT (NATIONAL IRRIGATION MASTER PLAN)

1. MAPPING COMPONENT

Maps are and will continue to be basic tools for planing development projects. To this effect irrigation projects are no exception. In the inception report nothing is mentioned about mapping. It is being suggested that mapping be considered at this very early stage and that provision for the would be requisite maps be provided. Experience has shown that mapping is always considered at late stages resulting in difficulties of producing maps when required. In some instances projects have delayed to take off for want of maps which take time to prepare. Refer Chapter 4, undertaking of the Government of Tanzania. Item Number 7.

2. LAND OWNERSHIP

Since people will own the irrigation schemes it has to be clear if the schemes will be owned individually or communally. Whatever the case that has to be in conformity with the Land Acts and especially the Village Land Act, No. 5 of 1999. This is because most of the irrigation schemes will be in the villages. Critical on this matter will be the irrigation canals which, most probably, will be shared by the public (the villagers who are farmers)

Kamaka J. Kamaka
ASSISTANT DIRECTOR
SURVEYS AND MAPPING DIVISION
MINISTRY OF LANDS AND HUMAN SETTLEMENTS DEVELOPMENT
16/01/2004.

Attachment 9

Minutes of Meeting on Draft Guidelines

MINUTES OF MEETING
ON
DRAFT GUIDELINES
FOR
IRRIGATION SCHEME FORMULATION
FOR
DISTRICT AGRICULTURAL DEVELOPMENT PROGRAMME
UNDER
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as the "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as the "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Draft Guidelines for Irrigation Scheme Formulation for District Agricultural Development Programme to the MAFS (hereinafter referred to as the "Guidelines").

In connection with the Guidelines, the Steering Committee Meeting was held on March 3, 2004 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Guidelines, focusing on the preliminary study on the irrigation schemes screened among those listed in Village Plans. This was followed by discussions on the contents of the Guidelines among the Participants. As a result of the discussions, the contents of the Guidelines were accepted by the Steering Committee. The main issues raised and discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT9 - 1

Mr.M.A.Mudogo
Acting Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: March 4, 2004

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: March 4, 2004

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) Review of Minutes of Meeting of the Sixth Steering Committee for Inception Report 3

After the opening address by the Chairman, Mr.M.A.Mudogo, the Acting Permanent Secretary of MAFS, the Minutes of Meeting of the Sixth Steering Committee for Inception Report 3 which was held on January 14, 2004 were reviewed and accepted by all participants.

(2) Draft Guidelines for Irrigation Scheme Formulation for District Agricultural Development Plans

(a) Reflection of Social Aspects

The Guidelines followed the application of O & OD methodology which takes up the social data from villagers. Furthermore, the Guidelines incorporate the adequacy in technical aspect, social aspect and cost performance into project evaluation. The Guidelines were thus prepared taking into consideration the social aspects as well as the technical, economical and environmental aspects.

(b) Continuous Capacity Building to District Staff

The Guidelines proposed to provide District Government with backup support by Central Government, especially Zonal Irrigation Units. In this connection, all participants recognized that the Zonal Irrigation Units should be strengthened in quality and in staff number, so as to provide continuous supporting including capacity building to District staff. All participants also understood the need of strengthening communication between the Central Government (Zonal Irrigation Units) and District Government.

(c) Seminar disseminating the Guidelines to District Government

According to the Phase 3 work schedule mentioned in Inception Report 3, a seminar is planned to be held in September 2004, for the purpose of disseminating the Guidelines to the District staff.

(d) Participatory approach to irrigation scheme formulation

The Guidelines were prepared in a participatory approach concept. For example, the proposed District Project Development Team in charge of irrigation scheme formulation, includes the farmers' representatives concerned and NGO.

(3) Need of Strengthening Inter-sectoral Coordination

All participants acknowledged the need of strengthening the inter-sectoral coordination in agricultural sector, to make effective capacity building to farmers' organization and also to consolidate many development plans raised by sub-sectors into DADPs in a proper way.

(4) Data and Reports collected in Master Plan and Action Plan Studies

The MAFS requested the Study Team to keep the data and reports collected in the Master Plan and Action Plan studies in the Data and Information Management Unit of DITS of MAFS, which are so useful for implementation of Master Plan.

(5) Assignment of DITS Staff for Data and Information Management Unit

The MAFS agreed to assign two staff as full-timers to the Data and Information Management Unit of DITS of MAFS.

(6) Kiswahili Version of Guidelines

The MAFS appreciated the preparation of the Kiswahili version of the Guidelines as mentioned in Inception Report 3, and suggested the Study Team to submit it in a form of draft, since the MAFS will arrange the official check by the authorized committee later.

(ANNEX II)

List of Participants

1. **Tanzanian Side**

(1) **Steering Committee Member**

(a)	Mr. M.A.Mudogo	Acting Permanent Secretary, MAFS
(b)	Mr. C.K.Chiza	DITS, MAFS
(c)	Mr. E.Maponde	POPP
(d)	Mr. Fabiani Mukome	MNRT
(e)	Mr. N.A. Ngwala	MEM
(f)	Mr. Mbogo Futakamba	DITS, MAFS
(g)	Mr. J.F.Kanyasi	PORALG
(h)	Dr. R.Mugodo	MOWLD
(i)	Mr.R.Materu	MLHS

(2) **MAFS Staff**

(a)	Mr. E.H. Masija	DITS, (RBMSHP), MAFS
(b)	Mr. G.M.Kalinga	DITS, MAFS
(c)	Mr. R.Temu	DITS (ASPS), MAFS
(d)	Mr. A.H. Simba	DITS (Chief counterpart), MAFS
(e)	Mr. L.A.G.Gallet	DITS, MAFS
(f)	Mr. E.W. Siyame	DITS (ZIU Mwanza), MAFS
(g)	Mr. R.Libuhi	DITS (ZIU Mtwara), MAFS
(h)	Mr. A. G Ruhangisa	DITS (ZIU Morogoro), MAFS
(i)	Mr. R.L. Daluti	DITS (ZIU Kilimanjaro), MAFS
(j)	Mr. P.F.Kweka	DITS (ZIU Mbeya), MAFS
(k)	Mr. J. Bayaga	DITS (ZIU Tabora), MAFS
(l)	Ms. R.A. Kweka	DITS (Counterpart), MAFS
(m)	Mr. R.Rushomesa	DITS (Counterpart), MAFS
(n)	Mr. S.P.Luswema	DITS (ZIU Morogoro), MAFS
(o)	Mr. Simkanga A.L	DITS, MAFS
(p)	Mr. D.B.Qawoga	DITS, MAFS
(r)	Mr. P.M.Mafuru	DITS (Counterpart), MAFS
(s)	Mr.A.D.Lwena	DITS, MAFS
(t)	Mr.Medadi	DITS, MAFS
(u)	Dr. J. Nozaka	DITS (Technical Services Advisor), MAFS

2. **JICA Tanzania Office**

(a)	Mr. Ezekiel Kiagho	JICA Tanzania staff

3. JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Dr. Shuichi Matushima	Staff
(c)	Mr. Hiroyasu Ohnuma	Staff
(d)	Mr.Jun Tsurui	Staff
(e)	Ms.Wakana Yamamoto	Staff

AT9 - 3

Attachment 10

Minutes of Meeting on Progress Report 3

MINUTES OF MEETING
ON
PROGRESS REPORT 3
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as the "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as the "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Progress Report 3 to the MAFS (hereinafter referred to as the "Report").

In connection with the Report, the Steering Committee Meeting was held on August 5, 2004 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Report, focusing on the objectives, procedure, and effect of Verification Study, and also recommendations obtained. This was followed by discussions on the contents of the Report among the Participants. As a result of the discussions, the contents of the Report were in principle accepted by the Steering Committee. The main issues raised and discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT10 - 1

Mr.M.A.Mudogo
Acting Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: August 6, 2004

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: August 6, 2004

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) Issues Raised and Replies

(a) Digital Maps for Irrigation GIS.

The source of data used to produce digital maps in the Irrigation GIS should be clarified.

(b) Acquisition of Water Right

The guidelines for irrigation scheme formulation for DADPs, should mention that District Offices should assist the irrigators' association in the acquisition of water right from the Ministry of Water and Livestock Development.

(c) Collection of Basic Data for Database System

DIMU of DITS, MAFS should collect the basic data from the District Offices and other agencies, to manage the database system substantially.

(d) Water Conflict

In the guidelines for irrigation scheme formulation for DADPs, the water conflict should be described as one of study items.

(e) Guidelines for Irrigation Schemes

They should be modified whenever necessary, because its utilization is a dynamic phenomenon and not static.

(f) Technology

It was raised that the existing local technology should not be ignored but should be blended with the new technology. This was replied by explaining that, whatever is being done is participatory, implying that, local technologies are explored prior to introducing the new ones.

(e) Conclusion

For the Verification Study Report, the conclusion should be written down exhaustively based on the study results at the completion of the report.

(2) The MAFS requested the JICA Study Team to mention the outline of Master Plan Study and Action Plan Study in the Verification Study Report, to understand the purpose of Verification Study and to establish continuity on this phased programme

(3) Further comments on the Report if any, will be sent to the Study Team by August 31, 2004, through DITS of MAFS.

(ANNEX II)

List of Participants

1. Tanzanian Side

(1) Steering Committee Member

(a)	Mr. M.A.Mudogo	Acting Permanent Secretary, MAFS
(b)	Mr. Mbogo Futakamba	Assistant Director, DITS, MAFS
(c)	Dr.R.J.Mngodo	Senior Hydrologist, MOWLD
(d)	Mr. R.Materu	Land Surveyor, MOL
(e)	Mr. G.Remmy	Economist, MOEM
(f)	Mr.F.Mukome	Senior Forest Officer, MNRT
(g)	Mr. K.F.Manyika	Senior Forest Officer, VPO-DOE

(2) MAFS Staff

(a)	Mr. A.H. Simba	DITS (Chief counterpart), MAFS
(b)	Ms. R.A. Kweka	DITS (Counterpart), MAFS
(c)	Mr. R.Rushomesa	DITS (Counterpart), MAFS
(d)	Mr. P.M.Mafuru	DITS (Counterpart), MAFS
(e)	Mr. A.D.Lwena	DITS (Counterpart), MAFS
(f)	Dr.M.N.W. Mnzava	DITS, MAFS
(g)	Mr.E.Mwaka	DITS, MAFS
(h)	Mr.Simukanga A.L.	DITS, MAFS
(i)	Mr.R.R.Komanga	DITS (Counterpart), MAFS
(j)	Dr. J. Nozaka	DITS (Technical Services Advisor), MAFS

2. JICA Tanzania Office

(a)	Mr. Ezekiel Kiagho	JICA Tanzania staff

3. JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Mr.Jun Tsurui	Staff
(c)	Ms.Wakana Yamamoto	Staff

AT10 - 2

Attachment 11

Minutes of Meeting on Draft Verification Study Report

MINUTES OF MEETING
ON
DRAFT VERIFICATION STUDY REPORT
FOR
THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE REPUBLIC OF TANZANIA

In accordance with the Scope of Work for the Study on the National Irrigation Master Plan in the United Republic of Tanzania (hereinafter referred to as the "NIMP"), signed between the Ministry of Agriculture and Food Security (hereinafter referred to as the "MAFS") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on April 10, 2001, the Study Team submitted thirty (30) copies of the Draft Verification Study Report (hereinafter referred to as the "Report") to the MAFS.

In connection with the Report, the Steering Committee Meeting was held on September 27, 2004 at the conference room of MAFS. In the meeting, the Study Team explained the contents of the Report, focusing on the activities and results of Verification Study, and also lessons learned obtained. This was followed by discussions on the contents of the Report among the Participants. As a result of the discussions, the contents of the Report were in principle accepted by the Steering Committee. The main issues raised and discussed among Participants and the list of Participants are shown in ANNEXES attached hereto.

AT11 - 1

Mr.Wilfred Ngirwa
Permanent Secretary
Ministry of Agriculture and Food Security
The United Republic of Tanzania
Date: September 28, 2004

Mr.Hitoshi Shimazaki
Leader
The Study Team
Date: September 28, 2004

Mr.Norio Kuniyasu
Leader
The JICA Monitoring Team for the Study
Date: September 28, 2004

(ANNEX I)

Main Issues Confirmed and Agreed at the Meeting

(1) Issues Raised and Replies

(a) Appropriate way to disseminate the guidelines to the districts

As far as experience of the Study Team is concerned, the more effective way to disseminate the guidelines, is through "on-the-job training". In the Verification Study, the mentioned approach brought about the significant effect to the district staff.

(b) Application of O & OD methodology

Application of O & OD methodology as a participatory approach is a government decision. Therefore, DADP guidelines should give more concrete description on how to apply it and how to arrange a budget.

(c) Accommodation of national policies into the guidelines

The guidelines aims to show the practical process of the irrigation scheme formulation by district staff. National policies should be thus discussed in the DADP guidelines.

(d) Involvement of private sectors

In order to promote the involvement of private sectors in irrigation development, a sound legal framework is a prerequisite for empowering farmers and the other private sectors to enable them to secure ownership and to take full responsibility for all decisions involved in development. Areas of involvement are mentioned in the Master Plan Report.

(e) How to harness the potential in irrigation?

For the irrigation potential to be well harnessed, different development approaches are to be considered taking into account the existing knowledge of beneficiaries on irrigation. For example, if the beneficiaries have less experience in irrigation, simple irrigation system should be applied. On the other hand, if the beneficiaries have ample experience in irrigation, the modernized irrigation system would be applicable. In this context, irrigation policy is indispensable for developing the potential effectively. In addition to the above considerations, effective use and conservation of water resources such as water harvesting, should be carefully considered with bearing an environmental concerns.

(f) Need of comprehensive study on water demand for irrigation

The database system is so useful for the establishment of water demand for irrigation. In this, quantification of water rights for all irrigation which is inputted in the database, should be undertaken. This should be coupled with projection of the future water demand.

(2) The MAFS requested the government of Japan to give kind consideration to the further assistances

which are mostly recommended in the Action Plan Study: These are :

(a) Promotion of Farmer Managed Irrigation Scheme Development

(b) Support on the Irrigation Scheme Formulation Process in DADP

(c) Strengthening of Irrigators Practical and Association

(d) Assistance to Lower Moshi Irrigation Project

(e) Support to Irrigation Research

(f) Capacity Building

Detailed explanation is shown in the attached paper.

(3) Further comments on the Report if any, will be sent to the JICA Tanzania Office by October 31, 2004, through DITS of MAFS.

AT11 - 2

(ANNEX II)

List of Participants

1. Tanzanian Side

(1) Steering Committee Member

(a) Mr. Wilfred Ngirwa	Permanent Secretary, MAFS
(b) Mr. Mbogo Futakamba	Assistant Director, DITS, MAFS
(c) Dr.R.J.Mngodo	Senior Hydrologist, MOWLD
(d) Mr. R.Materu	Land Surveyor, MOL
(e) Mr. J.R.Mboya	Economist, POC-PP
(f) Mr.P.Uwoya	System analyst, MOEM

(2) MAFS Staff

(a) Mr. A.H. Simba	DITS (Chief counterpart), MAFS
(b) Ms. R.A. Kweka	DITS (Counterpart), MAFS
(c) Mr. P.M.Mafuru	DITS (Counterpart), MAFS
(d) Mr.R.R.Komanga	DITS (Counterpart), MAFS
(e) Mr.G.M.Kalinga	PC-RBMSIIP, MAFS
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(g) Mr.J.R.L/Kayumbe	DITS, MAFS
(h) Mr.Simukanga A.L.	DITS, MAFS
(i) Mr.A.G.Ruhangisha	Morogoro ZIU, MAFS
(j) Mr.J.L.Bayaga.	Tabora ZIU, MAFS
(k) Mr.G.R.Moshi	Mwanza ZIU, MAFS
(l) Mr.S.P.Luswema	Manyara ZIU, MAFS
(m) Mr.R.Libuhi	Mtwara ZIU, MAFS
(n) Mr.J.B.Bunyinyiga	Mbeya ZIU, MAFS
(o) Mr. L.Gallet	DITS, MAFS
(p) Ms.Kikeke Hawa	DITS, MAFS
(q) Mr.H.Medadi	DITS, MAFS
(r) Dr. J. Nozaka	DITS (Technical Services Advisor), MAFS

2. JICA Monitoring Team

(a) Mr. Norio Kuniyasu	Leader
(b) Mr. Hiroaki Nakhori	Staff

3. JICA Tanzania Office

(a) Ms.Kaori Matsushita	JICA Tanzania staff
(b) Mr. Ezekiel Kiagho	JICA Tanzania staff

4. KATC

(a)	Mr. Mitsuhiko Ota	Leader

5. JICA Study Team

(a)	Mr. Hitoshi Shimazaki	Leader
(b)	Mr.Hiroyasu Ohnuma	Staff
(c)	Mr Jun Tsurui	Staff

AT11 - 3

AREA WHICH NEED TO BE ASSISTED IN VIEW OF THE STATUS OS THE NIMP

1. Promotion of Farmers Managed Irrigation Scheme Development.
   This could start with schemes identified in Action Plan phase. Funds needed to start rehabilitation work.

2. Support on the Irrigation Scheme Formulation Process in DADP.
   This will involve dissemination on the guidelines and training of the district and zonal staff for the effective use on the guidelines.

3. Strengthening of Irrigators Practical and Association.
   This will involve training farmers on Operation, Maintenance and Management of irrigation scheme.

4. Assistance to Lower Moshi Irrigation Project.
   This request is made in the understanding that already 3.71m^3/sec of water has been granted from Kikuletwa River. This discharge can be of a help to the Project than it is now, as the whole amount of water is utilized prior to reaching the project. So construction work on the canal conveyance system can help substantially.

5. Support to Irrigation Research.
   Assist in the establishment of Irrigation Research Centre, which will not undertake crop research only but also the infrastructural research too, hence coming with new innovations on irrigation structures which are being constructed in a number of irrigation schemes country wide.

6. Capacity Building.
   In this areas issues pertaining to training of technical personnel and availing working facilities could be one of the areas.

PERMANENT SECRETARY
MINISTRY OF AGRCULTURE AND FOOD SECURITY

Attachment 12

Detailed Explanation of Rectification Works

Detailed Explanation of Rectification Works

1. General

Based on the trial operation/use, the original system, manual and guidelines were rectified. Detailed explanation, such as findings and reasons for rectification, solutions, original functions/descriptions and rectified functions/descriptions are given hereunder:

2. Prototype Database and Information Systems

2.1 Prototype Irrigation Database

Rectification 1
Provide a function to monitor development status of irrigation schemes in various developmental stages.

Finding and reasons for rectification

A great deal of scheme data were collected during the quick site inspections in the Verification Study - 2 (Support for irrigation scheme formulation for DADP). They had not been utilized in the draft database because there had been no function for entering scheme information obtained through quick site inspections.

Solution

The database was improved to deal with scheme plans for all the developmental stages, such as village plans, plans for DADP, feasibility studies, detailed designs, status during construction, and status after completion.

Original function

The function provided by the database had been restricted to only the results of the inventory surveys and the results of preliminary planning for DADP.

Rectified function

The database can handle scheme information, not only for the DADP stage, but also for all the developmental stages.

Rectification 2
Provide a function to revise administrative bodies.

Finding and reasons for rectification

It was confirmed that administrative bodies often change in the country. As details regarding administrative bodies are key information to search certain scheme data, the database should always have the latest information on administrative bodies.

Solution

A function to revise administrative bodies was installed.

Original function

There was no function to update administrative bodies.

Rectified function

A function to revise administrative bodies is available.

Rectification 3
Provide passwords to avoid unauthorized operation.

Finding and reasons for rectification

During the training program, some of the DITS staff suggested that passwords should be provided in order that the data cannot be lost by strangers.

Solution

Passwords were provided for the first screen, so the database can be operated by nominated staff only.

Original function

Anyone could have operated the database and edited the data as well.

Rectified function

Passwords were provided to keep strangers away from the database.

2.2 Prototype Irrigation GIS

Rectification 1
Enable access to detailed information for each polygon.

Finding and reasons for rectification

Since only the code number is shown on the legend for the themes such as agro-ecological zone, land unit and soil type, it is useful to confirm the detailed information of each polygon instantly on screen. This function is quite helpful for irrigation scheme formulation because the characteristic of the area where the proposed scheme belongs can be confirmed instantly. This is also strengthening the **Basic Approach-1: Linkage with Guidelines and the Database System**.

Solution

All the detailed information useful to judge the characteristics of the polygon for agro-ecological zone, land unit and soil type was transferred from the data source to the theme table of the Irrigation GIS in order to make instant confirmation possible on the screen.

Original function

Some of the detailed information for each polygon for the agro-ecological zone, land unit and soil type were not included in the theme table. Such information therefore could not be seen on the screen.

Rectified function

All the detailed information for each polygon for agro-ecological zone, land unit and soil type can be seen on the screen instantly by simply clicking the identify button.

(6) Rectification of Draft Operation Manual

Rectification of the draft operation manual was made in parallel with the rectification of the database system based on the users' requests and comments. The following is a list of rectification works for the draft operation manual.

Rectification works for the draft operation manual (Irrigation Database)

(a) Reorganize structure of explanation to follow the operation order.

Rectification works for the draft operation manual (Irrigation GIS)

(a) Explain basic operation of GIS software (Arc View),
(b) Explain method to obtain area of polygon data,
(c) Explain insertion method for graticule to layout, and
(d) Explain useful functions such as "dissolve" and "clip".

Detail of the rectification works are shown below.

2.3 Draft Operation Manual (Irrigation Database)

Rectification 1
Reorganize structure of explanation to follow the operation order.

Finding and reasons for rectification

It was found that users of the operation manual tried to find the solution when they get stuck in the middle of operation. This means that it is easier for them to find the solution if the manual is prepared in the order of operation.

Solution

Structure of explanation should be reorganized to follow the operation order.

Original function

Explanation was done for each panel but it did not follow the operation order.

Rectified function

Structure of the operation manual was grouped by type of operation such as "data input", "data edition" and "data inquiry". For each operation, a way of handling the database was explained in order of operation in the rectified operation manual.

2.4 Draft Operation Manual (Irrigation GIS)

Rectification 1
Explain basic operation of GIS software (Arc View).

Finding and reasons for rectification

GIS software (Arc View) is not as common as compared to the word processing and the spreadsheet programs for ordinary computer users. Furthermore, the

number of the staff who have experience using GIS software was extremely limited according to the results of the questionnaire survey. It was therefore decided from the viewpoint of the **Basic Approach-3: Introduction of User-friendly Guidelines and Database System** to add an "Introduction and Basic Operation of GIS Software" at the beginning of the GIS part of the manual.

Solution

Introductory remarks, including the role and usefulness of GIS and the basic operation methods, were prepared and added in the new operation manual.

Original function

Introductory remarks and basic operation were not described in the draft operation manual.

Rectified function

Introductory remarks and basic operation were described in the first part of the rectified operation manual.

Rectification 2
Explain method to obtain area of polygon data.

Finding and reasons for rectification

It is useful to obtain the area of newly created polygon data in order to make a rough estimation of the size of the potential area and/or development area of an irrigation scheme under GIS analysis. This function is quite helpful for irrigation scheme formulation and is also strengthening the linkage with the guidelines and the database system (**Basic Approach-1: Linkage with Guidelines and Database System**).

Solution

A method for obtaining the area from the polygon data was prepared and added in the new operation manual.

Original function

Only the method of preparation for polygon data from the data set of locations for the perimeter of the target area was described in the draft operation manual.

Rectified function

A method for obtaining area from the polygon data was described in the rectified operation manual.

Rectification 3
Explain of the method for insertion of a graticule to the layout.

Finding and reasons for rectification

It is useful to insert a graticule in the layout of the newly created GIS map in order

to confirm the location visited using a GPS during the field survey. The map thus created is useful for the quick site inspection and field survey activities described in the guidelines for the irrigation scheme formulation. This is the point emphasized in the **Basic Approach-1: Linkage with Guidelines and Database System** of the Verification Study.

Solution

A method to insert graticules into the layout of the newly created maps was prepared and added in the new operation manual.

Original function

Only the preparation method for layout from the view data was described in the draft operation manual.

Rectified function

A graticule insertion method was described in the rectified operation manual.

Rectification 4
Explain useful functions such as "dissolve" and "clip".

Finding and reasons for rectification

In case of the modification of the administration boundaries, the functions such as "dissolve" and "clip" under the Geo-Processing operation should be applied. Those functions were not necessary for the routine operation of the Irrigation GIS and therefore were not introduced in the draft operation manual.

Solution

Since this function was useful, not only for the modification of boundaries, but also for many other operations, it was decided to introduce this function in the new operation manual.

Original function

The function of "clip" under the Geo-Processing operation was not introduced in the draft operation manual.

Rectified function

The methods to "dissolve features based on an attribute" and "clipping one theme based on another theme" were described in the rectified operation manual

3. Draft Guidelines

3.1 Addition of the Process

Rectification 1
Add a process for confirming District irrigation development priority.

Finding and reasons for rectification

Prior to the screening process of irrigation schemes, the district irrigation development priority should be clarified. This was because it was found that the

criteria and score for the screening process could not be determined without a clear development priority of the district.

Solution

The clause of "Confirmation of District Irrigation Development Priority" was added as Step-1 of the Guideline.

Original description

There was no step to confirm the district irrigation development priority in the draft guidelines.

Rectified description

"Confirmation of District Irrigation Development Priority" was added as Step-1 in the rectified guidelines.

Rectification 2
Add a process for listing all the irrigation schemes in the District including completed schemes.

Finding and reasons for rectification

All the existing irrigation schemes should be listed as baseline data for the future irrigation development in the district. Furthermore, all the data to be collected under the process of irrigation scheme formulation for DADP should be effectively utilized for the database system taking into consideration the **Basic Approach-1: Linkage with Guidelines and Database System**.

Solution

The preparation of the list of all irrigation schemes in the District together with the information such as developmental stage, currently irrigated area and the necessity of quick site inspections for each scheme was included under the process of Step-1.

Original description

- The process for listing all irrigation schemes in the District was not included in the draft guideline.
- According to the draft guideline, surveys will be carried out only for the schemes that need development with some required works.

Rectified description

- The process of listing all irrigation schemes in the district was included under the process of Step-1 in the rectified guideline.
- The list of all irrigation schemes in the new guideline includes even completed schemes that are important as baseline data for the database system.

Rectification 3
Explain necessity of preparatory works before the field survey.

Finding and reasons for rectification

There are various activities to be carried out in the office prior to the field survey including (i) confirmation of the role of each DPDT member, (ii) arrangement to inform the survey schedule to the village, (iii) familiarization with the natural conditions of the site through the materials provided and (iv) preparation of survey sheets and materials for mapping.

Solution

It was decided to extract all such activities as preparatory works and describe them at the beginning of the step for the field survey.

Original description

There was no description of the preparatory works for the field survey in the draft guidelines.

Rectified description

“Preparatory Works in the Office prior to the Field Survey” was added as (a) of Step-5 in the rectified guidelines.

Rectification 4
Introduce a process for village resource map preparation.

Finding and reasons for rectification

Preparation of the village resource map was found to be essential for the scheme formulation, since there is no other map available.

Solution

It was decided that the process of preparing the village resource map was to be described in the rectified guidelines.

Original description

The process for the preparation of the village resource map was not included in the draft guidelines.

Rectified description

Preparation of the village resource map was added as one of the steps for the field survey of selected irrigation schemes in the rectified guidelines.

Rectification 5
Add a process for reaching agreement on the proposed area.

Finding and reasons for rectification

It was found to be necessary that the villagers should agree on a certain area as the proposed area for the purpose of the irrigation scheme formulation and the area should be delineated on the village resource map.

Solution

Since this process was not included in the original guideline, it was decided to add

such a process in the new guideline. The process consists of (i) explanation of village resource map by the mapping group, (ii) confirmation of the potential area, (iii) selection of the proposed area and (iv) preparation of a document.

Original description

The process for reaching agreement on the proposed area for planning purposes was not described in the draft guidelines.

Rectified description

The process of reaching agreement on the proposed area was added as one of the activities of field survey in the rectified guidelines.

Rectification 6
Introduce a process for preparing a present situation map.

Finding and reasons for rectification

Preparation of a scaled topographic map using handheld GPS based on the village resource map was found to be essential for the scheme formulation. The scaled map was named a present situation map.

Solution

The new step to prepare the present situation map was added. All the detailed procedures, including measuring items, measuring points and also the method of plotting the coordinates on graph paper was described in the rectified guidelines.

Original description

No process for preparing the present situation map was included in the draft guidelines.

Rectified description

A process for preparing the present situation map was added as one of the activities of field survey in the rectified guidelines.

Rectification 7
Add procedures for identifying and designing district support programmes.

Finding and reasons for rectification

The programs to solve the common problems in the implementation of irrigation schemes were considered important during the process of the Verification Study. Other programs to strengthen the management of scheme implementation, to enhance the benefit of irrigation and to sustain the implemented irrigation were also felt necessary.

Solution

The necessary steps to identify the effective support programs through the process

of quick site inspections, field surveys and preliminary planning were described in the rectified guidelines. The necessary steps to design such support programs were also described.

Original description

- The identification and design of the support programs was not included in the draft guidelines.

Rectified description

- The process of identification and design of support programs was added in the rectified guidelines.

3.2 Improvement of the Process

Rectification 8
Improve the check list for the quick site inspections.

Finding and reasons for rectification

It was found by the district team that the check list in the original guideline was inconvenient for be use as a questionnaire for farmers. It was suggested that some of the questions were not clear as to whether they were asking for the present condition or the condition under the development plan. It was also suggested to add some questions that would provide important data as indicators of screening criteria.

Solution

The check list was rectified by dividing the questions mainly into the present conditions part and the village plan part and some questions useful for screening criteria were also added.

Original description

The check list for site inspections did not clearly explain what kinds of data were required.

Rectified description

A survey sheet for quick site inspections, which explains clearly about what kind of data are required, was provided.

Rectification 9
Introduce stage-wise flow into the screening.

Finding and reasons for rectification

It was observed that the screening procedure could effectively be carried out under three stages; the 1st stage to reject inappropriate schemes, the 2nd stage to prioritize according to the potential of the scheme and the 3rd stage to reconsider the particular circumstances. Furthermore, it was emphasized that the district

irrigation policy should be clarified prior to the screening process.

Solution

The process for the confirmation of district irrigation development priorities was added as already described in Rectification-1. The stage-wise screening flow was shown in the new guideline with necessary instructions.

Original description

Screening criteria without stages was provided.

Rectified description

Stage-wise screening flow was provided.

Rectification 10
Improve timing of data collection.

Finding and reasons for rectification

Since it was anticipated that it would take a long time to transport useful data from the Irrigation GIS, it was proposed to request such data as soon as the screening report was assessed and endorsed.

Solution

A process to request the above-mentioned useful information for the field survey was added as one of the sub-steps in the step for assessment and endorsement by ZIU.

Original description

DPDT requests that useful data be sent from the Irrigation GIS when they start the field survey.

Rectified description

ZIU requests that useful data be sent from the Irrigation GIS on behalf of DPDT, as soon as assessment and endorsement was done.

Rectification 11
Rearrange work flow of the field survey according to the time table.

Finding and reasons for rectification

The draft guideline was edited in the order of subjects such as meteorology, hydrology, agriculture, and so on. It was, however, very inconvenient for the DPDT members to use at the site due to lack of sequential order.

Solution

It was thus decided to rearrange the guideline based on the activity in the time table such as interviews, map preparation, field inspection and so on.

Original description

The work of the field survey was explained according to the subject.

Rectified description

The work of the field survey was explained in the chronological order of required action.

Rectification 12
Explain the process of a water balance study in more detail.

Finding and reasons for rectification

It was found to be necessary to modify the process for water balance studies to suit rectified methods of the river discharge measurement and water requirement estimation. It was also identified that the DPDTs faced difficulty in determining the development area from the obtained irrigable areas in the dry and rainy seasons.

Solution

The calculation form for the water balance study to obtain irrigable areas in dry and rainy seasons using obtained river discharge data and estimated water requirements was improved and explained in detail. Furthermore, the method to determine the development area was also described.

Original description

- The DPDT was requested to conduct the water balance study without a detailed explanation.
- There was no description about how to determine the development area after getting irrigable areas in the dry and rainy seasons.

Rectified description

- The procedure for a water balance study using obtained data was explained in detail.
- The method to determine the development area was added in this step.

Rectification 13
Rearrange the method for scheme development planning considering the availability of topographic maps.

Finding and reasons for rectification

It was found to be difficult for DPDTs to prepare the scheme development plans and estimate the scheme development costs from the present situation maps.

Solution

The process of preparing the scheme development plans was explained in detail using figures. Then the DPDT was instructed to prepare the scheme development plan maps by plotting the location of weirs, main canals, proposed area and so on. The process of estimating scheme development costs was also rearranged to be based on the scheme development plan maps.

Original description

The method of preparing scheme development plans and scheme development

cost estimates was not explained in detail.

Rectified description

- The procedure for preparing scheme development plans was explained in detail.
- The process for preparing the scheme development plan maps was introduced.
- The method of estimating scheme development costs was rearranged to be based on the scheme development plan maps.

Rectification 14
Introduce detailed calculation methods and various indicators for the schemes' incremental benefit estimations

Finding and reasons for rectification

The scheme benefit was not appropriately estimated due to various reasons such as inaccurate data, inappropriate conversion of data and difficulty in estimation of cropped area. It was also not well understood by the DPDT that the cost and benefit analysis should be made based on the same area as where the investment was made and from which the benefit was derived. 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.

Solution

The survey sheet for the interview was modified in order to use the units that farmers were giving such as bags and acres instead of kg and hectares in order to avoid any confusion during the interviews. At the step of benefit estimation, the equation for the conversion into kg and hectares was clearly shown. The emphasis was also given to clarify the development area from where the benefit is derived. As for the strategic crops and the target yields, some indicators were given as references.

Original description

- The method of calculation for the incremental benefit was not adequately shown in the draft guidelines.

Rectified description

- In addition to the calculation method for the incremental benefit, the equation for the conversion of the crop yield and the indicators for the estimation of the target yield of the strategic crops were described in the rectified guidelines.

3.3 Simplification of the Process

Rectification 15
Simplify the interview survey method for efficient data collection.

Finding and reasons for rectification

It was found necessary to prepare survey sheets for interviews by combining the check lists of different subjects such as agriculture, marketing and associations. It was also found necessary to simplify the survey sheet in order to perform the interview within a reasonable period of time.

Solution

In order to perform the interview survey efficiently, the survey sheets were combined and at the same time simplified by concentrating into focal points and by deleting the insignificant questions. These survey sheets were utilized for the actual field surveys in the pilot District. Comments and suggestions obtained from the District's staff were reflected for further modification of the survey sheets. This is an important point emphasized in the **Basic Approach-2: Participatory Approach to Guidelines and Database System Preparation**.

Original description

The check lists for interview surveys were scattered under the different subjects in the draft guidelines.

Rectified description

- The survey sheets for the interviews were prepared by combining and simplifying the scattered check lists in the draft guidelines.
- The survey sheets were further modified according to the comments and suggestions obtained through the trial use in the model districts.

Rectification 16
Simplify soil survey methods based on availability of equipment.

Finding and reasons for rectification

Regarding the measurement of soil properties, it was found that soil pH and fertility cannot be measured due to expiry of the soil test kit distributed by the extension department. The situation seemed similar in many districts.

Solution

It was decided to omit pH and fertility from the measurement items and the emphasis is given to the measurement of soil texture, because the soil texture is essential for the irrigation planning.

Original description

The DPDT was requested in the draft guidelines to survey soil texture, soil profile, soil pH, soil salinity and soil fertility on site.

Rectified description

The DPDT is requested to survey soil texture type of the dominant soil in the proposed area. In addition to that, notable soil characteristics on soil profile and soil salinity should also be noted, if there are any.

Rectification 17
Simplify river discharge measurement method based on the required data.

Finding and reasons for rectification

Regarding the measurement of the river discharge, it was found that the result of only the day of survey is not enough for the planning. It is necessary to estimate the discharge at the critical months in the dry and rainy seasons. Furthermore, periodical data are considered essential for the proper planning.

Solution

The method of estimation for the river discharge at the critical months in the dry and rainy seasons was added in the rectified guidelines. It was also decided to nominate a record keeper for the monthly measurement of the river discharge.

Original description

The measurement method for the river discharge on the day of the survey was simply described in the draft guidelines.

Rectified description

- A method for estimating river discharge at the critical months in the dry and rainy seasons was additionally explained in the rectified guidelines.
- It was proposed to nominate a record keeper for the river discharge in the rectified guidelines.

Rectification 18
Simplify the water requirement estimation method considering availability of the data.

Finding and reasons for rectification

It was found to be difficult for the district staff to collect meteorological data, which is essential to estimate irrigation water requirements within the working period for DADP preparation.

Solution

It was not necessary to calculate water requirements very accurately in the irrigation scheme formulation stage. Considering this situation, the standard water requirements for (i) paddy, (ii) maize, and (iii) vegetables in each region was calculated and presented in the guideline. Users of the guideline can obtain the water requirements by making copies of the calculated values.

Original description

- The DPDT was requested to collect meteorological data from relevant agencies.
- The DPDT was instructed to calculate irrigation water requirements using the collected meteorological data.

Rectified description

Standard values of irrigation water requirements are presented in the rectified guideline, so the DPDT can easily obtain calculated values.

Rectification 19
Simplify a procedure for environmental considerations considering the requirements in the scheme formulation stage.

Finding and reasons for rectification

Under the article of the environmental considerations in the draft guidelines, there were various unnecessary descriptions that were not directly related to the irrigation scheme formulation at the stage of DADPs.

Solution

The detailed information on the preliminary environmental assessment and the environmental impact assessment that might be needed in the later stage of the Verification Study was eliminated. Only the items needed to be examined at this stage were kept in the rectified guidelines.

Original description

- A full description, including the preliminary environmental assessment and the environmental impact assessment, was given in the draft guidelines.

Rectified description

- Only the clauses related to the confirmation of the necessity of the environmental impact assessment and the treatment for the schemes in the protected area were kept in the rectified guidelines.

3.4 Improvement of the Process

Rectification 20
Provide terminology for the guidelines in order to avoid confusion.

Finding and reasons for rectification

Since there are two different types of site inspection activities for all the schemes and selected schemes, proper terminology was needed to distinguish them. Furthermore, there are many types of areas, such as potential area, proposed area, development area and others. There was a lot of confusion in using those terms.

Solution

The terminology with the definition of each term was prepared and added in the beginning of the guidelines.

Original description

- No names for two different site inspection activities.
- No definition for various areas.

Rectified description

- Names for two different site inspection activities (quick site inspections and

field surveys) were shown in the terminology.
- Meanings of various areas such as potential area, proposed area, and development area were explained in the terminology.

Rectification 21
Explain effective use of the database system.

Finding and reasons for rectification

It was found very difficult for the district staff to collect useful data within the working period for DADP planning.

Solution

Available useful data stored in the database system was clearly explained to the users, so that they could easily approach the database system.

Original description

Available useful data related to irrigation scheme formulation was not clearly explained.

Rectified description

Available useful data related to irrigation scheme formulation was clearly explained.