No.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF AGRICULTURE AND FOOD SECURITY (MAFS)

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

VERIFICATION STUDY REPORT

VOLUME-II: APPENDIXES

DECEMBER 2004

NIPPON KOEI CO., LTD.
NIPPON GIKEN INC.

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Appendix A

Record of Training on
Simple Database and Information System
(VS-1)

THE STUDY
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APPENDIX A

RECORD OF TRAINING ON
SIMPLE DATABASE AND INFORMATION SYSTEM
(VS-1)

Table of Contents

Chapter 1

Introduction

CHAPTER 1 INTRODUCTION

This "Appendix A: RECORD OF TRAINING ON SIMPLE DATABASE AND INFORMATION SYSTEM" presents the record of the training carried out for the "Establishment of Simple Database and Information System (Verification Study - 1)".

Chapter 2 presents the record of training made for the Data and Information Management Unit (DIMU) of Division of Irrigation and Technical Services (DITS). The training was basically conducted in accordance with the exercises given by the Training Kit, which was specially prepared for the training. In the Training Kit, exercises were divided into nine sessions (see table below) and the chapter 2 was described by the session. The description for each session is basically composed of (i) outline of the session, (ii) attendance list, (iii) record of discussion, (iv) findings, (v) photos, (vi) summary of result of the questionnaire, and (vii) others.

Chapter 3 presents the above-mentioned Training Kit. The Training Kit was so designed as to simulate the various situations that may happen in the future. It can also be used for the training on the database system operation to the ZIU staff when the database system needs to be used in the ZIU in future.

Session No.	Exercises
Session I	Kickoff Seminar
Session II	Exercise-01(1) Basic operation of GIS (ArcView)
Session III	Exercise-01(2) Basic operation of database (Microsoft Access)
Session IV	Exercise-02 Before starting irrigation scheme formulation - Supplying data to districts -
Session V	Exercise-03 After completion of irrigation scheme formulation (1) - Entering planning results into the database – Exercise-04 After completion of irrigation scheme formulation (2) - Plotting scheme locations on the GIS -
Session VI	Exercise-05 Upon the data remittance requests - Supplying planning results to DITS – Exercise-06 Maintenance of the system - Revising administration bodies –
Session VII	Exercise-07 Commencement of actual operation
Session VIII	Exercise-08 Trial operation of the database and GIS
Session IX	Exercise-09 Proposal on database system utilization - Wrap-up Presentation to DITS -

Chapter 2

Record of Training on
Simple Database and Information System

Session I

Kickoff Seminar for
Simple Database and Information System

Activities Carried out:

Prior to starting the training program, Kickoff Seminar was held to familiarize the established prototype database and information system at the DITS to staff of DIMU, DITS and ZIUs. The JICA Study Team explained the basic concept of the database system and gave a brief demonstration. In the afternoon session, participants discussed the role of respective organizations and the way of data transmission from districts or ZIUs to the DIMU.

List of Records:

1. Outline of Kickoff Seminar
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Kickoff Seminar

Program

Date: Mar 2, 2004

Place: Department of Irrigation and Technical Services, MAFS

Facilitator: Mr. H. Shimazaki (Team Leader of the JICA Study Team)
Mr. H. Ohnuma (Irrigation GIS)
Mr. J. Tsurui (Irrigation Database)

Material: Operation Manual of Simple Database and Information System

Time	Title	Facilitator
Morning Session		
9:00-9:10	Filling the questionnaire	Mr. Tsurui
9:10-9:30	Objectives and concept of the "Simple Database and Information System"	Mr. Shimazaki
9:30-10:30	What can we get from the "Irrigation Database"? Explanation of functions of the database using the operation manual	Mr. Tsurui
10:30-11:30	How to operate the "Irrigation GIS"? Explanation of functions of the GIS using the operation manual	Mr. Ohnuma
Afternoon Session		
13:00-14:50	Free discussion - Training program - How to use the system - Role and responsibility of headquarters and zonal irrigation offices on data management	Mr. Ohnuma and Tsurui
15:00	Closing of the seminar	Mr. Ohnuma and Tsurui

2. Attendance List

Name	Organization
Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
Mr. Amandus David Lwena	DIMU of DITS, MAFS
Mr. Remigius Ignace Rushomesa	DITS, MAFS
Mr. Anthony K.Nyarubamba	DITS, MAFS
Mr. Lait A.Simukanga	DITS, MAFS
Mr. Hanisi Mebadi	DITS, MAFS
Mr. Libuhi Rajabu	ZIU(MTWARA)
Mr. Jeremiah L.M.Bayaga	ZIU (TABORA)
Mr. E.W.Siyame	ZIU (MWANZA)
Mr. P.F.Kweka	ZIU (MBEYA)
Mr. A.G.Ruhangisa	ZIU (MOROGORO)
Mr. L.Daluti	ZIU (KILIMANJARO)
Mr. Seth P.Luswema	ZIU (MOROGORO)
Mr. Hitoshi Shimazaki	JICS Study Team
Mr. Hiroyasu Ohnuma	JICA Study Team
Mr. Jun Tsurui	JICA Study Team
Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed at the meeting.

1. Training on operation of the database system for the ZIU was strongly requested by staff of the ZIU. It was concluded that the training for the ZIU should be made by headquarter.
2. It was suggested that role and responsibility of the central, zonal, and district offices on data management should be clarified through the Verification Study.
3. It was also suggested that data transmission method from district to the ZIU and from the ZIU to headquarter should be clarified through the Verification Study, and that e-mail should be utilized for data transmission between the ZIU and headquarter.

4. Photos

Demonstration of the Irrigation Database

Demonstration of the Irrigation GIS

5. Summary of Result of the Questionnaire

Question	Answer	
1. Experience in database and GIS		
Organization:	DIMU, DITS	2 persons
	DITS (other section)	5 persons
	Zonal Irrigation Unit	6 persons
Professional Experience:	More than 20 years	5 persons
	16-20 years	5 persons
	10-15 years	3 persons
Computer Experience:	More than 10 years	4 persons
	6-10 years	3 persons
	1-5 years	5 persons
	None	1 person
Experience in database	"Yes"	3 persons
	"No"	10 persons
-If "Yes", what kind of opportunity was it?	"In some training course"	3 persons
	"In some project"	1 person
Experience in GIS	"Yes"	2 persons
	"No"	11 persons
-If "Yes", what kind of opportunity was it?	"In some training course"	2 persons
	"In some project"	1 person
2. Impression about the seminar		
Subject contents:	"very satisfied"	11 persons
	"satisfied"	2 persons
Facilitator:	"very satisfied"	12 persons
	"satisfied"	1 person
Facilities:	"very satisfied"	8 persons
	"satisfied"	5 persons
Timetable:	"very satisfied"	5 persons
	"satisfied"	6 persons
	"regular"	1 person
Presentation and handout:	"very satisfied"	8 persons
	"satisfied"	3 persons
Relevance to your job:	"very effective"	12 persons
	"effective"	1 person
Did you get interested in the topics?	"got much interested"	11 persons
	"got interested"	1 person
Was the subject appropriate for your skill level?	"yes"	13 persons
Next action	"Operate the system by myself"	8 persons
	"Instruct someone to operate the system"	2 persons
	"Utilize the data stored in the system"	7 persons
Suggestion about next training programs	"Need more exercises"	8 persons
	"More practical training is needed"	3 persons
	"Next training should include zonal irrigation staff"	3 persons
Idea for utilizing the database system	"New database for irrigation staffing and equipment shall be provided"	
	"Assist districts in selecting irrigation schemes for implementation"	

Session II

Training on Database System
Exercise-01 (1)

Activities Carried out:

In this session, Exercise-01 (1): Basic Operation of GIS (ArcView) was performed. Before starting the session, as this was the first session in the training program, overall schedule was explained by the JICA Study Team. Following the explanation of the training schedule, role of the DITS, especially of the DIMU, concerning the database system was confirmed among the participants. Then, the JICA Study Team explained basic operation of GIS: “Add and arrange theme”, “Open and close theme table”, “Create project”, etc. Those explanations were made based on the training kit for Exercise-01(1).

List of Records:

1. Outline of Exercise -01(1)
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Exercise-01 (1)

Program
Date: May 18, 2004
Place: Database and Information Management Room, MAFS
Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Mr. J. Tsurui (Irrigation Database)
Ms. W Yamamoto (Irrigation Database)
Material: Operation Manual of Simple Database and Information System
Training Kit for Exercise-01 (1)

Time	Title	Facilitator
11:00-11:30	Brief explanation of objectives and overall schedule of the training	Mr. Ohnuma Mr. Tsurui
11:30-12:00	Exercise-01 (1) Basic operation of GIS (ArcView)	Mr. Ohnuma
12:00-12:10	Filling the questionnaire on the session	

2. Attendance List

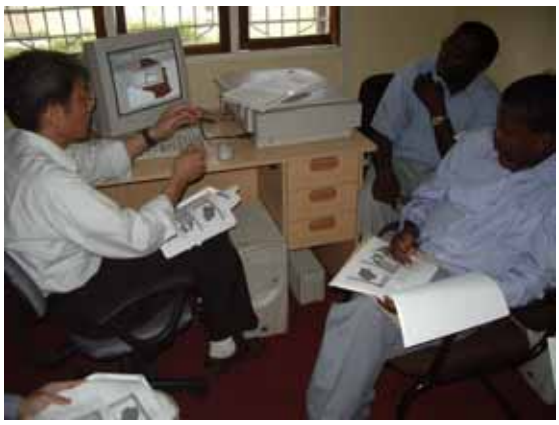
Name	Organization
Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
Mr. Amandus David Lwena	DIMU of DITS, MAFS
Mr. Remigius Ignace Rushomesa	DITS, MAFS
Mr. Fares E.Mahuha	Land Use Planning, MAFS
Mr. Hiroyasu Ohnuma	JICA Study Team
Mr. Jun Tsurui	JICA Study Team
Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed at the session.

1. It was suggested that introduction of GIS should be included in the training kit, since the trainee may not be familiar with the term “GIS”.
2. It was confirmed by all the participants that the training could be carried out by use of the Training Kit.
3. It was suggested that information on rainfed area should be connected with the Irrigation GIS in future.
4. It was agreed that the database system should be expanded to zonal and district level in future by initiative of the DIMU of DITS.
5. It was agreed by all the participants that communication with the related organization (such as soil conservation and land use planning section and department of research and development) is very effective.
6. It was confirmed that establishment of data management system (procedure) is one of the most important roles of the DIMU.

4. Photos



A member of the JICA Study Team is explaining the basic operation of GIS.

5. Summary of Result of the Questionnaire

Question	Answer	
Subject contents:	"very satisfied"	3 persons
	"satisfied"	1 person
Facilitator:	"very satisfied"	4 persons
Facilities:	"very satisfied"	1 person
	"satisfied"	3 persons
Timetable:	"very satisfied"	1 person
	"satisfied"	2 persons
	"regular"	1 person
Presentation and handout:	"very satisfied"	2 persons
	"satisfied"	2 persons
Did you get interested in the topics?	"got much interested"	4 persons
Important topic -Keyword and why?-	"Basic Operation of GIS" It provides basis to beginners. "Overlaying of different element e.g. soil, region boundaries and national parks" Interested to my field, especially when locating irrigation schemes in relation to sensitive areas. "Project" I used to apply the name without understanding the real meaning, implication to GIS.	
Evaluation about your work	"very satisfactory"	2 persons
	"satisfactory"	2 persons
Suggestions and comments	"Introductory chapter is needed." "More exercise is needed." "More space for the seminar room is needed"	

Session III

Training on Database System
Exercise-01(2)

Activities Carried out:

In this session, Exercise-01 (2): Basic Operation of Database (Microsoft Access) was carried out. The Training Kit for Exercise-01 (2) was utilized for the exercise. Basic operations such as “Open and quit the database” and “Operate data input panels” were explained by the JICA Study Team and the participants fully understood them.

List of Records:

1. Outline of Exercise-01 (2)
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Exercise-01 (2)

Program
Date: May 27, 2004
Place: Database and Information Management Room, MAFS
Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Ms. W Yamamoto (Irrigation Database)
Material: Operation Manual of Simple Database and Information System
Training Kit for Exercise-01 (2)

Time	Title	Facilitator
13:00-13:10	Review of last exercise	Mr. Ohnuma
13:10-13:50	Exercise-01 (2)	Ms. Yamamoto
	Basic operation of Database (Microsoft Access)	
13:50-14:00	Filling the questionnaire on the session	

2. Attendance List

Name	Organization
Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
Mr. Amandus David Lwena	DIMU of DITS, MAFS
Mr. Remigius Ignace Rushomesa	DITS, MAFS
Mr. Lait A.Simukanga	DITS, MAFS
Mr. Hiroyasu Ohnuma	JICA Study Team
Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed and confirmed in the session.

1. Through the session, operation rules unique to Microsoft Access such as operation of data input panels were fully understood by the participants.
2. It was suggested by the staff of DITS that a password should be installed for the data input, since there is a possibility that data will be lost by unauthorized operation.

4. Photos

The participants are reviewing the last session.

5. Summary of Result of the Questionnaire

Question	Answer	
Subject contents:	"very satisfied"	1 person
	"satisfied"	2 person
Facilitator:	"very satisfied"	3 persons
Facilities:	"very satisfied"	2 persons
	"satisfied"	1 person
Timetable:	"satisfied"	3 persons
Presentation and handout:	"very satisfied"	2 persons
Did you get interested in the topics?	"got much interested"	2 persons
	"got interested"	1 person
Important topic -Keyword and why?-	"All topics" (2 persons) "(No word)" It is a very important planning and decision tool.	
Evaluation about your work	"very satisfactory"	2 persons
	"satisfactory"	1 person
Suggestions and comments	"Data fields of the database system should be added so as to store the many types of data." "Provision of a password on the data input panel is needed so that data is protected. The password contributes to restrict intentional or accidental data entry which could damage the data."	

Session IV

Training on Database System
Exercise-02

Activities Carried out:

In this session, training on Exercise-02: Before starting irrigation scheme formulation- supplying data to districts - was carried out. The Training Kit for Exercise-02 was utilized for the exercise. As presented in the Training Kit, the DIMU staffs were given the virtual situation as if they were requested to send useful information to district staffs for their scheme formulation. They tried to find out useful information for the district staffs and tried to retrieve the information from the database.

List of Records:

1. Outline of Exercise-02
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Exercise-02

Program

Date: June 1, 2004
Place: Database and Information Management Room, MAFS
Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Ms. W Yamamoto (Irrigation Database)
Material: Operation Manual of Simple Database and Information System
Training Kit for Exercise-02

Time	Title	Facilitator
13:00-13:10	Review of last exercise	Mr. Ohnuma Ms. Yamamoto
13:10-14:50	Exercise-02 Before starting irrigation scheme formulation -Supplying necessary data for scheme formulation from the database and GIS- ◇Situation 2-1 Request of data and information from the district office before starting irrigation scheme formulation ◇Situation 2-2 Output of required data ◇Situation 2-3 Supply of output data to the district office	
14:50-15:00	Filling the questionnaire on the session	

2. Attendance List

Name	Organization
Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
Mr. Amandus David Lwena	DIMU of DITS, MAFS
Mr. Remigius Ignace Rushomesa	DITS, MAFS
Mr. Fares E.Mahuha	Land Use Planning, MAFS
Mr. Hiroyasu Ohnuma	JICA Study Team
Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed and confirmed in the session.

1. It was suggested that data would be sent by fax or mail to district offices in general, but it could be sent by e-mail to some offices that have internet connection.

2. The participants understood what kind of data they can provide to district offices through the exercise.
3. All the participants learned how to retrieve data of a certain irrigation scheme from the Irrigation Database and GIS.

4. Photos

Participants are trying to retrieve data for scheme formulation by a district from the database system

5. Summary of Result of the Questionnaire

Question	Answer	
Subject contents:	"very satisfied"	3 persons
	"Satisfied"	1 person
Facilitator:	"very satisfied"	4 persons
Facilities:	"very satisfied"	3 persons
Timetable:	"very satisfied"	2 persons
	"Satisfied"	2 persons
Presentation and handout:	"very satisfied"	2 persons
	"Regular"	1 person
Did you get interested in the topics?	"got much interested"	4 persons
Important topic -Keyword and why?-	"Database and GIS" Those are very useful tool in decision making. "Accessing key data for use like "land cover" Because the key data such as "land cover" is useful in the field. "GIS" Because it is new to me.	
Evaluation about your work	"very satisfactory"	2 persons
	"satisfactory"	2 persons
Suggestions and comments	"This training is very important for irrigation development in Tanzania." "The training program is excellent up to this moment."	

Session V

Training on Database System
Exercise-03 and 04

Activities Carried out:

In this session, the training on Exercise-03: After completion of irrigation scheme formulation (1) -entering planning results into the database-, and Exercise-04: After completion of irrigation scheme formulation (2) - plotting scheme locations on the GIS- were carried out. The Training Kits for Exercise-03 and 04 were utilized for each exercise. Participants experienced the virtual situation as if they received results of scheme formulation from a district, inputted the scheme data into the Irrigation Database, and plotted its location on the Irrigation GIS.

List of Records:

1. Outline of Exercise-03 and 04
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Exercise-03 and 04

Program

Date: June 2, 2004

Place: Database and Information Management Room, MAFS

Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Mr. J. Tsurui (Irrigation Database)

Material: Operation Manual of Simple Database and Information System
Training Kit for Exercise-03 and 04

Time	Title	Facilitator
13:00-13:10	Review of last exercise	Mr. Ohnuma
13:10-14:50	Exercise-03 After completion of irrigation scheme formulation (1) - Data entry of scheme formulation result into the database ◇Situation 3-1 Supply of scheme formulation results from the district office ◇Situation 3-2, 3-3 Data entry into the database Exercise-04 After completion of irrigation scheme formulation (2) - Plotting the scheme location on the GIS ◇Situation 4-1 Input of GPS data of candidate scheme into GIS and confirm the scheme is not located in the protected area ◇Situation 4-2 Supply of the data obtained to the district office	Mr. Tsurui
14:50-15:00	Filling the questionnaire on the session	

2. Attendance List

Name	Organization
Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
Mr. Amandus David Lwena	DIMU of DITS, MAFS
Mr. Fares E. Mahuha	Land Use Planning, MAFS
Mr. Hiroyasu Ohnuma	JICA Study Team
Mr. Jun Tsurui	JICA Study Team
Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed at the session.

1. New function of the Irrigation Database, which is monitoring function of irrigation schemes, was explained by the JICA Study Team. It was confirmed by the participants that the new function can facilitate comprehensive monitoring of irrigation development in Tanzania.
2. It was strongly requested by the DIMU staff that more advanced training on database development should be held after the basic training session proposed by the JICA Study Team, since further enhancement of database function in future should be made by the DIMU staff.

4. Summary of Result of the Questionnaire

Question	Answer	
Subject contents:	"very satisfied"	2persons
	"satisfied"	1 person
Facilitator:	"very satisfied"	3 persons
Facilities:	"very satisfied"	2 person
	"regular"	1 person
Timetable:	"very satisfied"	1 person
	"satisfied"	2 persons
Presentation and handout:	"very satisfied"	1 person
	"satisfied"	1 person
Did you get interested in the topics?	"got much interested"	3 persons
Important topic -Keyword and why?-	"Data Input & convert to GIS format" Very useful in planning and decision making "Polygon of irrigation scheme" Locating an area under irrigation using computer is very important. "All of them" They are very important for my office works.	
Evaluation about your work	"very satisfactory"	2 persons
	"satisfactory"	1 person
Suggestions and comments	"This training is satisfied." "This training should be continued."	

Session VI

Training on Database System
Exercise-05 and 06

Activities Carried out:

In this session, training on Exercise-05: Upon the data remittance request -supplying planning results to DITS-, and Exercise-06: Maintenance of the system - revising administrative bodies - were carried out. The training kit for Exercise-05 and 06 were utilized for the each exercise. In the Exercise-05, participants experienced the virtual situation as if their boss asked them to submit the monitoring report. In the Exercise-06, another virtual situation that establishment of new district was given to the participants, so they had to re-arrange the administrative boundaries.

List of Records:

1. Outline of Exercise-05 and 06
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire

1. Outline of Exercise-05 and 06

Program

Date: June 4, 2004

Place: Database and Information Management Room, MAFS

Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Mr. J. Tsurui (Irrigation Database)
Ms. W. Yamamoto (Irrigation Database)

Material: Operation Manual of Simple Database and Information System
Training Kit for Exercise-05 and 06

Time	Title	Facilitator
13:00-13:10	Review of last exercise	Mr. Ohnuma
13:10-13:30	Discussion about actual operation and future programs	Mr. Ohnuma
	-actual operation of database and GIS	Mr. Tsurui
	-training to the staff of zonal irrigation unit	Ms. Yamamoto
	-advanced trainings	
13:30-14:50	Exercise-05	Mr. Ohnuma
	Upon the data remittance requests	Mr. Tsurui
	◇Situation 5-1	Ms. Yamamoto
	Request of information about a certain irrigation scheme and data for the annual report	
	◇Situation 5-2, 5-3	
	Prepare & consider information required in each case	
	Exercise-06	
	Upon the data remittance requests	
	◇Situation 6-1	
	Request for the reflection of the new administrative boundary	
	◇Situation 6-2	
	Modification of database and GIS according to the new administrative boundary	
14:50-15:00	Filling the questionnaire on the session	Ms. Yamamoto

2. Attendance List

Name	Organization
Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
Mr. Amandus David Lwena	DIMU of DITS, MAFS
Mr. Remigius Ignace Rushomesa	DITS, MAFS
Mr. Hiroyasu Ohnuma	JICA Study Team
Mr. Jun Tsurui	JICA Study Team
Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed at the session.

1. As this was the last session of simulation style trainings by using the Training Kit, further training plan was discussed by the DIMU staff and the members of the JICA Study Team. As a result, the DIMU staff agreed to try to operate the database system in the actual situation at first. Then they would try to explain the functions of the Irrigation Database and GIS to the staff of ZIU in some opportunities. Finally they might try to learn advanced skill as long as time permits.
2. It was tentatively decided by the DIMU staff that when they explain the functions to the staff of ZIU, general functions would be presented at first and detail operation would be explained to group by group.
3. It was also suggested by the DIMU that specific staff should be assigned for database and GIS operation in each ZIU to make sure that the database system would come into use.

4. Summary Result of the Questionnaire

Question	Answer	
Subject contents:	"very satisfied"	1 person
	"satisfied"	1 person
Facilitator:	"very satisfied"	1 person
	"satisfied"	1 person
Facilities:	"very satisfied"	1 person
	"satisfied"	1 person
Timetable:	"satisfied"	2 persons
Presentation and handout:	"very satisfied"	2 persons
Did you get interested in the topics?	"got much interested"	2 persons
Important topic -Keyword and why?-	"Database Management + GIS" "Link " Linking the Irrigation Database to the Irrigation GIS is very important for visualization of various subjects.	
Evaluation about your work	"very satisfactory"	1 person
	"satisfactory"	1 person
Suggestions and comments	"This training is satisfied" "No suggestions and comments for today's training"	

Session VII

Training on Database System
Exercise-07

Activities Carried out:

In this session, operation of the database system was commenced by the DIMU using actual data sent from the two model districts. The JICA Study Team gave instruction for starting actual operation, and the database system (hardware and software) were temporarily handed over to the DIMU.

List of Records:

1. Outline of Exercise-07
2. Attendance List
3. Record of Discussion
4. Handout for Exercise-07

1. Outline of Exercise-07

Program

Date: June 10, 2004

Place: Database and Information Management Room, MAFS

Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Mr. J. Tsurui (Irrigation Database)

Material: Handout

Time	Title	Facilitator
10:00-10:40	Exercise-07 Commencement of Actual Operation Explanation on how to commence actual operation of the system	Mr. Ohnuma Mr. Tsurui
10:40-11：00	Additional Explanation on Administrative Boundary Changing in GIS	Mr. Ohnuma

2. Attendance List

No.	Name	Organization
1	Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
2	Mr. Amandus David Lwena	DIMU of DITS, MAFS
3	Mr. Rodgers Ishengoma	Morogoro Zonal Irrigation Unit
4	Mr. Hiroyasu Ohnuma	JICA Study Team
5	Mr. Jun Tsurui	JICA Study Team

3. Record of Discussion

The following matters were discussed and confirmed in the session.

1. The database system was temporarily handed over to the DIMU to commence actual operation.
2. The DIMU staff agreed to start the actual operation based on the facilities and materials temporarily handed over from the JICA Study Team.

4. Handout for Exercise-07

Necessary works to commence actual operation of the system

1. Necessity of the Latest Data Management
   The system should always be operated with the latest data. It is necessary to operate the system in only one computer; otherwise it might be difficult to maintain it in the latest condition. It is also necessary to keep record of data entry and data revision on paper.
2. Necessity of Security Control
   The data stored in the system is very important for the country. It was agreed between the

DITS of MAFS and the JICA Study Team for NIMP that the dataset should be strictly controlled by responsible persons of the DIMU (Eng. January and Mr. Luena). Passwords to operate the Irrigation Database were given only to the DIMU by the JICA Study Team.

3. Necessity of Preparing Backup Dataset

   To avoid loss of the dataset, it is necessary to backup the dataset in external hard disk periodically. The dataset can be revived from the backup hard disk even the database computer is totally crushed.

4. Necessity of Controlling Received and Issued Correspondence Documents

   The database can store only the latest data. It means that non-latest data should be kept in files on paper basis and they should be retrieved upon the request. To provide non-latest data to a client, it is necessary to file received and issued correspondence documents in systematic way. The JICA Study Team proposes the following filing system.

Title of the File	Upper level	Middle level	Lower level
File 1 (Issued)	Zonal irrigation office	Region	District
File 2 (Received)	Zonal irrigation office	Region	District

5. Necessity of Use of Stabilizer

   To avoid electrical trouble of the database computer, it is necessary to use a stabilizer. The JICA Study Team temporarily handed over the computer with a stabilizer for the purpose of conduct training on Exercise-7.

6. Necessity of Preparing Annual Time Table of Operation

   Annual time table on database operation such as data input, report submission should be prepared by the DIMU.

List of Necessary Equipments for Actual Operation of the System

Date: Jun 10, 2004

(1) Database computer	1 no.
(2) Irrigation GIS	1 no.
(3) Irrigation Database	1 no.
(4) External hard disk for backup	1 no.
(5) Stabilizer	1 no.
(6) Sheet for recording latest data entry of revision	1 sheet
(7) Sheet for recording document correspondence	1 sheet
(8) Sheet for recording lending reference documents	1 sheet
(9) Ring files	3 nos.

Form for Data Entry and Revision

Date	Contents for Data Entry/Revision	Person in charge	Signature

Form for Document Correspondence

RECEIVED

Date	Corresponding Organization	Title of Document	Person in charge

Form for Document Correspondence

ISSUED

Date	Corresponding Organization	Title of the Document	Person in charge

Form for Lending Reference Documents

Date of Lending	No. of Document	Title	Borrower	Date of return

Session VIII

Training on Database System
Exercise-08

Activities Carried out:

In this session, training on Exercise-08: Trial operation of the database and GIS was carried out. Actual data on irrigation scheme formulation obtained through another component of the Verification Study, which was “Support on Irrigation Scheme Formulation for DADP”, were delivered to the DIMU staffs. They tried to enter them into the database system. The JICA Study Team checked the progress periodically and provided them with advice when requested.

List of Records:

1. Outline of Exercise-08
2. Attendance List

1. Outline of Exercise-08

Program

Date: June 10-July 21, 2004
Place: Database and Information Management Room, MAFS
Facilitator: Mr. H. Ohnuma (Irrigation GIS)
Mr. J. Tsurui (Irrigation Database)
Ms. W. Yamamoto (Irrigation Database)
Material: None

Time	Title	Facilitator
June 28	Exercise-08	Mr. Ohnuma
	Discussion about the progress in data input	Mr. Tsurui
	Additional explanation on changing administrative boundary in Irrigation Database	Ms. Yamamoto
July 8	Explanation on the operation of "Reference Document" and "Topographic Maps"	Ms. Yamamoto
	How to supply the data (document title and scanned maps) into the database	
July 13,14	Explanation on the operation of GIS	Mr. Ohnuma
	"Dissolve" and "clip" under the Geo-Processing operation	
July 15 – July 21	Trial operation of the database system	None

2. Attendance List

June 28

No.	Name	Organization
1	Mr. Amandus David Lwena	DIMU of DITS, MAFS
2	Mr. Hiroyasu Ohnuma	JICA Study Team
3	Mr. Jun Tsurui	JICA Study Team
4	Ms. Wakana Yamamoto	JICA Study Team

July 8

No.	Name	Organization
1	Mr. Amandus David Lwena	DITS, MAFS
2	Ms. Wakana Yamamoto	JICA Study Team

July 13 and 14

No.	Name	Organization
1	Mr. Amandus David Lwena	DITS, MAFS
2	Mr. Hiroyasu Ohnuma	JICA Study Team

Session IX

Training on Database System
Exercise-09

Activities Carried out:

In this session, training on Exercise-09: Proposal on database system utilization -Wrap-up Presentation to DITS- was carried out. It aimed to present the DIMU's achievement in the training to the DITS staff. It also aimed to inform the DITS staff that the database system was ready to be used. The DIMU staff demonstrated the function and available data of the database system.

At the end of the session, questionnaires were distributed to the DITS staff to grasp their impression on the DIMU presentation. At the same time, the DIMU staff evaluated effect of the training by themselves.

List of Records:

1. Outline of Exercise-09
2. Attendance List
3. Record of Discussion
4. Photos
5. Summary Result of the Questionnaire for the DITS staff
6. Questionnaire after All the Programmes for the DIMU (Team)
7. Questionnaire after All the Programmes for the DIMU (Individuals)

1. Outline of Exercise-09

Program

Date: July 22, 2004

Place: Meeting Room in Kilimo II, MAFS

Facilitator: Mr. H. Shimazaki (Team Leader)
Mr. J. Tsurui (Irrigation Database)
Ms. W. Yamamoto (Irrigation Database)

Material: Handout

Time	Title	Facilitator
13:30-13:35	Exercise-09 Explanation about today's session	Data and Information Management Unit, DITS
13:35-14:55	What can we get from the "Irrigation Database" and "Irrigation GIS"?	-do-
14:55-14:05	Explanation of linkage with VS-1:support on irrigation scheme formulation for DADPs	Mr.J. Tsurui
14:05-14:15	Discussion on the use of database system	Data and Information Management Unit, DITS
14:15-14:30	Filling the questionnaire	Ms.W. Yamamoto

2. Attendance List

No.	Name	Organization
1	Mr. January R.L.Kayumbe	DIMU of DITS, MAFS
2	Mr. Amandus David Lwena	DIMU of DITS, MAFS
3	Mr. A.H.Simba	DITS, MAFS
4	Ms. R.A.Kweka	DITS, MAFS
5	Mr. R.I.Rushomesa	DITS, MAFS
6	Mr. M.N.W.Mnzava	DITS, MAFS
7	Mr. Hitoshi Shimazaki	JICA Study Team
8	Mr. Jun Tsurui	JICA Study Team
9	Ms. Wakana Yamamoto	JICA Study Team

3. Record of Discussion

The following matters were discussed at the seminar.

1. Function of the database system and its available data were demonstrated by the DIMU to the DITS staff.
2. The DITS staff understood that scheme data which had not been inputted yet would be supplied through each ZIU with utilization of the guidelines.

4. Photos

The DIMU staff is demonstrating the function of the Irrigation GIS.

5. Summary of Result of the Questionnaire for DITS staff

Question	Answer	
Do you think that you can obtain useful information through Data and Information Management Unit?	"Yes, I think so."	5 persons
Do you think you want to use the data stored in the database system?	"Yes, I think so."	5 persons
In which situation do you want to utilize the data?	"For planning purpose" (2 persons) "For planning, operation, and management" "For development of other programs" "Dissemination of new information to farmers for possible yield improvement" "To expand irrigation"	
What did you think about the performance of the DIMU in the presentation?	"Very good" "Good"	4 persons 1 person
Comments to presentation of DIMU:	"Very good presentation done, however, information they have is very limited to few districts" "The unit need to be supported by DITS through provision of new state-of-the art PCs and transparent means. In addition, DITS should set aside a budget for the unit."	
Comments and suggestions:	"The information is good but planning and budgeting is needed so that more areas could be reached." "Training programme is required for the district people." "This is a good start. What we are going to do is to cover the remaining districts. Need of expanding database to be more responsive to emergent questions."	

6. Questionnaire after All the Programmes for the DIMU (Team)

Part I Information Management in the DITS before starting the training programme

(1) Was there any data management system to grasp existing irrigated area in the whole nation before starting the study on the National Irrigation Master Plan?

There was practical data management system through collection of hard copy of the printed documents. However, some digital information on irrigation development touching most of district existed. In addition, RBMSIIP database existed.

(2) Was there any on-going programme that is to establish monitoring system on irrigation development in DITS before starting the study on the National Irrigation Master Plan?

It was highlighted in the National Irrigation. Development plan of 1994. Also groundwork on Pangani and Rufiji River basins collected by RBMSIIP.

(3) How had you been exchanging information on irrigation development with local government?

Through fax and E-mail. Also through visits and support from Zonal Irrigation Offices.

(3) What were the major constraints in information management in DITS? Please write down three items in descending order from the severest one.

(1) Expert to establish Database.
(2) Knowledge on importance of Database.
(3) Limitation of fund.

Part II Data and information management system after completion of the programme

Consider the data and information management system established in this programme and answer to the following questions.

(1) Do you think there was some improvement in information management in DITS since the data and information management system had been established?

☒much better ☐better ☐no difference

(2) Please tell us what was improved and what was not improved by introducing the system?

(Improved)

Irrigation Database (Knowledge and Skills)
Irrigation GIS (Knowledge and Skills)

(Not improved)

Facilities like old computer are used to operate modern Database and GIS.

The unit should be well equipped with good machines to handle database and GIS which are helped to expand our time.

Transport is also important in order to be able to support zones and Districts.

Part III Simple database and information management system

Please answer to the following questions as the DIMU

(1) Do you think the programme "Irrigation database" and "Irrigation GIS" are essential for irrigation development monitoring in the DITS?

☒essential ☐not essential

(2) Do you think the operation manual for simple database and information management system is essential when you get stacked in operation?

☒essential ☐not essential

(3) Do you think you learned the skill necessary for the situations shown in the training kit?

☒ Yes, ☐No.

Comments and suggestions, if any

1) The established unit need to have moderns computer like Pentium IV version to operate system and it should be facilitated with transport motor vehicles for data collection, operation and management (General support to zones and districts).
2) Exchange of knowledge and skills with new developments and possibility to see how system is functioning in other parts of the world is required.
3) Techniques in how to cope with the changing dynamic environment is needed.

7. Questionnaire after All the Programmes for the DIMU (Individuals)

Part I Satisfaction at the training program	
Overall satisfaction to the training program	70% 1 person 95% 1 person
Part II Knowledge of irrigation database (Microsoft Access) and irrigation GIS (ArcView)	
(1) Skills for the operation	
-Irrigation database	"I learned the skill very well." 1 person "I learned some of the skills." 1 person
-Irrigation GIS	"I learned the skill very well." 1 person "I learned some of the skills." 1 person
(2) Is there any topic which you got more interested in during the exercise?	- Operation of GIS - All the topics
(3) Do you think your supervisor knows that you are dealing well with the data and information management system?	"Yes, I do." 1 person "He might not know." 1 person
(4) Do you think you want to improve the data and management system in case it's necessary?	"Yes, I want to." 2 persons
(5) Do you think you will try to ask the site office when you received information with some data missing?	"Yes, I will." 2 persons
Comments and suggestions:	"Need of supporting the unit with new facilities and transport to be able to support zones and districts and to respond to their needs." "Need of further training on GIS & Database management system."

Chapter 3

Training Kit for Simple Database and Information System

Excercise-01 (1)

Basic Operation of GIS (ArcView)

Exercise-01(1)

Basic Operation of GIS (ArcView)

Training schedule and its concept

1) Training Schedule

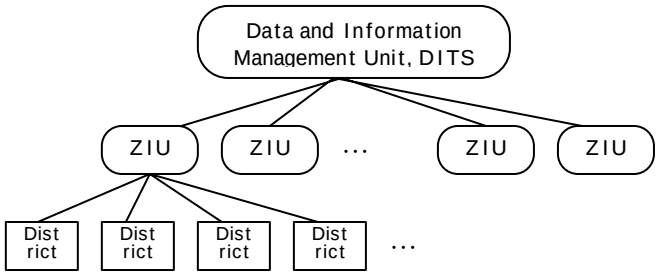
   Overall schedule is attached.

2) Concepts of the Training Program

   "Practice and utilize the database into the actual situation"

Staff in charge and their respective roles

- ✓ Data and Information Management Unit
- ✓ Zonal Irrigation Unit (ZIU)
- ✓ District offices



e.g. Role of staff of the Data and Information Management Unit

- ✓ To make effective use of information

  Operation and maintenance of the database on the computer

  Management of Information among zonal and district offices

- ✓ To support staff of the zonal irrigation units (ZIU) in operation and maintenance of the database, and management of information
- ✓ To expand or improve the function, if necessary

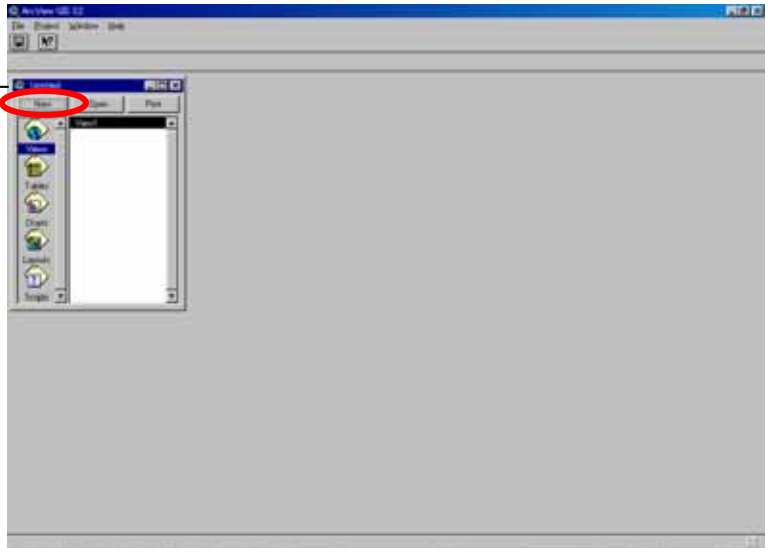
Basic operation of GIS (Arc View)

1) Add Theme to the View Screen

Add Theme

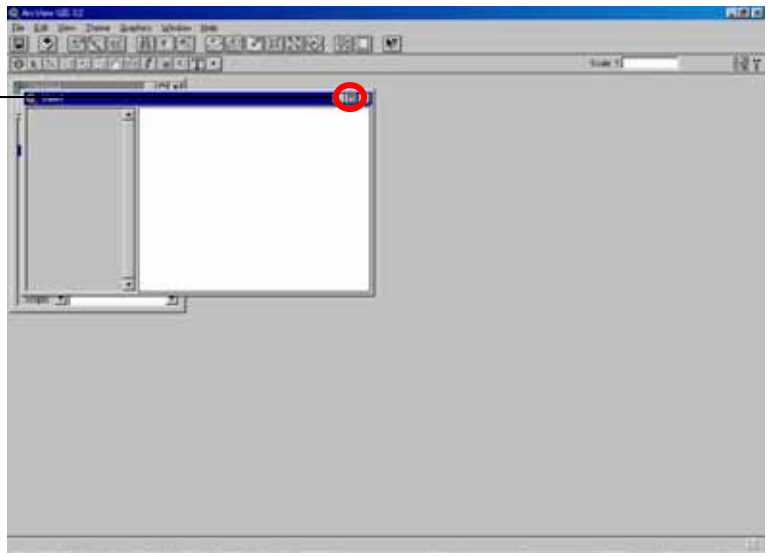
When the "theme" is added, Arc View accesses to the database and shows the "theme" on the view screen.

(1) Click "New" to open View Screen



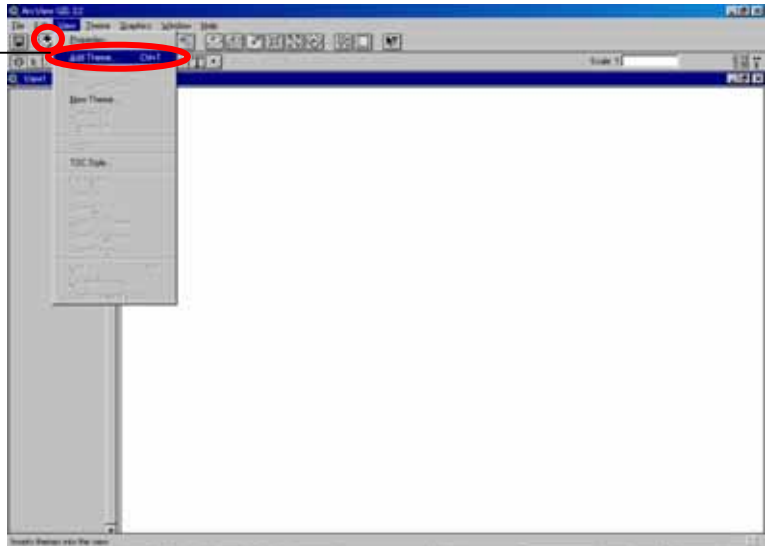
(2) View1 will be opened

(3) Click "Full Screen" button to enlarge View1



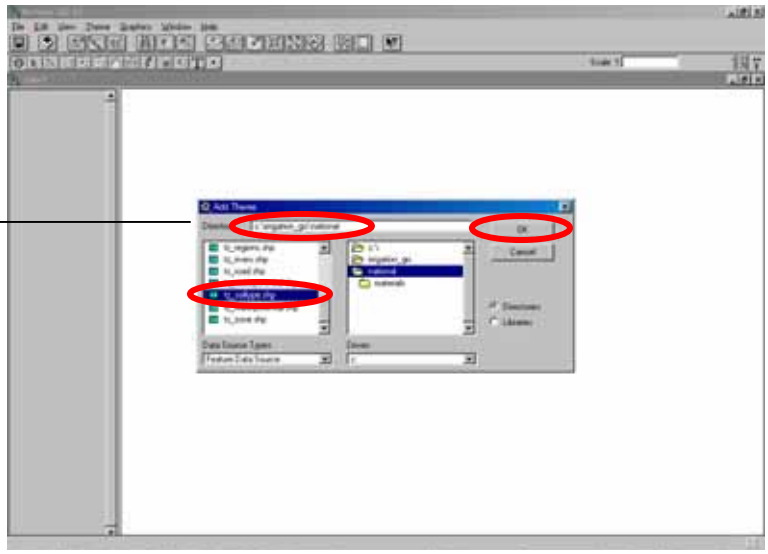
(4) View1 will be enlarged

(5) Click "+" button or select "Add Theme" from View Menu

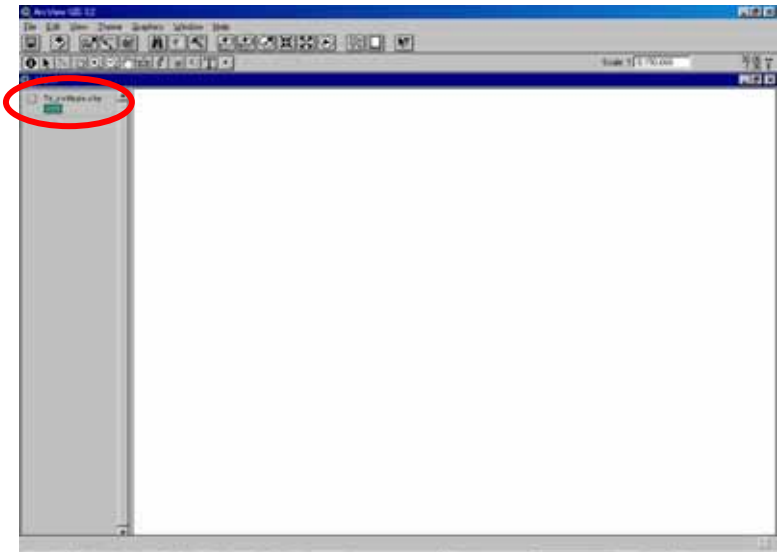


(6) Select target "Theme" from the directory where the shape files are stored

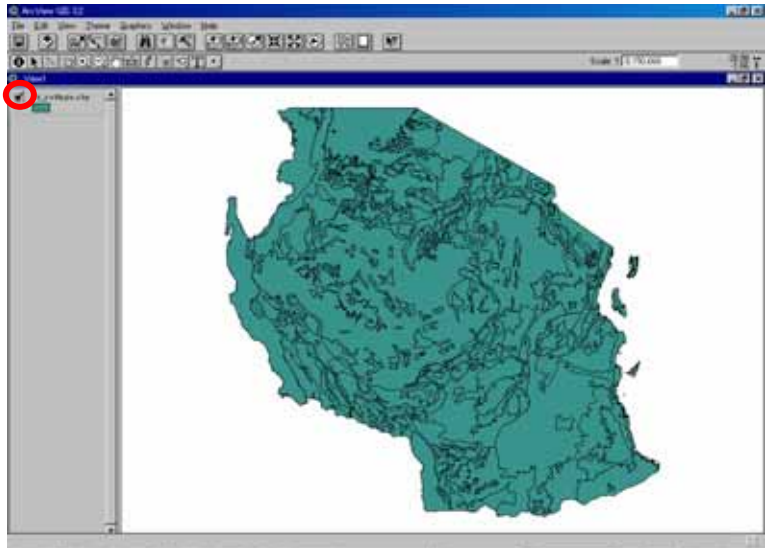
(7) When the target "Theme" is selected, click "OK"



(8) Confirm the target "Theme" is located at the legend position of the View Screen



(9) Click the check box of "Theme" to show the "Theme" on the View Screen



Utilization of readily available legend

For some themes such as land cover and soil type, the ready-made legend can be utilized as shown below.

(1) Double click "Theme" added (Tz_soiltype for example)

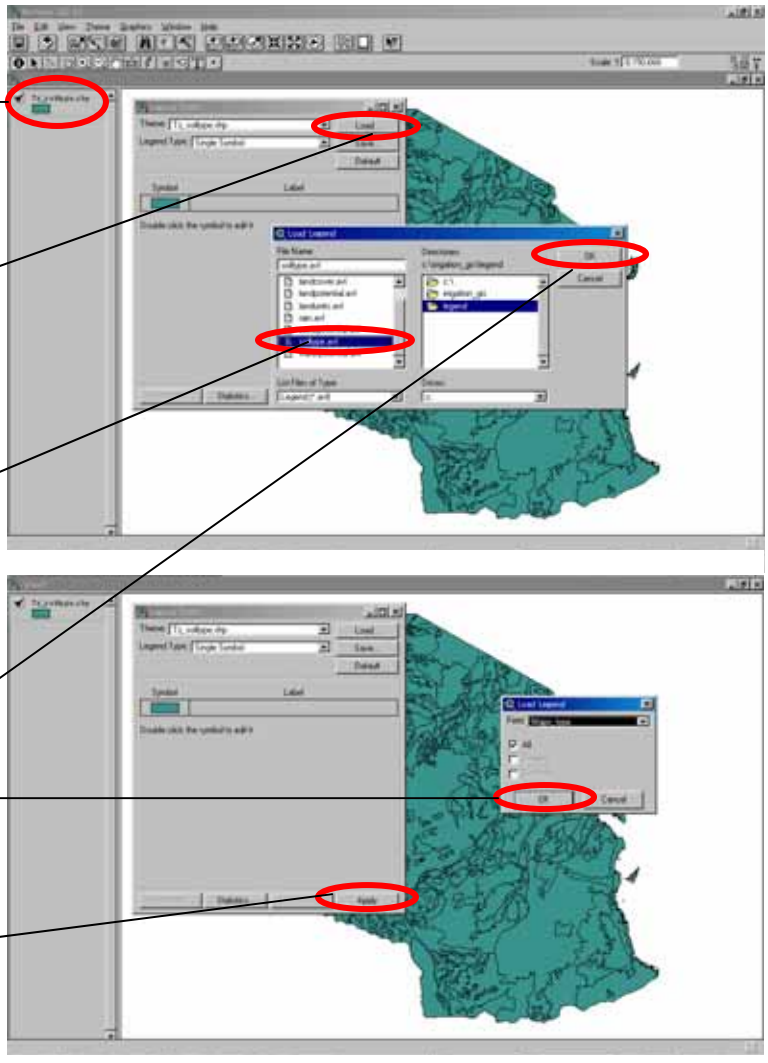
(2) Click "Load" in Legend Editor window

(3) Select "soiltype.avl" in Load Legend window

(4) Click "OK"

(5) Click "OK" in Load Legend window

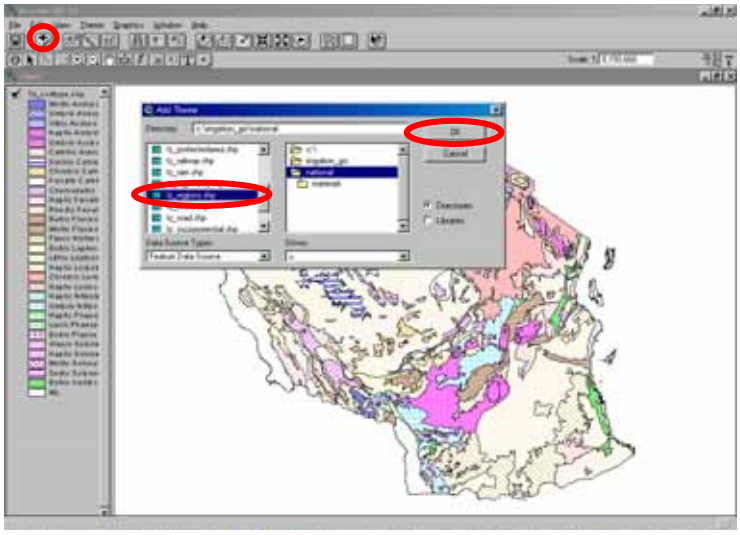
(6) Click "Apply" in Legend Editor window



Add Another "Theme"

In addition to Tz_soiltype.shp, Tz_regions.shp can be added to the same view screen in order to show the border of regions on the map of soil type.

(1) Tz_regions.shp will be added in the same manner mentioned above

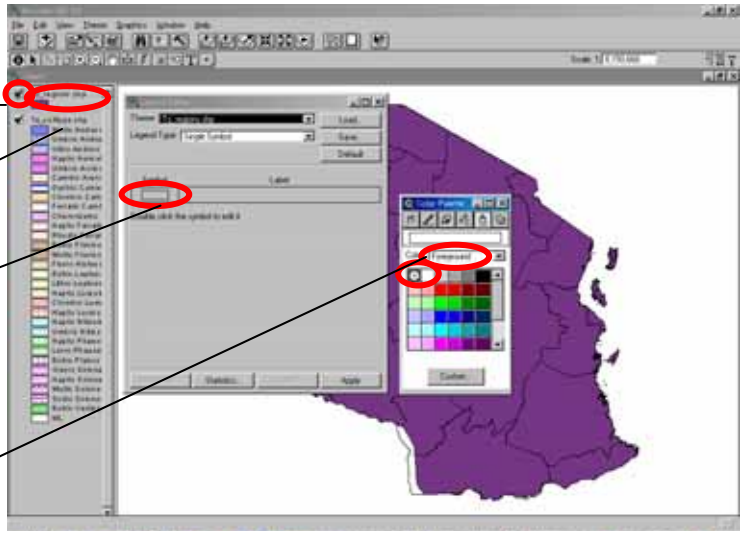


(2) Click the check box of "Theme" to show the "Theme" on the View Screen

(3) Double click "Theme" to get legend editor

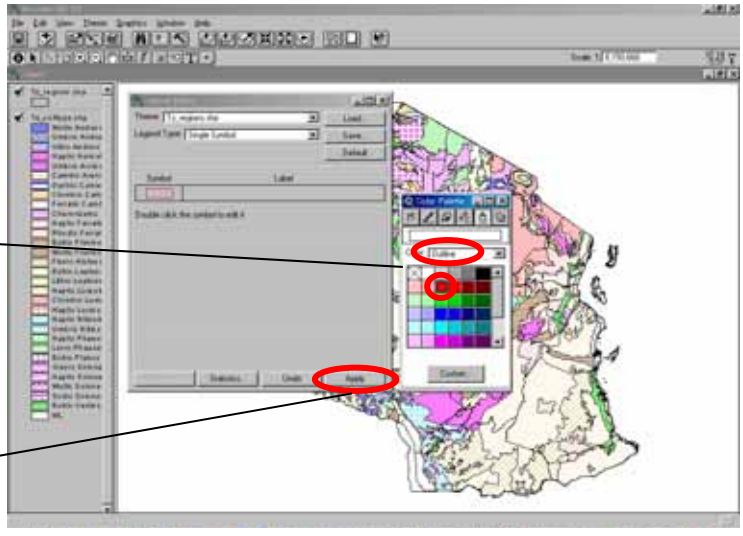
(4) Double click "Symbol" to edit legend

(5) Select "Foreground" and click white and X to show only border



(6) Select "Outline" and click red to show the border in red color

(7) Click "Apply" to show the result on screen

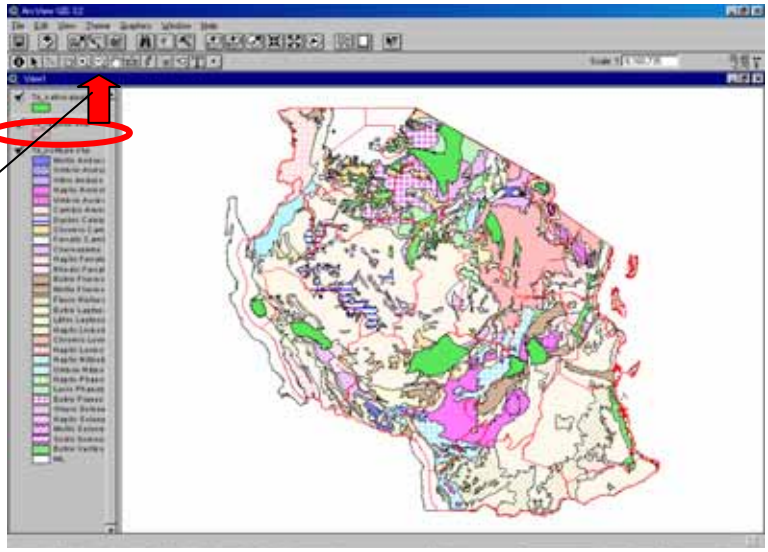


Arrangement of Themes

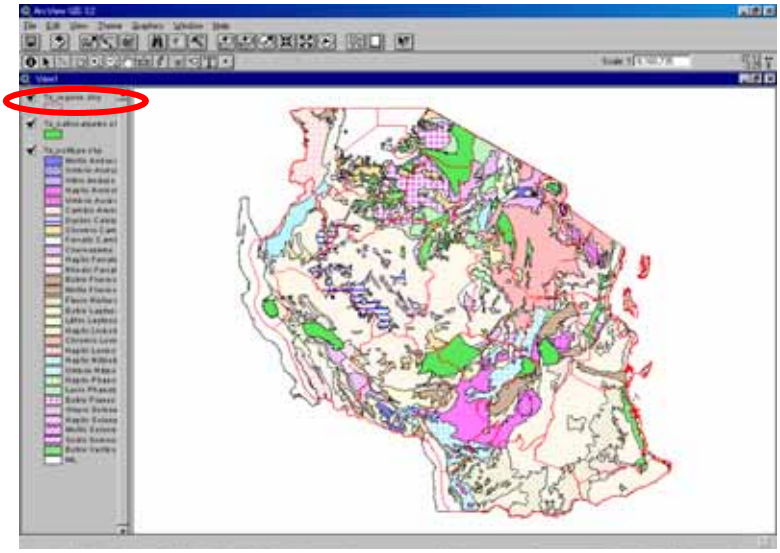
Add another theme of Tz_nationalparks.shp and arrange themes.

(1) National parks will be shown on the border

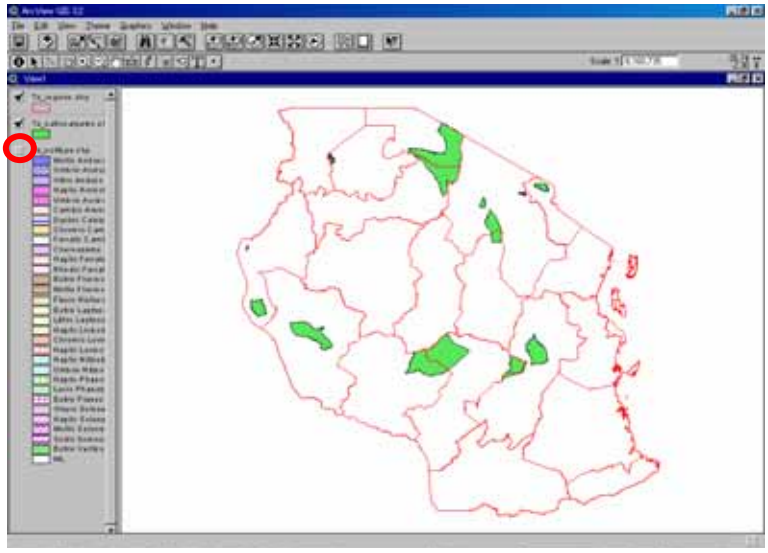
(2) In order to show the border on National parks, activate Tz_regions.shp and drag to the top of the list



(3) Border is shown on National Parks and National Parks are shown on Soil Types

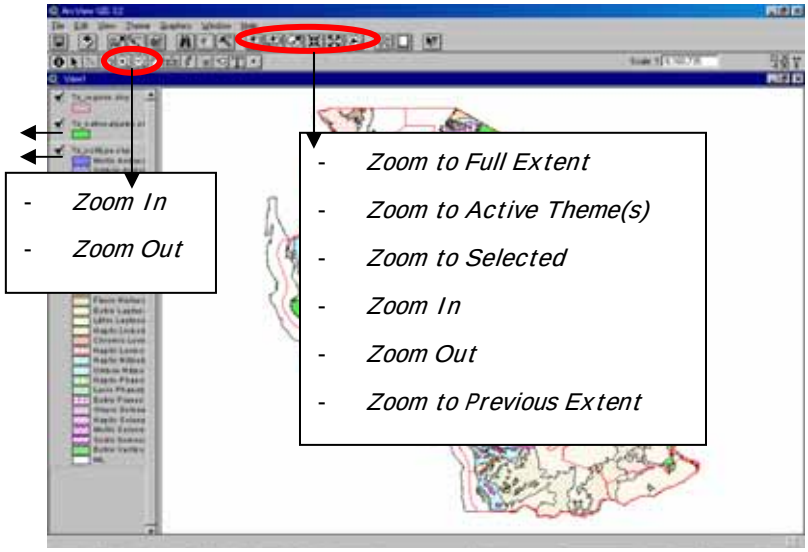


(4) Non-display can be arranged for unnecessary theme(s) by removing the check mark from check box

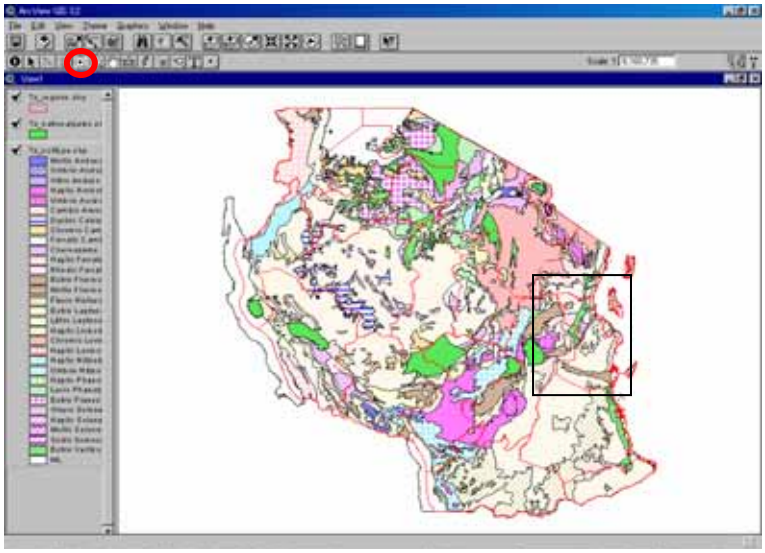


Other view controls such as zoom in and zoom out

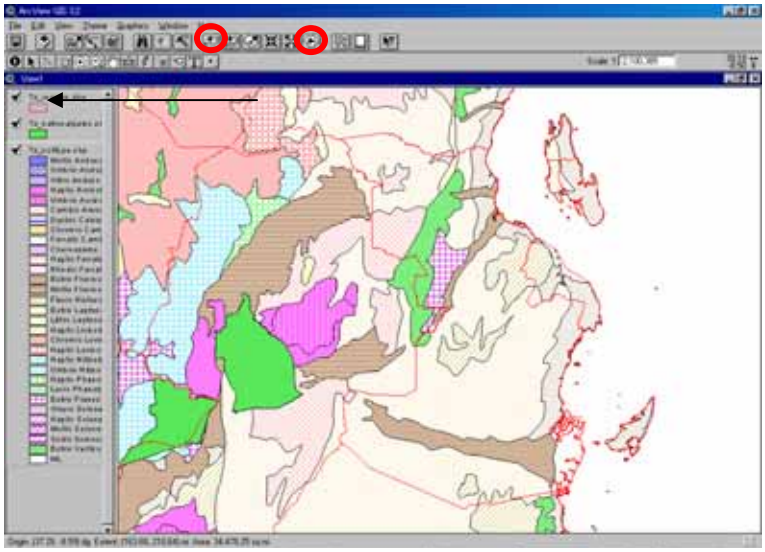
The following buttons can be used for zoom in, zoom out and other functions.



(1) Click "Zoom In" button and select the area to be enlarged for example Coast Region



(2) The selected area will be enlarged for example to show the details of Coast Region



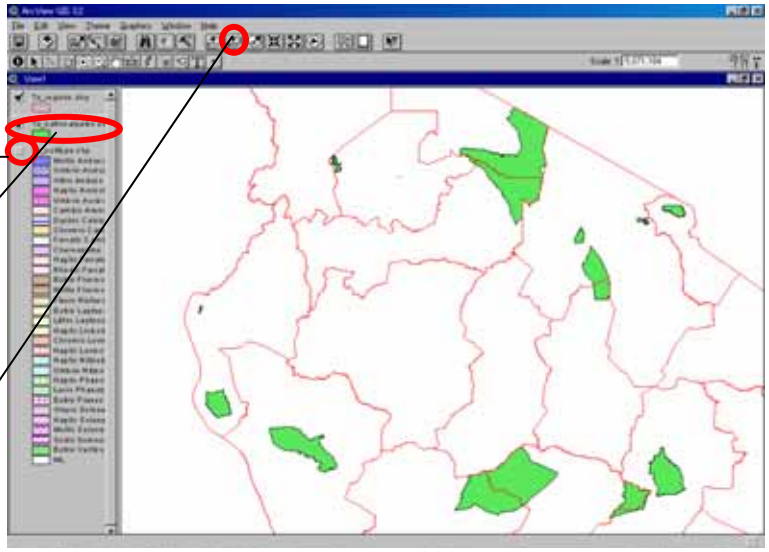
(3) Return to the previous extent by clicking "Zoom to Full Extent" or "Zoom to Previous Extent"

In order to show the distribution of national parks in different regions, the following arrangement can be carried out.

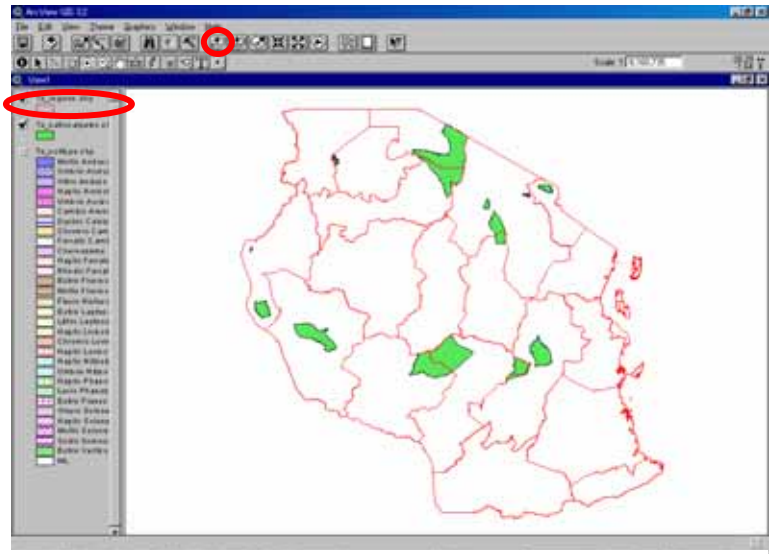
(1) Remove check mark from soil type

(2) Activate National Parks Theme

(3) Click "Zoom to Active Theme"



(4) Return to the previous extent by activating the regions theme and clicking "Zoom to Full Extent"



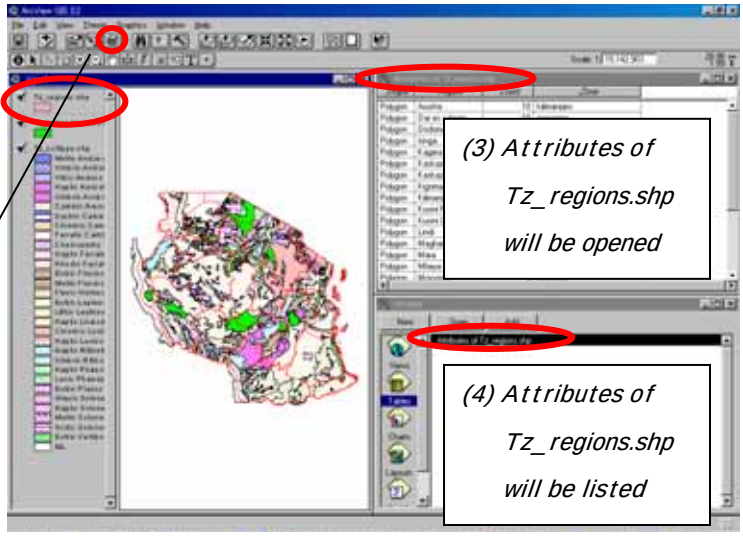
2) Theme Tables

Open Theme Table

Theme table can be shown on screen by clicking "Open Theme Table" button.

(1) Activate the theme for example Tz_regions.shp

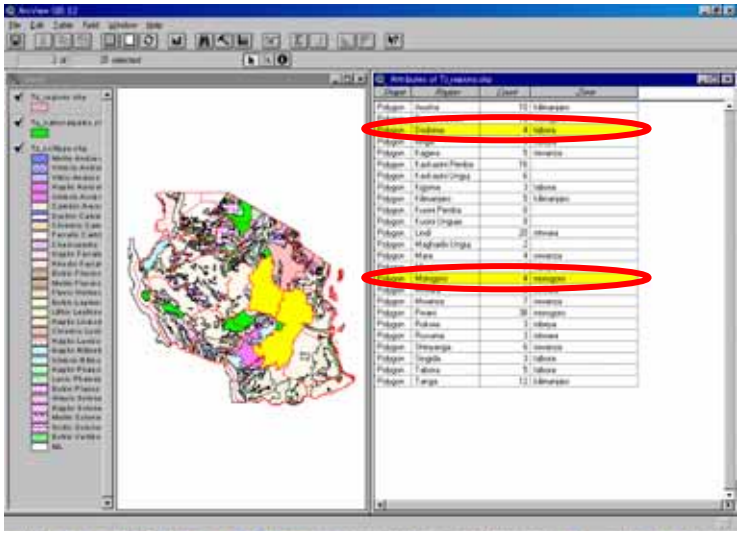
(2) Click "Open Theme Table" button



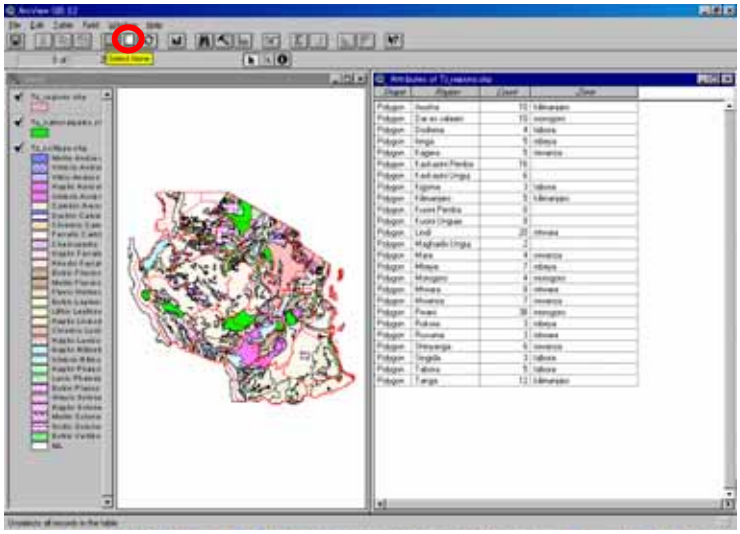
(5) Click any polygon in the table

(6) The selected polygon will be highlighted in the map

(7) More than one polygon can be selected with Shift Key

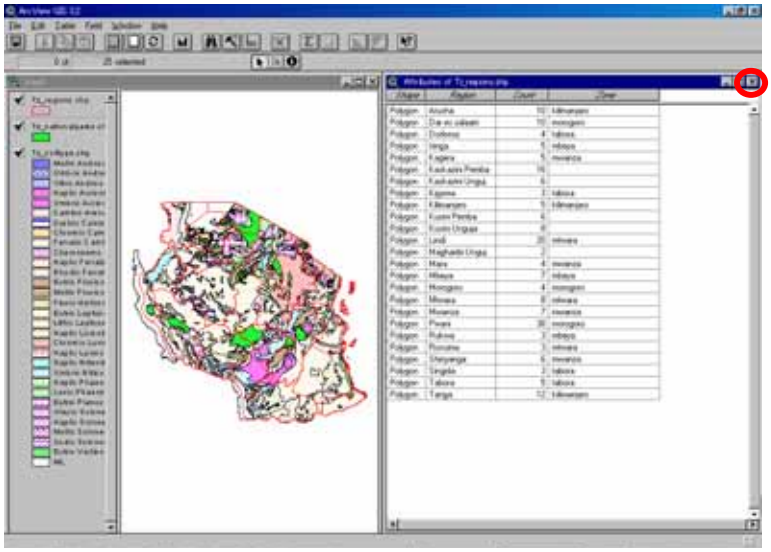


(8) Selected polygons can be cancelled by clicking "Select None" button



Close Theme Table

Theme table can be closed by clicking the close button of the table window.



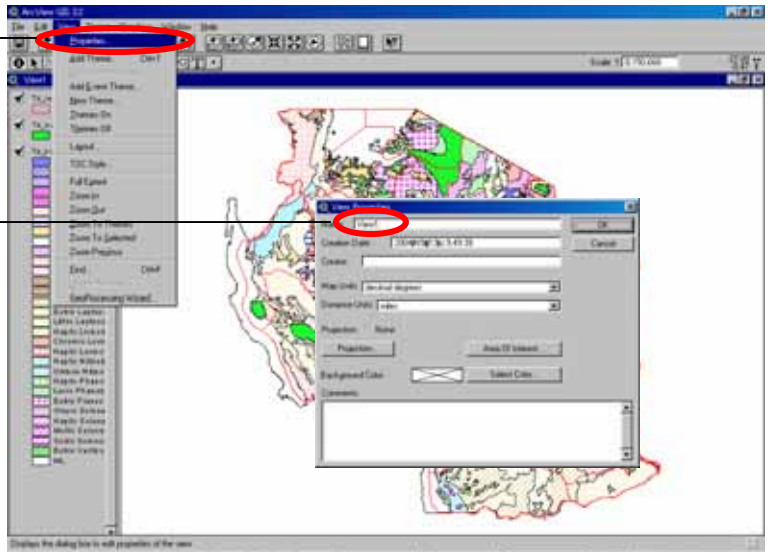
3) Project

Change View Name

View name can be changed from the temporary name of "View1".

(1) Select "Properties" from View Menu

(2) Type appropriate name instead of View1



(3) "Soil Type and National Parks" for example

Save Project

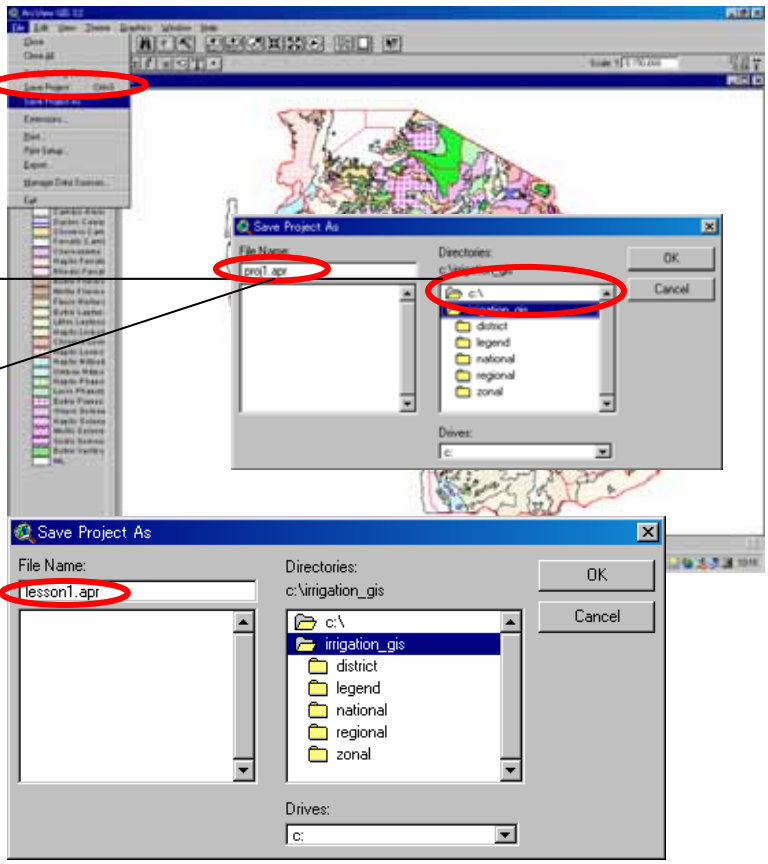
Created set of data can be stored as Project Files.

(1) Select "Save Project As" from File Menu

(2) Select suitable directories

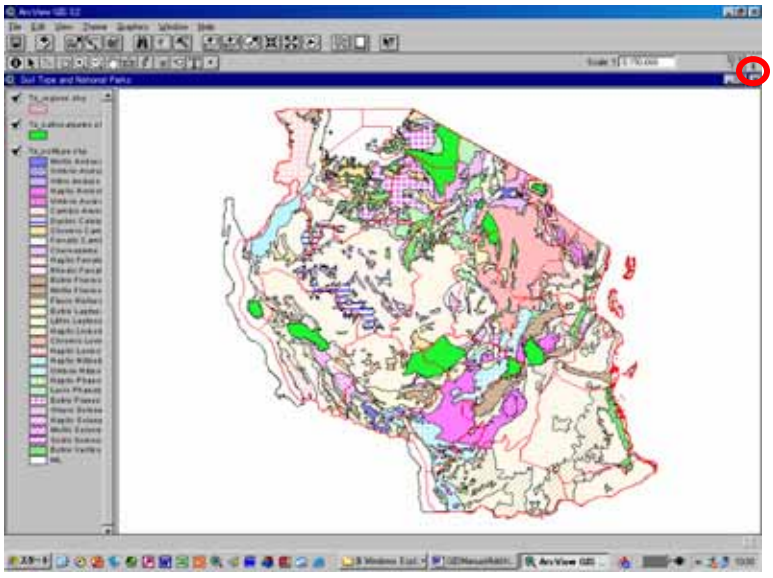
(3) Type appropriate name instead of Proj1

(4) " lesson1" for example



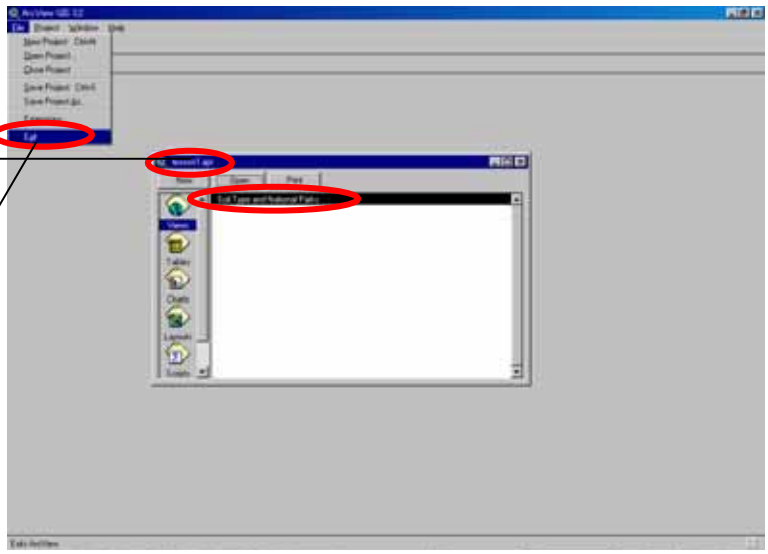
Close Project

(1) Close View by clicking close button of view

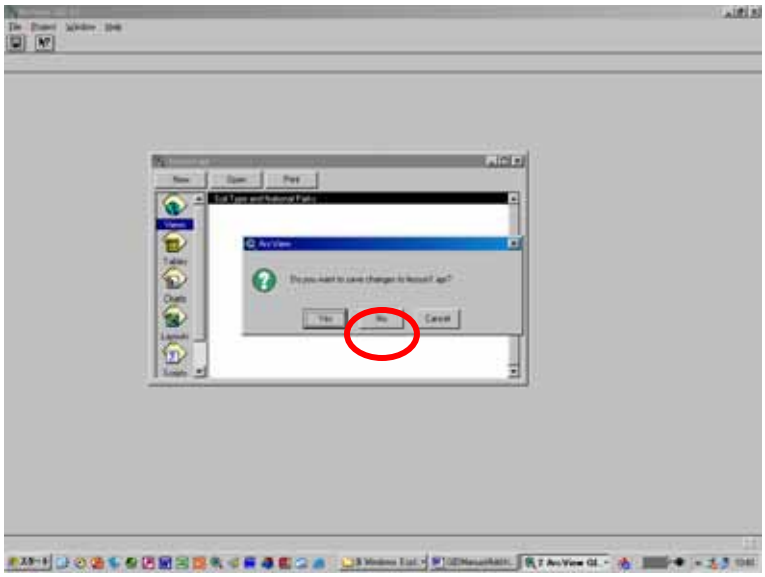


(2) Confirm "View Name" and "Project Name"

(3) Select "Exit" from File Menu



(4) Select "No" if there is no change



Open Project

Once the project file is saved, this project file can be opened by simply double clicking the icon of this file.

Excercise-01(2)

Basic Operation of Database

(Microsoft Access)

Exercise-01(2)

Basic Operation of Database (Microsoft Access)

Basic operation of the database (Microsoft Access)

0) What kind of information does the database have?

→See "Operation Manual for Simple Database and Information System"

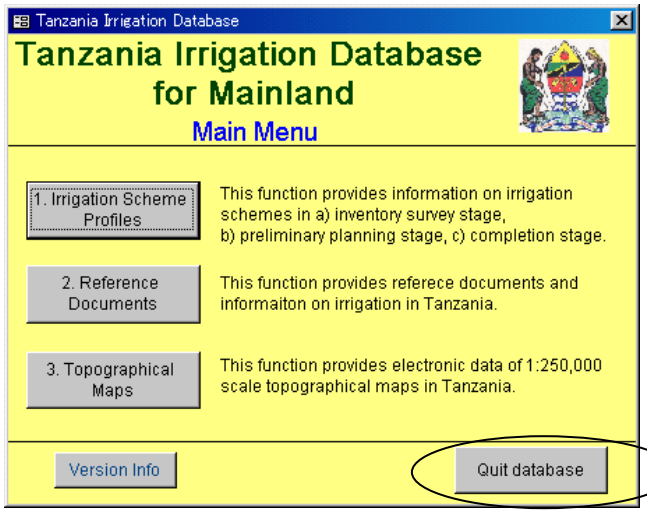
1) Basic operation

Start the database

Open the file from the following place.
File name: Tanzania_Irri-dbM
Place: _____

It is strongly recommended to decide on a specific place to save the file.

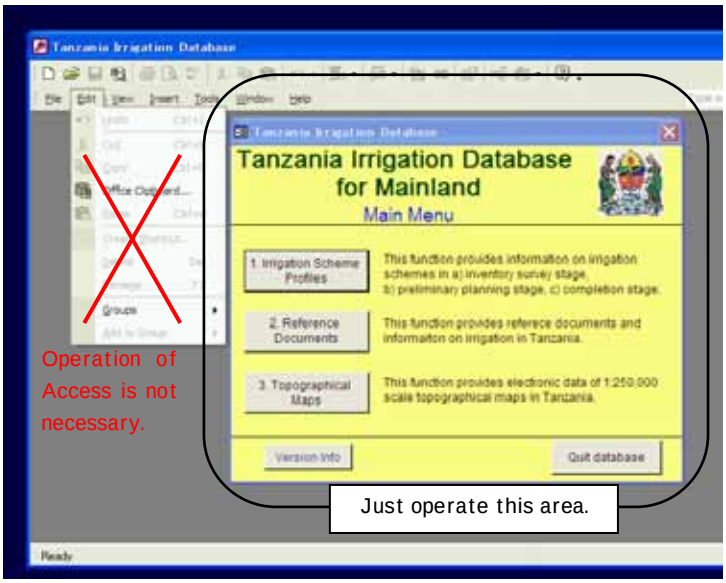
Quit the database



When you are going to exit the database, go back to the main menu and click "Quit database".
Remember that the main menu is the only one screen that has option to quit.

Click here to exit the database.

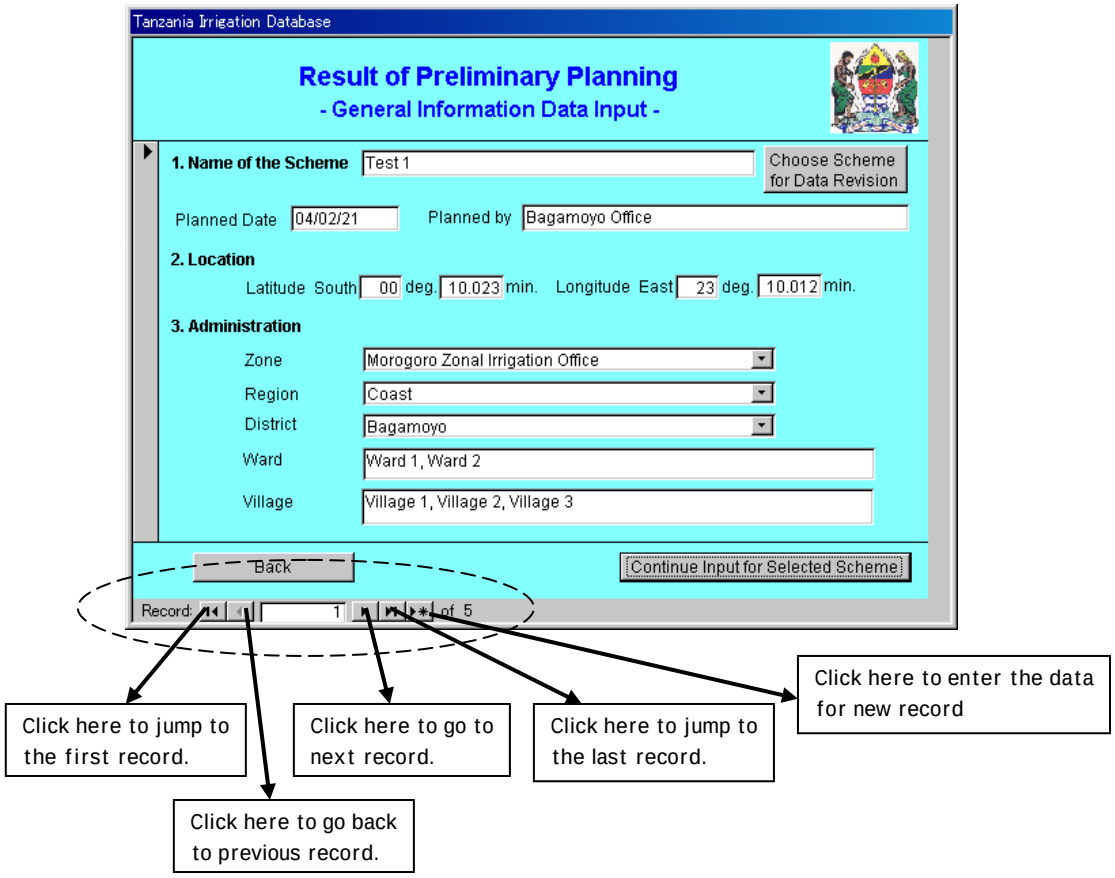
※Operation of Access “Not necessary”



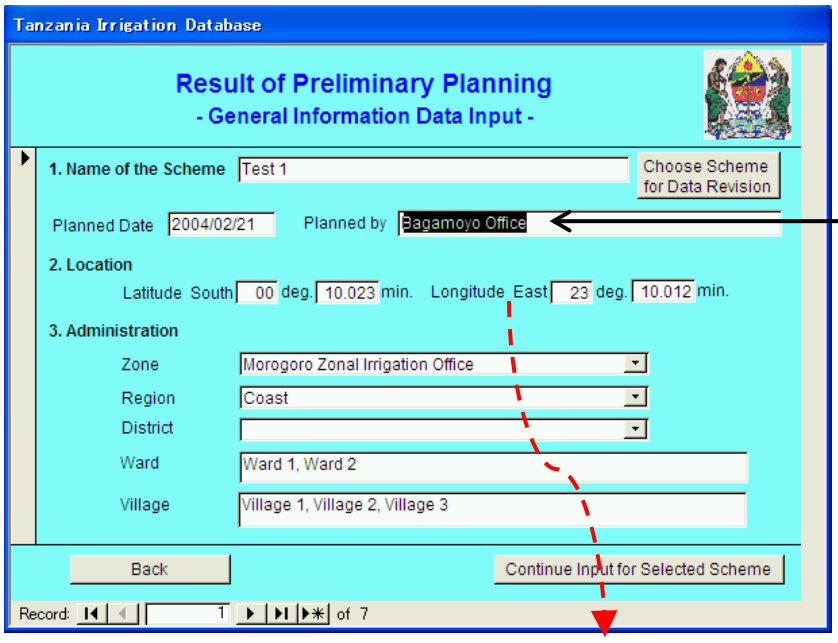
Operation of Access is not needed usually. The database was prepared to be utilized by anyone with little knowledge about Microsoft Access.

2) Operation of data input panels

Search a certain record



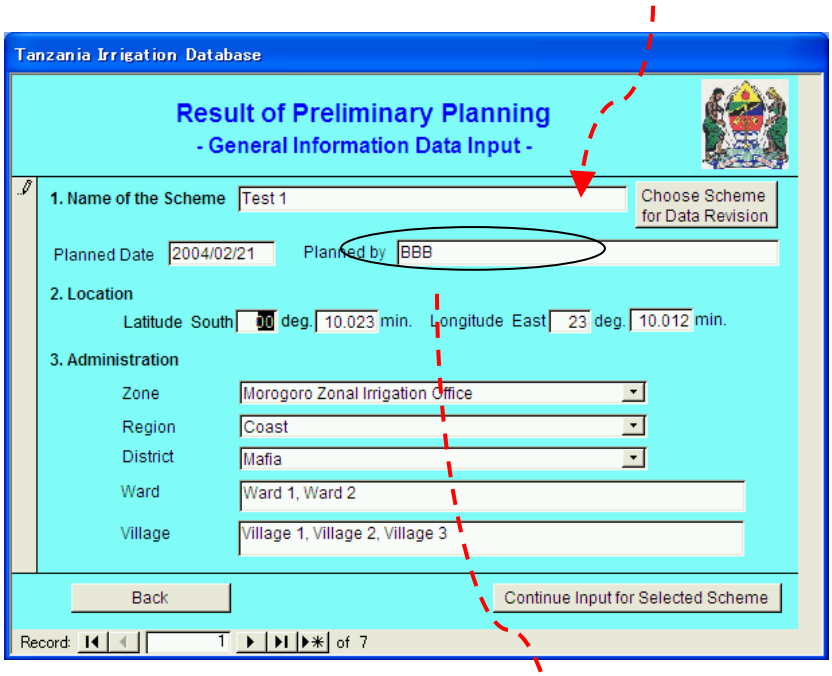
Revise data entered before



Proceed to the word which you want to revise by pressing "Tab" key or clicking directly the word

Rewrite the word. e.g. enter "BBB" instead of "Bagamoyo Office"

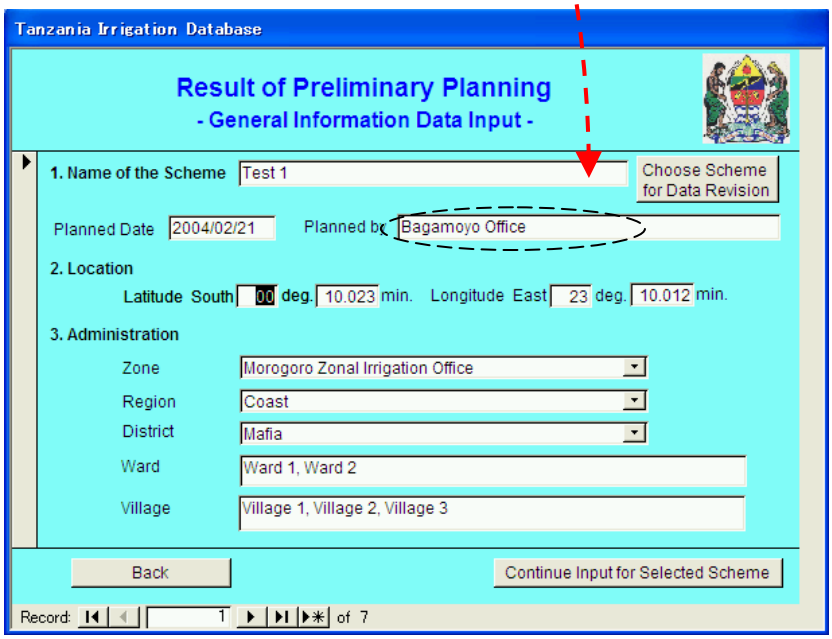
Click "Enter" or "Tab" key.



"Bagamoyo office" was replaced by "BBB".
It was registered as new data.

Retrieve the original data

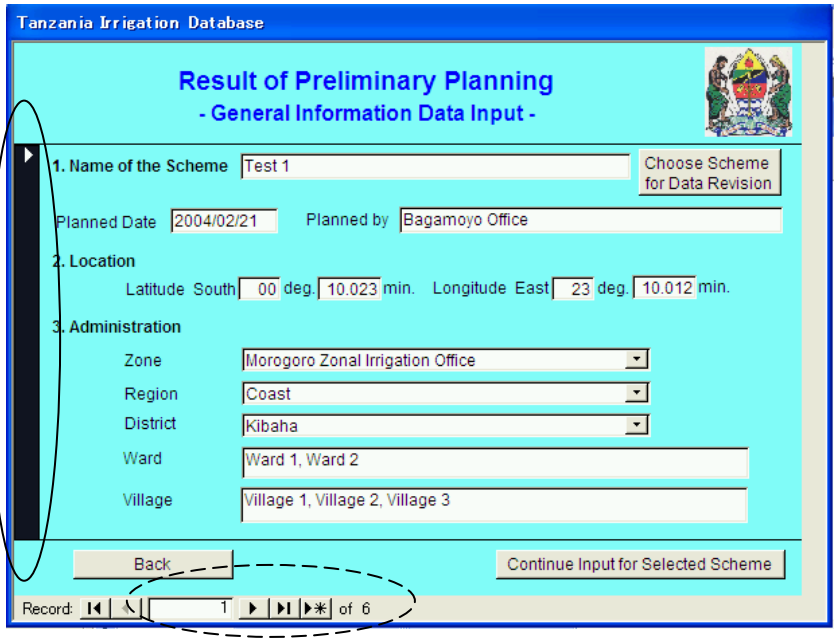
If you want to retrieve the data e.g. replaced by mistake,,,



Press "Esc" key

The original data "Bagamoyo Office" was retrieved.

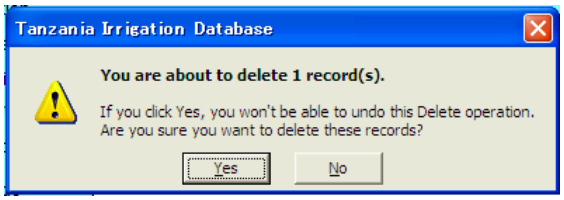
Select and delete a record



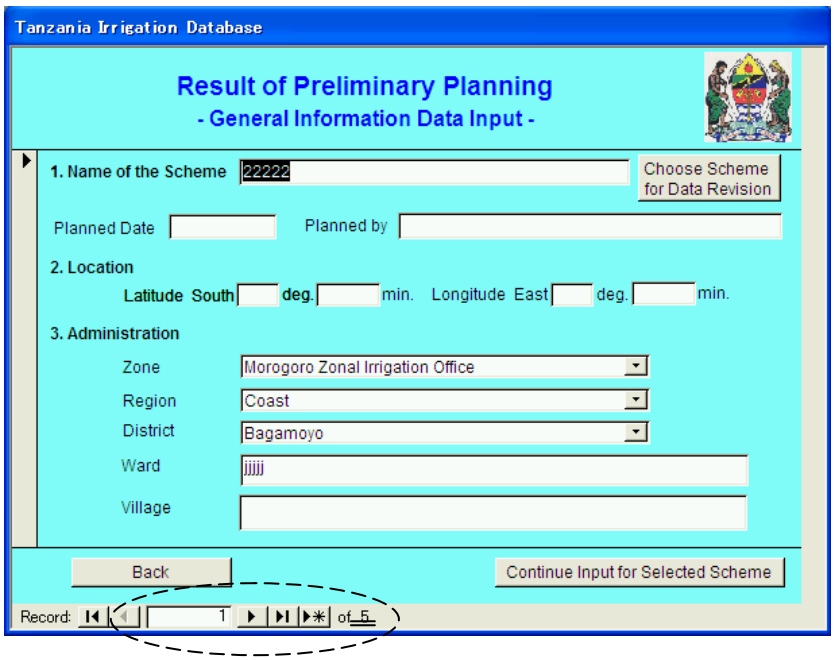
Click here and unhighlight it.

The record will be selected.

Then press "Delete" key to delete the record.



Click "Yes"



The record was deleted.

Be careful that once the record is deleted, it is impossible to be retrieved again.

In operation of Access, data or records are automatically saved in clicking or proceeding to the next step. We have to be careful in dealing with the panels for data input.

Exercise-02

Before starting irrigation scheme formulation

- Supplying data to districts -

Exercise-02

Before starting irrigation scheme formulation
- Supplying data to districts -

Situation 2-1[1]

You are the member of "Data and Information Management Unit" in the Ministry of Agriculture and Food Security in Dar Es Salaam and responsible for "Simple Database and Information System" operation.

One day, you have received a phone call from Mr. Jambo, one of the staff of Mkuranga district irrigation office.

Mr. Jambo: *Hello. How are you today?*

You: *I'm fine thank you. How about you?*

Mr. Jambo: *I'm fine but I need your help. Now, our district is going to conduct irrigation scheme formulation. For the planning, we are going to apply "Guidelines for Irrigation Scheme Formulation for District Agricultural Development Plan". The guideline stated that we have to receive some data from your "Data and Information Management Unit" before starting irrigation scheme formulation. I don't know what kind of data you can supply to us, but anyway I tried to call you.*

You: *Before starting the planning, you need to have the following data.*

(Please state your idea)

[1] People name, place, and project in this paper are all fictional.

(Please write down the final idea after the discussion)

Mr. Jambo: *Great! You can supply such kind of data to me. That's very helpful. Then, could you tell me when and how can I expect to receive the data?*

You: *You can receive it by phone, fax, or mail. Could I have your contact address?*

Mr. Jambo: *Address of our office is ……., phone number is ……., and fax number is …….*

You: *OK. I will contact you as soon as the data is ready.*

Mr. Jambo: *Thank you very much for your help.*

Situation 2-2

You are now in the room of "Data and Information Management Unit". You are going to output required data for the irrigation scheme formulation for Mkuranga district.

Task-1

Output the inventory survey result which outlines irrigation schemes in Mkuranga District from the "Irrigation Database" (see "Operation Manual for Simple Database and Information System" for the detail operation).

Mini-information

Mkuranga District

Zonal office:	MOROGORO Zonal Irrigation Office
Region:	COAST Region

Task-2

Output the inventory survey result for Kilimo irrigation scheme in Mkuranga District.

Task-3

Prepare the following maps from the "Irrigation GIS" (see "Operation Manual for Simple Database and Information System" for the detail operation). Useful information such as road network, river and the location of irrigation scheme (if available) should also be shown on the map.

1) Rainfall for Mkuranga District
2) Land Cover for Mkuranga District
3) Land Unit for Mkuranga District
4) Soil Type for Mkuranga District
5) Agro-ecological Zone for Mkuranga District
6) Protected Areas for Mkuranga District

Task-4

In case the location data of Kilimo irrigation scheme is available, examine whether the scheme is located in or adjacent to the protected areas or not. If the scheme is located in or adjacent to the protected area, specify the kind of the protected area and the distance from the scheme to the protected area.

Situation 2-3

When you obtain all the required information from the database and prepare various maps from GIS, you call Mr. Jambo.

You: *Hello, Mr. Jambo. I have the past inventory survey result of Kilimo irrigation scheme that might be helpful for your scheme formulation Furthermore, we are ready to provide you with various maps of Mkuranga District for many purposes. The scheme is not located in the protected areas according to the inventory survey result. I will send the inventory survey results to your office by fax and maps by mail through post office.*

Mr. Jambo: *How did you get all the information within such a short period? I cannot believe it!*

You: *We are now operating "database and information system" in our office. That's why we can supply such kind of information very quickly.*

Mr. Jambo: *I'm very impressed to hear about it. Anyway, thank you very much for your help.*

You: *You are welcome. Your result of scheme formulation will be delivered here through Morogoro Zonal Irrigation Office. I'll look forward to seeing your result. It's very important information for our country.*

Mr. Jambo: *OK. Good bye.*

Exercise-03

After completion of irrigation scheme formulation (1)

- Entering planning results into the database -

Exercise-03

After completion of the irrigation scheme formulation (1)
- Entering planning results into the database -

Situation 3-1[2]

You are the member of "Data and Information Management Unit" in the Ministry of Agriculture and Food Security in Dar es Salaam and responsible for "Simple Database and Information System" operation.

One month after you sent required information to Mr. Jambo, staff of Mkuranga district irrigation office, you call Mr. Jambo to ask him about the progress of the work.

You: *Hello. How are you today?*

Mr. Jambo: *I'm fine thank you. How about you?*

You: *I'm very fine. Today, I would like to ask you about the progress of the scheme formulation in your district.*

Mr. Jambo: *Thanks for providing us with useful information. We finished site inspection of all the irrigation schemes under our district and just submitted the screening report to the Morogoro Zonal Irrigation Unit. Our result, survey sheets, will be delivered to your office in a few days. Generally speaking, we didn't have any problem so far since "Guidelines for Irrigation Scheme Formulation for District Agricultural Development Plan" was very useful. But we found that some of the information given by inventory survey was not accurate and some schemes were newly proposed during our inspection. We need to update it. And especially for the location of the scheme, coordinates estimated in the inventory survey was a bit different from coordinates currently measured by GPS (Global Positioning System).*

You: *So, it means that we have to confirm the location in GIS again.*

Mr. Jambo: *That's right. I'm afraid it might be inside of protected areas. If it is inside protected area, we cannot proceed our scheme formulation. So I want to know the result as soon as possible.*

You: *OK. I will enter the result into the database and confirm the location in*

[2] Name of people, place, and project in this paper are all fictional names.

GIS. I will let you know the result soon.

Mr. Jambo: Thanks. I will look forward to your answer.

Situation 3-2

You are now in the room of "Data and Information Management Unit". You received the survey sheets from Mkuranga District. You are going to enter the result for Kilimo irrigation scheme. The result sent by Mr. Jambo is as shown in the next page.

Survey Sheet for Quick Site Inspection

1. General Information — Surveyed Date: 26 May,2004

(1) Name of the scheme : Kilimo Irrigation Scheme

(2) Location (any point in the scheme) : Latitude: 7°7.710' Longitude: 39°12.550'

(3) Administration : Ward Abab

: Village(s) Kilimo1, Kilimo2, Kilimo3

(4) Number of households : 300 households/ Scheme

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

2.1 Present Agricultural Conditions in the Potential Area

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

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

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

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

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

2.2 Existing Irrigation System

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

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

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

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

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

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

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

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

(4) Number of member : 140 members

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

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

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

3.1 Irrigation System Development Plan

(1) Potential area : 300 ha

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

(3) Name of the water source :

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

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

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

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

3.2 Irrigators' Association Establishment Plan

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

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

3.3 Agriculture Development Plan

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

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

4. Current Negative Impacts

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

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

Cause of conflict (_____)

5. Observation by the Inspection Team

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

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

6. Opinions of Village Officers and Beneficiaries

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

7. History of the Scheme

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

8. Findings of the District Project Development Team

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

Task-1

Enter the result of quick inspection for Kilimo irrigation scheme into "Irrigation Database".

Situation 3-3

Two months later, more detailed survey had been done in the district and you received the final result of scheme formulation, scheme digest of Kilimo irrigation scheme.

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

1. General Information | Prepared Date:

(1) Name of the scheme : KILIOMO IRRIGATION SCHEME
(2) Name of the scheme in the Quick Site Inspection : KILIMO IRRIGATION SCHEME
(3) Location (any point in the scheme) : Latitude: 7º7.710 Longitude: 39º12.550
(4) Administration : Ward Abab
: Village(s) Kilimo1, Kilimo2, Kilimo3

2. Present Condition of the Development Area

2.1 Present Agricultural Conditions in the Development Area

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

2.2 Existing Irrigation System in the Development Area

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

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

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

3. Development Plan

3.1 Irrigation System Development Plan

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

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

3.2 Agriculture Development Plan

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

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

(3) Annual incremental annual agricultural benefit : 72,013,500 Tsh.

3.3 Institutional Development Plan

(1) Establishment : by year 2004

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

(3) Registration : by year 2004

(4) Law : ☒ Association Act ☐ Cooperative Act

(5) Letter of undertaking : by year 2004

3.4 Environment

(1) EIA : ☐ Required ☐ Preliminary assessment is required ☒ Not required

(2) Location : ☐ Within protected area ☐ Outside of protected area

3.5 Scheme Development Cost

(1) Construction	224,844,000	Tsh.
(2) Soft component	13,490,640	Tsh.
(3) Administration	8,993,760	Tsh.
(4) Engineering	67,453,200	Tsh.
(5) O&M	3,372,660	Tsh.
(6) Replacement	4,496,880	Tsh.
TOTAL	322,651,140	Tsh.

Task-2

Enter the result of scheme formulation for Kilimo irrigation scheme into "Irrigation Database".

Exercise-04

After completion of irrigation scheme formulation (2)

- Plotting Scheme Locations on the GIS -

Exercise-04

After completion of irrigation scheme formulation (2)
- Plotting Scheme Locations on the GIS -

Situation 4-1[3]

You are the member of "Data and Information Management Unit" in the Ministry of Agriculture and Food Security in Dar Es Salaam and responsible for "Simple Database and Information System" operation.

You are now in the room of "Data and Information Management Unit". After you entered the result of the quick site inspection into the "Irrigation Database", you are going to plot the surveyed location (set of coordinates data for perimeter) of Kilimo irrigation scheme on the "Irrigation GIS".

Task-1

Input the surveyed location (set of coordinates data for perimeter) of Kilimo irrigation scheme by Microsoft Excel and save file as "Coordinates" into some folder in your computer.

Task-2

Open the Microsoft Excel file "Coordinates". Convert coordinates format from original (degrees and minutes) to suitable format (decimal degree) for ArcView (see page 3-15 of "Operation Manual for Simple Database and Information System" for the detail operation).

Task-3

Rename the calculated Microsoft Excel file "Coordinates" as "Coordinates2" and save it as "dbase" type (DBF 4) file into ArcView data folder.

Task-4

Import the dbase type file "Coordinates2" into ArcView and create the shape file for the perimeter of Kilimo irrigation scheme.

[3] Name of people, place, and project in this paper are all fictional names.

Task-5

Observe whether Kilimo irrigation scheme is located in protected areas or not.

What is your findings about the location of Kilimo irrigation scheme?

- ☐ Kilimo irrigation scheme is located in protected areas.
- ☐ Kilimo irrigation scheme is not located in protected areas but very close to protected areas.
- ☐ Kilimo irrigation scheme is not located in protected areas and far from any of protected area.

Trial

Try to obtain the surveyed location (set of coordinates data for perimeter) of Kilimo irrigation scheme from the "Irrigation Database" (see page 2-27 of "Operation Manual for Simple Database and Information System" for the detail operation). Rename the obtained Microsoft Excel type file and continue the same process mentioned above.

Situation 4-2

You are now calling Mr. Jambo to report the result of your work.

You: *Hello, Mr. Jambo, how are you today?*

Mr. Jambo: *I'm fine.*

You: *I confirmed that Kilimo irrigation scheme is not located in the protected areas. But there is forest reserve near by, so, negative impact of the project to the forest reserve should be carefully surveyed in the feasibility study stage.*

Mr. Jambo: *I'm very glad to have such kind of information. We will proceed to feasibility study with careful consideration on the forest reserve. Thank you so much for your help.*

You: *You are welcome. Bye-bye.*

Exercise-05

Upon the data remittance requests

- Supplying planning results to DITS -

Exercise-05

Upon the data remittance requests
- Supplying planning results to DITS -

Situation 5-1[4]

You are the member of "Data and Information Management Unit" in the Ministry of Agriculture and Food Security in Dar Es Salaam and responsible for "Simple Database and Information System" operation.

One day, you have received a phone call from your boss asking about the recent performance of "Data and Information Management Unit".

Boss: *Hello. How are you today?*

You: *I'm fine thank you. How about you?*

Boss: *I'm fine. How about the progress of your work?*

You: *We have entered the results of site inspection and preliminary planning. Those were sent from several schemes.*

Boss: *That's fine. We have to keep latest information to cope with any urgent request. And don't forget that we have to submit data for irrigation development monitoring report within this month.*
Today I called you to ask you one more. DALDO of Mkuranga district is asking me to visit Kilimo Irrigation Scheme and I have to visit there tomorrow. I need some information about the scheme. Could you please send me some information about it?

You: *OK. I will try. I will contact you as soon as possible.*

Boss: *Tank you very much.*

[4] Name of people, place, and project in this paper are all fictional names.

Situation 5-2

You are now in the room of "Data and Information Management Unit". You are going to prepare information about Kilimo Irrigation Schme.

Task-1

Prepare information about Kilimo irrigation scheme with basic information.

Task-2

Prepare a typical map for Kilimo irrigation scheme by considering the characteristic of the scheme.

Situation 5-3

One week later, you are trying to prepare data for the irrigation development monitoring report 2003.

Task-3

Consider what kind of data is necessary to be shown in the annual report and what information does your boss need?

Exercise-06

Maintenance of the system

- Revising administrative bodies -

Exercise-06

Maintenance of the system
- Revising administrative bodies -

Situation 6-1[5]

You are the member of "Data and Information Management Unit" in the Ministry of Agriculture and Food Security in Dar Es Salaam and responsible for "Simple Database and Information System" operation.

Upon completion of the presentation by your boss, you have received a phone call from your boss again.

Boss: *Hello. How are you today?*

You: *I'm fine thank you. How about your presentation?*

Boss: *I have carried out my presentation successfully by using the materials that you have prepared for me. Thank you very much for your efforts.*

You: *I am happy to hear that.*

Boss: *By the way, Babati is still within Arusha Region according to the materials you have prepared.*

You: *Yes, our database is established based on the old administration boundary and the modification has not been carried out since Babati separated from Arusha.*

Boss: *Is it possible to modify the database according to the new administration boundary?*

You: *We have to modify our database by any way. Let us try our best to modify the database as soon as possible.*

Boss: *Thank you very much. I think it is an important point to maintain the database always in good condition by keeping the data up-to-date.*

[5] Name of people, place, and project in this paper are all fictional names.

Situation 6-2

You are now in the room of "Data and Information Management Unit". You are going to modify irrigation database and also irrigation GIS according to the new administration boundary.

Task-1

Modify irrigation database according to the new administration boundary.

Task-2

Modify irrigation GIS according to the new administration boundary.

Additional Explanation

How to Develop the Database

Additional Explanation

How to Develop the Database

(Since Microsoft Office is the most common business software in the MAFS, this section explains how to expand the database system, assuming that you are familiar with Microsoft Office.)

When do we develop database?

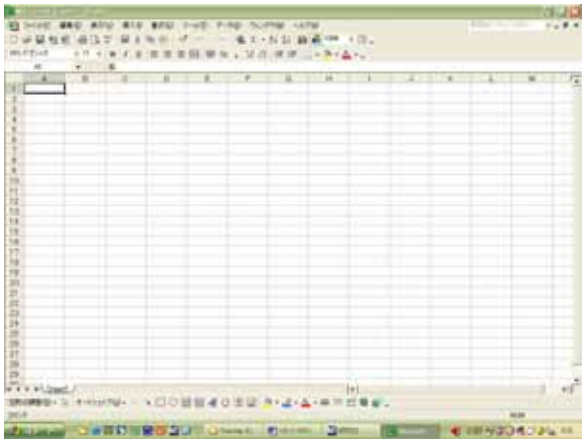
When we prepare a report, we choose to use word processing software, such as Microsoft Word. When we want to show a graph, we prepare it by spreadsheet software, such as Microsoft Excel. If you wrongly prepare a graph using the Microsoft Word, you may feel the software is inconvenient or even useless. Since you are familiar with word processing software and spreadsheet software, you do not make such kind of mistake.

However, people who are not familiar with database software often choose database software wrongly instead of spreadsheet software or vice versa. Advantage and disadvantage of database software should be clearly understood before you develop the database system, otherwise you may feel that database software is very difficult but useless.

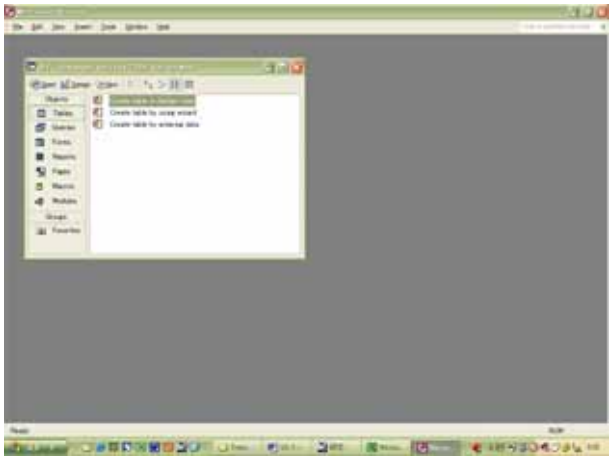
1. Disadvantage of database software (Microsoft Access) comparing with spreadsheet software (Microsoft Excel)

   You have to design database before you start to use it!

   In spreadsheet software, you can obtain blank sheet when you execute it, so you can immediately start data input, as show below.



On the other hand, you cannot obtain any of blank data input sheets in Microsoft Access, so you can not start data input without designing the database as shown below.



It means that if you are preparing table which will be used for once or several times, you had better to use Microsoft Excel instead of Microsoft Access, since it is easier.

2. Advantage of database software (Microsoft Access) comparing with spreadsheet software (Microsoft Excel)

You can keep consistency of your data easily!

If you are supposed to use the table for long time and going to update it many times, database can help you.

Example-1

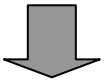
You are in charge of data management of administrative structure in Tanzania. You are asked to keep latest data for three kinds of information, such as i) Zone-Region-District, ii) Zone-Region, and iii) Zone-District. At present, Arusha region is supervised by Kilimanjaro Zonal Irrigation Unit. Suppose if Arusha region is going to be supervised by Mbeya Zonal Irrigation Unit, what kind of data revision is required?

If you use Microsoft Excel, procedure of data revision must be like this.

You have three tables to be revised.

Table-1 shows Zone-Region-District and you have to update this table.

Zone	Region_Name	District_Name
Kilimanjaro Zonal Irrigation Unit	Arusha	Arumeru
Kilimanjaro Zonal Irrigation Unit	Arusha	Babati
Kilimanjaro Zonal Irrigation Unit	Arusha	Hanang
Kilimanjaro Zonal Irrigation Unit	Arusha	Karatu
Kilimanjaro Zonal Irrigation Unit	Arusha	Mbulu
Kilimanjaro Zonal Irrigation Unit	Arusha	Monduli
Kilimanjaro Zonal Irrigation Unit	Arusha	Simanjiro
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Hai
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Moshi Rural
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Mwanga
Mbeya Zonal Irrigation Unit	Iringa	Ifunda
Mbeya Zonal Irrigation Unit	Iringa	Iringa Rural
Mbeya Zonal Irrigation Unit	Iringa	Ludewa
Mbeya Zonal Irrigation Unit	Iringa	Mufindi
Mbeya Zonal Irrigation Unit	Iringa	Njombe
Mbeya Zonal Irrigation Unit	Mbeya	Chunya
Mbeya Zonal Irrigation Unit	Mbeya	Ileje
Mbeya Zonal Irrigation Unit	Mbeya	Kyela
Mbeya Zonal Irrigation Unit	Mbeya	Mbeya Rural
Mbeya Zonal Irrigation Unit	Mbeya	Mbozi
Mbeya Zonal Irrigation Unit	Mbeya	Rungwe
Mbeya Zonal Irrigation Unit	Rukwa	Mpanda
Mbeya Zonal Irrigation Unit	Rukwa	Nkasi
Mbeya Zonal Irrigation Unit	Rukwa	Sumbawanga Rural
Mbeya Zonal Irrigation Unit	Rukwa	Sumbawanga Urban

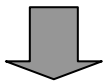


Arusha region was changed to be under "Mbeya Zonal Unit".

Zone	Region_Name	District_Name
Mbeya Zonal Irrigation Unit	Arusha	Arumeru
Mbeya Zonal Irrigation Unit	Arusha	Babati
Mbeya Zonal Irrigation Unit	Arusha	Hanang
Mbeya Zonal Irrigation Unit	Arusha	Karatu
Mbeya Zonal Irrigation Unit	Arusha	Mbulu
Mbeya Zonal Irrigation Unit	Arusha	Monduli
Mbeya Zonal Irrigation Unit	Arusha	Simanjiro
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Hai
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Moshi Rural
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Mwanga
Mbeya Zonal Irrigation Unit	Iringa	Ifunda
Mbeya Zonal Irrigation Unit	Iringa	Iringa Rural
Mbeya Zonal Irrigation Unit	Iringa	Ludewa
Mbeya Zonal Irrigation Unit	Iringa	Mufindi
Mbeya Zonal Irrigation Unit	Iringa	Njombe
Mbeya Zonal Irrigation Unit	Mbeya	Chunya
Mbeya Zonal Irrigation Unit	Mbeya	Ileje
Mbeya Zonal Irrigation Unit	Mbeya	Kyela
Mbeya Zonal Irrigation Unit	Mbeya	Mbeya Rural
Mbeya Zonal Irrigation Unit	Mbeya	Mbozi
Mbeya Zonal Irrigation Unit	Mbeya	Rungwe
Mbeya Zonal Irrigation Unit	Rukwa	Mpanda
Mbeya Zonal Irrigation Unit	Rukwa	Nkasi
Mbeya Zonal Irrigation Unit	Rukwa	Sumbawanga Rural
Mbeya Zonal Irrigation Unit	Rukwa	Sumbawanga Urban

Table-2 shows Zone-Region and you have to update this table as well.

Zone	Region_Name
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Rukwa
Mbeya Zonal Irrigation Unit	Rukwa
Mbeya Zonal Irrigation Unit	Rukwa
Mbeya Zonal Irrigation Unit	Rukwa

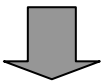


Arusha region was changed to be under "Mbeya Zonal Unit".

Zone	Region_Name
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Arusha
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Rukwa
Mbeya Zonal Irrigation Unit	Rukwa
Mbeya Zonal Irrigation Unit	Rukwa
Mbeya Zonal Irrigation Unit	Rukwa

Table-3 shows Zone-District and you have to update this table as well.

Zone	District_Name
Kilimanjaro Zonal Irrigation Unit	Arumeru
Kilimanjaro Zonal Irrigation Unit	Babati
Kilimanjaro Zonal Irrigation Unit	Hanang
Kilimanjaro Zonal Irrigation Unit	Karatu
Kilimanjaro Zonal Irrigation Unit	Mbulu
Kilimanjaro Zonal Irrigation Unit	Monduli
Kilimanjaro Zonal Irrigation Unit	Simanjiro
Kilimanjaro Zonal Irrigation Unit	Hai
Kilimanjaro Zonal Irrigation Unit	Moshi Rural
Kilimanjaro Zonal Irrigation Unit	Mwanga
Mbeya Zonal Irrigation Unit	Ifunda
Mbeya Zonal Irrigation Unit	Iringa Rural
Mbeya Zonal Irrigation Unit	Ludewa
Mbeya Zonal Irrigation Unit	Mufindi
Mbeya Zonal Irrigation Unit	Njombe
Mbeya Zonal Irrigation Unit	Chunya
Mbeya Zonal Irrigation Unit	Ileje
Mbeya Zonal Irrigation Unit	Kyela
Mbeya Zonal Irrigation Unit	Mbeya Rural
Mbeya Zonal Irrigation Unit	Mbozi
Mbeya Zonal Irrigation Unit	Rungwe
Mbeya Zonal Irrigation Unit	Mpanda
Mbeya Zonal Irrigation Unit	Nkasi
Mbeya Zonal Irrigation Unit	Sumbawanga Rural
Mbeya Zonal Irrigation Unit	Sumbawanga Urban



Districts under Arusha region was changed to be under "Mbeya Zonal Unit".

Zone	District_Name
Mbeya Zonal Irrigation Unit	Arumeru
Mbeya Zonal Irrigation Unit	Babati
Mbeya Zonal Irrigation Unit	Hanang
Mbeya Zonal Irrigation Unit	Karatu
Mbeya Zonal Irrigation Unit	Mbulu
Mbeya Zonal Irrigation Unit	Monduli
Mbeya Zonal Irrigation Unit	Simanjiro
Kilimanjaro Zonal Irrigation Unit	Hai
Kilimanjaro Zonal Irrigation Unit	Moshi Rural
Kilimanjaro Zonal Irrigation Unit	Mwanga
Mbeya Zonal Irrigation Unit	Ifunda
Mbeya Zonal Irrigation Unit	Iringa Rural
Mbeya Zonal Irrigation Unit	Ludewa
Mbeya Zonal Irrigation Unit	Mufindi
Mbeya Zonal Irrigation Unit	Njombe
Mbeya Zonal Irrigation Unit	Chunya
Mbeya Zonal Irrigation Unit	Ileje
Mbeya Zonal Irrigation Unit	Kyela
Mbeya Zonal Irrigation Unit	Mbeya Rural
Mbeya Zonal Irrigation Unit	Mbozi
Mbeya Zonal Irrigation Unit	Rungwe
Mbeya Zonal Irrigation Unit	Mpanda
Mbeya Zonal Irrigation Unit	Nkasi
Mbeya Zonal Irrigation Unit	Sumbawanga Rural
Mbeya Zonal Irrigation Unit	Sumbawanga Urban

Finally you could update all the tables. However, you were required three operations for one change of administration structure. Obviously, if you have more tables, it will be more difficult and there might be some operation error.

If you use Microsoft Access, procedure of data revision must be like this.

Probably, we have three tables.

Table-1 shows list of Zonal Irrigation Units.

Table-2 shows list of regions (with relationship with zones).

Table-3 shows list of districts (with relationship with regions)

We also have three queries.

Query-1 shows Zone-Region-District.

ZRD : Select Query

Zone	Region_Name	District_Name
Kilimanjaro Zonal Irrigation Office	Arusha	Arumeru
Kilimanjaro Zonal Irrigation Office	Arusha	Babati
Kilimanjaro Zonal Irrigation Office	Arusha	Hanang
Kilimanjaro Zonal Irrigation Office	Arusha	Karatu
Kilimanjaro Zonal Irrigation Office	Arusha	Mbulu
Kilimanjaro Zonal Irrigation Office	Arusha	Monduli
Kilimanjaro Zonal Irrigation Office	Arusha	Simanjiro
Kilimanjaro Zonal Irrigation Office	Kilimanjaro	Hai
Kilimanjaro Zonal Irrigation Office	Kilimanjaro	Moshi Rural
Kilimanjaro Zonal Irrigation Office	Kilimanjaro	Mwanga
Mbeya Zonal Irrigation Office	Iringa	Ifunda
Mbeya Zonal Irrigation Office	Iringa	Iringa Rural
Mbeya Zonal Irrigation Office	Iringa	Ludewa
Mbeya Zonal Irrigation Office	Iringa	Mufindi
Mbeya Zonal Irrigation Office	Iringa	Njombe
Mbeya Zonal Irrigation Office	Mbeya	Chunya
Mbeya Zonal Irrigation Office	Mbeya	Ileje
Mbeya Zonal Irrigation Office	Mbeya	Kyela
Mbeya Zonal Irrigation Office	Mbeya	Mbeya Rural
Mbeya Zonal Irrigation Office	Mbeya	Mbozi
Mbeya Zonal Irrigation Office	Mbeya	Rungwe
Mbeya Zonal Irrigation Office	Rukwa	Mpanda
Mbeya Zonal Irrigation Office	Rukwa	Nkasi
Mbeya Zonal Irrigation Office	Rukwa	Sumbawanga Rural
Mbeya Zonal Irrigation Office	Rukwa	Sumbawanga Urban

Query-2 shows Zone-Region.

ZR : Select Query

Zone	Region_Name
Kilimanjaro Zonal Irrigation Office	Arusha
Kilimanjaro Zonal Irrigation Office	Kilimanjaro
Mbeya Zonal Irrigation Office	Iringa
Mbeya Zonal Irrigation Office	Mbeya
Mbeya Zonal Irrigation Office	Rukwa
Morogoro Zonal Irrigation Office	Coast
Morogoro Zonal Irrigation Office	Dar-Es-Salaam
Morogoro Zonal Irrigation Office	Morogoro
Mtwara Zonal Irrigation Office	Lindi
Mtwara Zonal Irrigation Office	Mtwara
Mtwara Zonal Irrigation Office	Ruvuma
Mwanza Zonal Irrigation Office	Kagera
Mwanza Zonal Irrigation Office	Mara
Mwanza Zonal Irrigation Office	Mwanza
Mwanza Zonal Irrigation Office	Shinyanga
Mwanza Zonal Irrigation Office	Tanga
Tabora Zonal Irrigation Office	Dodoma
Tabora Zonal Irrigation Office	Kigoma
Tabora Zonal Irrigation Office	Singida
Tabora Zonal Irrigation Office	Tabora

Query-3 shows Zone-District.

ZD : Select Query

Zone	District_Name
Kilimanjaro Zonal Irrigation Office	Arumeru
Kilimanjaro Zonal Irrigation Office	Babati
Kilimanjaro Zonal Irrigation Office	Hai
Kilimanjaro Zonal Irrigation Office	Hanang
Kilimanjaro Zonal Irrigation Office	Karatu
Kilimanjaro Zonal Irrigation Office	Mbulu
Kilimanjaro Zonal Irrigation Office	Monduli
Kilimanjaro Zonal Irrigation Office	Moshi Rural
Kilimanjaro Zonal Irrigation Office	Mwanga
Kilimanjaro Zonal Irrigation Office	Simanjiro
Mbeya Zonal Irrigation Office	Chunya
Mbeya Zonal Irrigation Office	Ifunda
Mbeya Zonal Irrigation Office	Ileje
Mbeya Zonal Irrigation Office	Iringa Rural
Mbeya Zonal Irrigation Office	Kyela
Mbeya Zonal Irrigation Office	Ludewa
Mbeya Zonal Irrigation Office	Mbeya Rural
Mbeya Zonal Irrigation Office	Mbozi
Mbeya Zonal Irrigation Office	Mpanda
Mbeya Zonal Irrigation Office	Mufindi
Mbeya Zonal Irrigation Office	Njombe
Mbeya Zonal Irrigation Office	Nkasi
Mbeya Zonal Irrigation Office	Rungwe
Mbeya Zonal Irrigation Office	Sumbawanga Rural
Mbeya Zonal Irrigation Office	Sumbawanga Urban

Now you revise Table-2.

T901_Region : Table

Zone_ID	Region_ID	Region_Name
Kilimanjaro Zonal Irrigation Unit	1	Arusha
Morogoro Zonal Irrigation Unit	2	Coast
Morogoro Zonal Irrigation Unit	3	Dar-Es-Salaam
Tabora Zonal Irrigation Unit	4	Dodoma
Mbeya Zonal Irrigation Unit	5	Iringa
Mwanza Zonal Irrigation Unit	6	Kagera
Tabora Zonal Irrigation Unit	7	Kigoma
Kilimanjaro Zonal Irrigation Unit	8	Kilimanjaro
Mtwara Zonal Irrigation Unit	9	Lindi
Mwanza Zonal Irrigation Unit	10	Mara
Mbeya Zonal Irrigation Unit	11	Mbeya
Morogoro Zonal Irrigation Unit	12	Morogoro
Mtwara Zonal Irrigation Unit	13	Mtwara
Mwanza Zonal Irrigation Unit	14	Mwanza
Mtwara Zonal Irrigation Unit	15	Ruvuma
Mbeya Zonal Irrigation Unit	16	Rukwa
Mwanza Zonal Irrigation Unit	17	Shinyanga
Tabora Zonal Irrigation Unit	18	Singida
Tabora Zonal Irrigation Unit	19	Tabora
Mwanza Zonal Irrigation Unit	20	Tanga
	utoNumber)	

T901_Region : Table

Zone_ID	Region_ID	Region_Name
Mbeya Zonal Irrigation Unit	1	Arusha
Morogoro Zonal Irrigation Unit	2	Coast
Morogoro Zonal Irrigation Unit	3	Dar-Es-Salaam
Tabora Zonal Irrigation Unit	4	Dodoma
Mbeya Zonal Irrigation Unit	5	Iringa
Mwanza Zonal Irrigation Unit	6	Kagera
Tabora Zonal Irrigation Unit	7	Kigoma
Kilimanjaro Zonal Irrigation Unit	8	Kilimanjaro
Mtwara Zonal Irrigation Unit	9	Lindi
Mwanza Zonal Irrigation Unit	10	Mara
Mbeya Zonal Irrigation Unit	11	Mbeya
Morogoro Zonal Irrigation Unit	12	Morogoro
Mtwara Zonal Irrigation Unit	13	Mtwara
Mwanza Zonal Irrigation Unit	14	Mwanza
Mtwara Zonal Irrigation Unit	15	Ruvuma
Mbeya Zonal Irrigation Unit	16	Rukwa
Mwanza Zonal Irrigation Unit	17	Shinyanga
Tabora Zonal Irrigation Unit	18	Singida
Tabora Zonal Irrigation Unit	19	Tabora
Mwanza Zonal Irrigation Unit	20	Tanga
	utoNumber)	

Zone supervising Arusha region was changed to be "Mbeya Zonal Unit".

Then you can get revised Query-1 to 3 without changing them.

Query-1 (automatically revised)

ZRD : Select Query

Zone	Region_Name	District_Name
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Hai
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Moshi Rural
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro	Mwanga
Mbeya Zonal Irrigation Unit	Arusha	Arumeru
Mbeya Zonal Irrigation Unit	Arusha	Babati
Mbeya Zonal Irrigation Unit	Arusha	Hanang
Mbeya Zonal Irrigation Unit	Arusha	Karatu
Mbeya Zonal Irrigation Unit	Arusha	Mbulu
Mbeya Zonal Irrigation Unit	Arusha	Monduli
Mbeya Zonal Irrigation Unit	Arusha	Simanjiro
Mbeya Zonal Irrigation Unit	Iringa	Ifunda
Mbeya Zonal Irrigation Unit	Iringa	Iringa Rural
Mbeya Zonal Irrigation Unit	Iringa	Ludewa
Mbeya Zonal Irrigation Unit	Iringa	Mufindi
Mbeya Zonal Irrigation Unit	Iringa	Njombe
Mbeya Zonal Irrigation Unit	Mbeya	Chunya
Mbeya Zonal Irrigation Unit	Mbeya	Ileje
Mbeya Zonal Irrigation Unit	Mbeya	Kyela
Mbeya Zonal Irrigation Unit	Mbeya	Mbeya Rural
Mbeya Zonal Irrigation Unit	Mbeya	Mbozi
Mbeya Zonal Irrigation Unit	Mbeya	Rungwe
Mbeya Zonal Irrigation Unit	Rukwa	Mpanda
Mbeya Zonal Irrigation Unit	Rukwa	Nkasi
Mbeya Zonal Irrigation Unit	Rukwa	Sumbawanga Rural
Mbeya Zonal Irrigation Unit	Rukwa	Sumbawanga Urban
Morogoro Zonal Irrigation Unit	Coast	Bagamoyo

Zone supervising Arusha region was automatically changed to be “Mbeya Zonal Unit”.

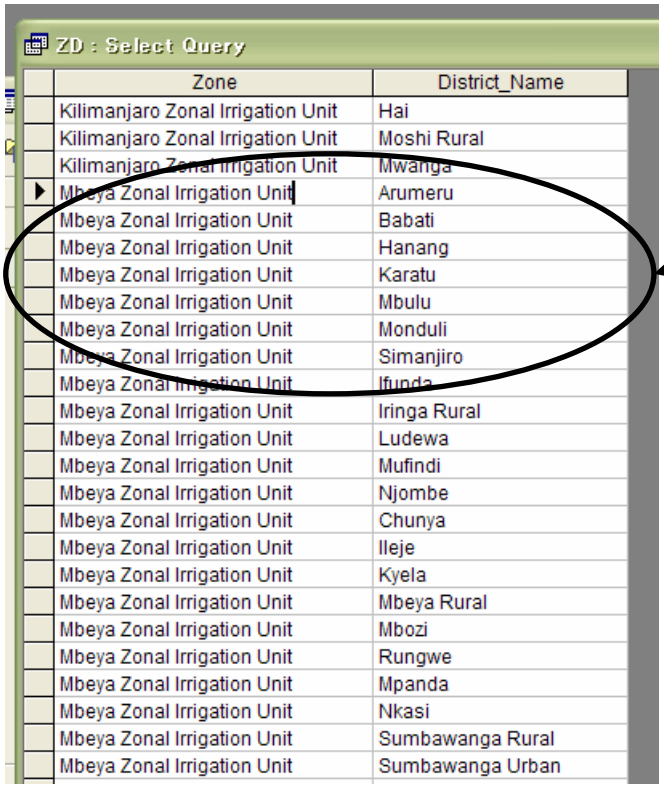
Query-2 (automatically revised)

ZR : Select Query

Zone	Region_Name
Kilimanjaro Zonal Irrigation Unit	Kilimanjaro
Mbeya Zonal Irrigation Unit	Arusha
Mbeya Zonal Irrigation Unit	Iringa
Mbeya Zonal Irrigation Unit	Mbeya
Mbeya Zonal Irrigation Unit	Rukwa
Morogoro Zonal Irrigation Unit	Coast
Morogoro Zonal Irrigation Unit	Dar-Es-Salaam
Morogoro Zonal Irrigation Unit	Morogoro
Mtwara Zonal Irrigation Unit	Lindi
Mtwara Zonal Irrigation Unit	Mtwara
Mtwara Zonal Irrigation Unit	Ruvuma
Mwanza Zonal Irrigation Unit	Kagera
Mwanza Zonal Irrigation Unit	Mara
Mwanza Zonal Irrigation Unit	Mwanza
Mwanza Zonal Irrigation Unit	Shinyanga
Mwanza Zonal Irrigation Unit	Tanga
Tabora Zonal Irrigation Unit	Dodoma
Tabora Zonal Irrigation Unit	Kigoma
Tabora Zonal Irrigation Unit	Singida
Tabora Zonal Irrigation Unit	Tabora

Zone supervising Arusha region was automatically changed to be “Mbeya Zonal Unit”.

Query-3 (automatically revised)



ZD : Select Query

Zone	District_Name
Kilimanjaro Zonal Irrigation Unit	Hai
Kilimanjaro Zonal Irrigation Unit	Moshi Rural
Kilimanjaro Zonal Irrigation Unit	Mwanga
Mbeya Zonal Irrigation Unit	Arumeru
Mbeya Zonal Irrigation Unit	Babati
Mbeya Zonal Irrigation Unit	Hanang
Mbeya Zonal Irrigation Unit	Karatu
Mbeya Zonal Irrigation Unit	Mbulu
Mbeya Zonal Irrigation Unit	Monduli
Mbeya Zonal Irrigation Unit	Simanjiro
Mbeya Zonal Irrigation Unit	Ifunda
Mbeya Zonal Irrigation Unit	Iringa Rural
Mbeya Zonal Irrigation Unit	Ludewa
Mbeya Zonal Irrigation Unit	Mufindi
Mbeya Zonal Irrigation Unit	Njombe
Mbeya Zonal Irrigation Unit	Chunya
Mbeya Zonal Irrigation Unit	Ileje
Mbeya Zonal Irrigation Unit	Kyela
Mbeya Zonal Irrigation Unit	Mbeya Rural
Mbeya Zonal Irrigation Unit	Mbozi
Mbeya Zonal Irrigation Unit	Rungwe
Mbeya Zonal Irrigation Unit	Mpanda
Mbeya Zonal Irrigation Unit	Nkasi
Mbeya Zonal Irrigation Unit	Sumbawanga Rural
Mbeya Zonal Irrigation Unit	Sumbawanga Urban

Zone supervising Arusha region was automatically changed to be “Mbeya Zonal Unit”.

In case of database, you revised only once on Table-2 and other related queries were automatically revised. It means that you can keep consistency of the data easily and also you can decrease possibility of misoperation.

In conclusion, establishment of database requires some time. However, once you establish it, you can keep consistency of the latest data very easily. You have to consider whether your work worth to spend some time to establish

How do we develop database?

Microsoft Access database programme consists of four elements such as:

a) Table,
b) Query,
c) Form, and
d) Report.

Table has function to store the data. Query can search the required data by giving conditions from the Tables. Form can assist easy operation (data input and inquiry) of the database. Report can show result of the data inquiry.

To develop the Microsoft Access database programme, understanding of the four elements is essential. Especially, understanding of table and query is most important. Table and query is core of the Microsoft Access database programme, since they handle data transaction. Form and report can be considered as supporting elements, since they assist users to input and output the data only.

To familiarize yourself with use of table and query, understanding of "relationship" is required. The relationship is the function to relate table or query with other tables or queries. To understand the relationship, the following sample database was established.

Sample database (no relationship)

You are the owner of restaurant. You are serving meals consist of food and dish. You are preparing menu of the meals using the database.

In this case, it is recommended to prepare two kinds of master lists and show all the combination for the menu by query, since you can update Query-1, only modifying Table-1 or Table-2 without changing setting of Query-1.

Table-1 (master list of food)

	Food_Eng_ID	Food_Eng_Name
▶	1	Rice
	2	Banana
	3	Ugali
*	(AutoNumber)	

Table-2 (master list of dish)

		Dish_Eng_ID	Dish_Eng_Nam
▶	+	1	Beef
	+	2	Chicken
	+	3	Fish
*		(AutoNumber)	

Query-3 (combination of foods and dishes)

Food_Eng_ID	Food_Eng_Name	Dish_Eng_ID	Dish_Eng_Nam	Dish_Swahli_ID	Dish_Swahili
1	Rice	1	Beef	1	Mushikaki
2	Banana	1	Beef	1	Mushikaki
3	Ugali	1	Beef	1	Mushikaki
1	Rice	2	Chicken	2	Kuku
2	Banana	2	Chicken	2	Kuku
3	Ugali	2	Chicken	2	Kuku
1	Rice	3	Fish	3	Samaki
2	Banana	3	Fish	3	Samaki
3	Ugali	3	Fish	3	Samaki

In this sample, no "relationship" was declared since there is no relation between food and dishes. You can obtain all the possible nine combinations from three foods and three dishes.

Sample database (with relationship)

You are owner of the restaurant. You are going to prepare comparison table of dish menu between English and Swahili for English speaking people.

In this case, it is also recommended to prepare two kinds of master lists and show all the combination for the menu by query.

Table-a (master list of food in Swahili)

	Dish_Swahli_ID	Dish_Swahili
▶ +	1	Mushikaki
+	2	Kuku
+	3	Samaki
✳	(AutoNumber)	

Table-2 (master list of food in English)

	Dish_Eng_ID	Dish_Eng_Nam
▶ +	1	Beef
+	2	Chicken
+	3	Fish
✳	(AutoNumber)	

Query-c (comparison of English and Swahili)

	Dish_Eng_ID	Dish_Eng_Nam	Dish_Swahli_ID	Dish_Swahili
▶	1	Beef	1	Mushikaki
	2	Chicken	2	Kuku
	3	Fish	3	Samaki
✳	(AutoNumber)		(AutoNumber)	

In this sample "relationship" was declared between Dish_Swahili_ID and Dish_ENg_ID, since there is a relation. Dish_Swahili_ID (1), which is Mushikaki is related to Dish_ENg_ID (1), which is Beef. For ID 2 and 3, same things can be said. In this sample, you can obtain only three combinations in the Query-c, since the database recognized that there is no relationship between Dish_Swahili_ID (1) and Dish_ENg_ID (2) or (3). (Mushikaki is not related with Chicken and Fish).