

TRAINING COURSE C METADATABASE MANAGEMENT

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Part One: Overview of TANGIS system

The concept of GIS in LTBP

Aims

To give an overview of the place of GIS in the LTBP project

Notes

The LTBP PowerPoint display.

The role of the Metadatabase manager is to manage the flow of GIS information for the management and research of the lake.

Duties

1. Ensure the upkeep of the digital metadatabase. To actively seek relevant sources of data to support the data needs of the Strategic Action Programme. To liaise regularly with known data providers (e.g. to get updates of Survey databases every three months, liaise with National GIS data co-ordinators).
2. To update the catalogue web pages every three months and publicise the new datasets through a newsletter.
3. To liaise with or co-ordinate the GIS user group in the region and to assist in sourcing personnel with suitable technological, practical or theoretical solutions to GIS, data or spatial issues in the SAP.
4. To assist non-GIS users in the production of maps, charts and statistics to support SAP or research activity on the lake and in the catchment.

To do this, the metadatabase manager needs the following skills

Skills

1. Ability to use MS Access and knowledge of databases.
2. Understanding of GIS theory and experience in at least one GIS package (preferably Arcview). Some skills in geographical concepts (understanding particularly concepts of scale, projection, resolution, map-making and visualisation).
3. Good communication skills.
4. Some knowledge of Internet use and HTML would be an advantage.
5. French and English speaking and written skills.

Fundamentally, the metadatabase manager is the focal point of the information pathways for GIS data. He is to gather information about all datasets (and if possible the datasets themselves) from all sources and distribute the information widely around the region.

The information flow is proposed to work in a thirteen-week cycle:

Week	Job	Responsibility
------	-----	----------------

1	Required database updates sent to National Co-ordinator (or to report no new data)	Database managers (National Co-ordinator to follow up if not sent by certain date)
2		
3	Full set of databases sent to MINATE	National Co-ordinators (MINATE to follow up if not sent by certain date).
4		
5	Database catalogued by MINATE	MINATE
6		
7	Newsletter and Web Pages Produced	MINATE
8		
9	Strategic Inputs sent to SAP co-ordinators	MINATE (Responsible parties of SAP to follow up if not sent by certain date)
10	TANGIS datasets available to all identified sites	MINATE (National co-ordinators to check with GIS sites and follow up if not complete by certain date).
11		
12		
13		

The LTBP digital database

Aims

- To give an overview of the idea of a digital database
- To give an understanding of the types of data involved
- To understand some of the key datasets in the LTBP dataset
- To comprehend how the database is seen as an evolving tool

Notes

Overview

The database you are managing is simple in structure. All data can be stored in the same directory. However, there are a series of ancillary directories, which will be looked at in detail later.

Types of data

What types of data should be in the metadatabase?

- All GIS data coverages, shapefiles and GRID datasets
- All databases with some geographical reference (e.g. BIOSS Survey database)
- Statistical information relating to village, town, district or other administrative unit.
- One off images (such as Landsat scenes)

What data do not need to be in the archive?

- The massive LARST image catalogue should not be stored, but reference can be made to it.
- The literature and reports database - this is being catalogued elsewhere and is for non-spatial data.

Different Types of Datasets

Vector

Points, lines and polygons

Raster

Gridded data - for DEM or satellite images

Database

Such as the BIOSS database.

Text File - georeferenced datasets (e.g. from Excel spreadsheets).

Non Geo-referenced Text file - that can be joined onto Framework datasets

Comparison

Feature	Vector	Raster	Database/Text File
Data model types	Point, line , polygon	Grid cells	Point location
Overlay	Good	Very easy to model with.	Not easy to overlay
Creating data	Need GIS software	Need GIS, Image Processing Software	Can be integrated from many different forms
Modelling	Needs sophisticated software to model with.	Good for modelling data	Not easy to model with
Query	Easy to query with	Difficult to query	Very easy to query
Update/Modify	Need to extend original dataset	Difficult to update, unless getting a sequence of satellite images	Very easy to update
Digitising	Can digitise very easily	Difficult to digitise	Enter data in spreadsheet or database forms very easily.
Data size	Compact	Large	Compact
Attributes	Many	Restricted	many

Types of dataset in the LTBP dataset

There are various sorts of data in the database, and they can be classified different ways:

- By type (e.g. raster, vector)
- By application (e.g. Pollution study, Fishing Practices)
- By source (satellite data, map data, Special study database, survey)

Part of your job, as Metadatabase manager is to catalogue all the important information so that everyone can search for data of these types.

All these datasets can be stored in the Metadatabase and the digital datasets can be shown through TANGIS Web site – you can search for data through the web site. If you have TANGIS, though, you can directly search for the right datasets by using the **Add data** menus.

Some of the important datasets in TANGIS:

- Background maps – 1:1 Million scale maps of the main topographical features: roads, rivers, lakes, railways, settlements
- Extra land data – National parks and reserved land, land cover
- Elevation data – 1km raster data for the whole of the region, metre accuracy; slope map.
- Logistical data for project – study areas, project offices, GIS contacts database, sites of all special study activities, pollution, sedimentation survey sites.
- Bathymetrical data – bathymetry map of whole lake, index of individual sheets at higher scale, map of three basins
- Survey databases – BIOSS survey database, Pollution database (soon?), Core samples from ships' surveys.
- Geographical information – gazetteer of lakeshore, settlement names.

- Socio-economic/administrative data – districts and other administrative units, population statistics, boat surveys.

Check

When you get a new dataset source, check the source of the data – who originally made it and for what purpose

Check the format – will it fit into your GIS – is it a shapefile, image or database?

The scale – is it suitable for the work you are doing?

The time it was made – is it up to date?

For which datasets is the metadatabase manager responsible?

Basically all metadata, although you are not responsible for creating those data, only cataloguing and archiving them efficiently.

However, you are responsible for the upkeep of the following datasets:

- The Gazetteer of sites - place names around the lakeshore which are commonly in use.
- Updating the settlement database - with all place names around the catchment.
- Updating the GIS Contacts list -- since you are the focal point of lake activity.
- Maintaining the Special Studies Sites dataset in the TANGIS metadatabase. This is the list of all the special studies locations, and even though these may be changed as the project ends, there will be routine survey sites that should come on stream.

You should be responsible for ensuring that the background datasets are kept maintained, and if better (better scale or accurate) datasets come on stream, you should replace the older datasets with these.

The Main databases (BIOSS Survey, BIOSS Literature, Pollution Fishing Practices etc) are not your responsibility. However, you should be responsible for ensuring that they can be linked in with the GIS effectively. And as with other temporal datasets, you need to ensure that you receive timely updates.

You are not responsible for the LARST image database. However, you should be aware of its existence and be able to access the data when it is required.

The ultimate responsibility for the metadatabase manager is the maintenance of the metadatabase. This means making sure all the records are available in both English and French, that they are transferred to the CD every time an update is carried out, and that the web pages are updated effectively.

TANGIS interface

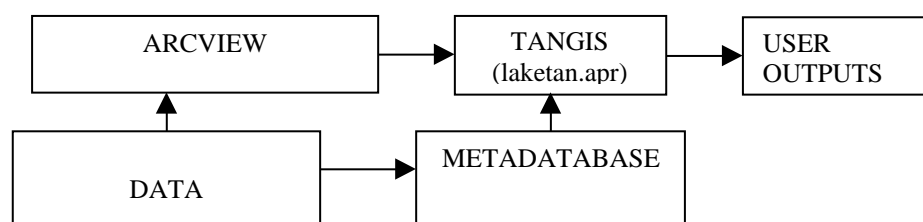
Aims

1. This shows how the GIS interface can be used
2. To allow the manager to have the knowledge to support other users of the Interface
3. To comprehend the different versions of TANGIS available.

Notes

TANGIS is an Arcview project with a series of customisations so that data from the project can be viewed easily by non-GIS specialists.

It is built upon a large database from various sources of information, managed through a metadata base, from which users can create outputs (such as maps, charts and tables).



The purpose of TANGIS is to allow non-GIS users to look at the datasets. More specialist GIS users will make use of the data for the LTBP, but will probably not need to use TANGIS.

There are four different versions of TANGIS available. These should be made available on all version of the CD, but some people can only use some versions depending on the software they have.

The four versions are:

Name of file	Application	
Laketan30.apr	For Arcview 3.0a without Spatial Analyst Extension	
Laketan30SA.apr	For Arcview 3.0a with Spatial Analyst Extension	
Laketan31.apr	For Arcview 3.1 without Spatial Analyst Extension	
Laketan31SA.apr	For Arcview 3.1 with Spatial Analyst Extension	

How to search for datasets

Aims

1. To show how to use the TANGIS interface to search for datasets
2. To understand the concept of dividing data into themes (Planning, general and SS)
3. To show how the normal Arcview tools can still be used

Notes

Adding and removing data from a view in TANGIS

To add data to a view

To add data to a view, click on the “Add data” menu and select one of the categories:

If you want to add data specific to the interface, click on the name of the interface (e.g. SEDIMENTS)

If you want to add from any of the datasets, click on “ALL DATA”

If you want data only of one type, select it (e.g., select Images, Other Raster, Map data (vector), and Text data.

To remove data from a view

Select the Remove data from the menu

- If you want to remove all data select All data
- If you want to remove data of a certain type, click on type of data.

To add new data that has no geographical reference

First add the framework dataset which it relates to

Then make that theme active, go to the Add data menu, select Join Themes and select the dataset from the drop down list. It will load into the framework dataset and rename itself.

The purpose of classifying the data correctly in the metadatabase

Part of your job of cataloguing data in the metadatabase is to classify the datasets so that they can be effectively used inside the TANGIS interface. To do this, you need to understand where the categories are important in adding data to a view.

1. **Projection field** - this determines whether the data is shown in the UTM or Lat/long co-ordinate system. You must correctly catalogue these; or else data which does not overlay will be shown in the same view.
2. **Main Application that the data will be used in** - This will determine whether the data can be searched through the SS menu. Choose carefully and if the data is generic to all applications, choose General
3. **Type** - it is fundamental to the application that this is entered correctly. Not only does it determine the search within the **Add data** menu, but also it needs to be correct so that the right processes are gone through to add the dataset in the system. If this is not done correctly, then TANGIS will have serious errors.
4. **UR and LL co-ordinates** - this must be correct so that the planning interface will run correctly

Non TANGIS data entry methods

Remember that you can use the normal Arcview tools to add data:

- Add theme button
- Feature data source - for vector, Image and GRID data types.
- Add event theme for text or DBF tables
- SQL connection for databases

We shall revise these ideas in the section on basic Arcview tools.

Using the TANGIS tools

Aims

This shows how to use some of the extra tools in the TANGIS interface, not normally present in Arcview

This includes use of:

- Merge Themes
- Projection
- XY data
- ID maker

Additionally, the issues surrounding the use of data in different projections will be discussed.

Notes

All these menus occur in the General Interface of TANGIS.

Merge Themes

This can be used when you have tiles of data.

1. Load the themes you want to merge in the table.
2. Make sure that they are compatible themes. For this to work properly, you must have themes of the same feature type, of the same co-ordinate system and projection and that the attribute fields are identical.
3. Run the program from the GIS Tools menu
4. Select the two or more themes you want to merge
5. Save the new file to your designated location
6. You are then asked whether you want to load this theme in a view. Do this and check that the merge has been completed successfully.

Projection Tool

Follow the guidelines in the manual to run the projection tool.

XY Location

This exports the Attribute table as a DBF file, with two extra columns of X and Y.

If a point – it records the point

If a line or a polygon, it records the centre point of the feature.

This is done automatically to the dataset.

ID Maker

You can use this if your dataset has no unique identifier for each feature. Simply select an active theme, select the program, from the menu and run. It asks for a new name for the column (you can take the default if you want to) and then makes a new ID number and populates it.

This is very useful if you have a GPS file with ID numbers in the GPS unit, lost in the transfer. Since they are stored in the same order, you can simply use this tool to renumber the attributes, then they are the same as the feature you are identifying.

Outputting maps, charts and statistics, from TANGIS

Aims

1. To show how to use the layout facilities to make maps
2. An introduction to the charting tool
3. Covering of Summary statistics tools in Arcview.

Notes

Layout

A **layout** is used to create a page that allows you to print out parts of your project.

You can add tables, charts, images and view to a layout but we shall concentrate here on outputting a view. You can make a layout from a view if you have the view open.

First:

Make sure your view has all the elements it needs inside it:

- A group of themes all properly labelled and symbolised
- A series of legends for each theme
- The view is zoomed to the correct location

Now go to the **View** menu and click on **Layout**.

Now the layout appears with a series of **graphic objects**:

- the **view** inside a **view frame** ,
- the table of contents shown as a **map legend**,
- a **scale bar**, and a **north arrow**,
- a **title**.
- The **LTBP logo**

You can rearrange any of these features by clicking on the graphic with the select tool

(). Small black boxes appear around the object to show it is selected.

- You can move the object now by clicking and dragging inside the box.
- You can resize by going to one of these black boxes and clicking and dragging the box to a new size.

To **add a new graphic to a layout**, you can select from the drop down tool menu:

For example:



- add a new view frame



- add a new chart



- add a new table



- add some text (e.g. a title)



- add a scale bar

To edit what is in the view frame, you need to adjust the view:

- Change the view **zoom** to fit the area you want to display in the layout
- Click items in the TOC on or off to decide what is shown in the layout.
- If you want a data layer to appear in the view frame but not in the map legend, you can make the theme active, click on **Theme** menu and select **Hide/Show Legend**.

You can change the properties of the layout or any of the Graphic elements in a layout.

View Frame properties include:

Scaling the view frame:

You have several options here;

- preserve the view scale, create a new scale, fit to the view frame.

You can also edit the relationship between the view and the view frame:

- fit to frame, same as View.

Once you are satisfied with the layout, you can click off the **live link** between the view and the view frame. This means you can continue to use the view (even create a new layout in a different area with different components).

Layout Properties

There are several properties you can set here:

- You can **rename** the layout - this is how it appears in the project window, not the title as it is printed out. You have to edit text in the title if you wish to change this.
- Moving the graphical elements around is normally controlled by the grid - which helps in aligning features. You can change the **resolution** of the grid in the layout properties, or alternatively, click off the **snap to grid** option.

Printing out a layout

When you are satisfied with your layout, you can print it out.

1. Go to File **Print Setup**

It is worth checking that the printer is set up correctly.

2. Check the **landscape/portrait** settings, the **paper size** and the colour/quality settings
3. Click OK
4. Click on File **Print**
5. Click on OK

The system will take a few moments to start printing.

Saving the file as an image

1. Go to File and select Export
2. Select the file type
3. Locate where you want to place the file
4. Give the file a name
5. Press OK

Chart tool

The charting facilities within Arcview are very limited but can be useful to make simple summary charts.

To make a chart

- Click on the Chart button and go to new.
- You get an interface within which you have to select:
- A table containing the data
- The fields you want to show
- What you want to call the chart
- A label field

Choose these items and then view your chart

There are options to change the look of your chart to:

- Scatter
- Line
- Pie
- Bar
- Column

Summary statistics

A good way to use your data is to summarise it. There are various ways to do this.

Statistics - general statistics can be used, either on the whole dataset or on the selected portions

Summarize - a new table can be made of summary data, which is useful if you want to total the area of different land use types, or find the maximum rainfall in an area.

Again the summaries can be on the whole dataset or the selected portion.

Part Two: Background software training

Overview of Arcview –Views/Tables/Charts/ Layouts; scale and projections

Aims

This section serves as a reminder of the main default Arcview tools available. Although you have already used some of these in TANGIS, this details their use and part in the whole application.

In this section you will learn how to :

- Open up Arcview
- Understand projects and documents
- Add data to a view
- Document a view
- Navigate around the view and zoom in and out
- Learn how to geo-referencing of data works.

Notes

Opening Arcview

To start Arcview, you click on the Arcview icon in Program Manager.

Introduction to a "Project"

Arcview is a program allowing you to manage your geographical documents. The documents are stored in a project. There are several different types of documents in an Arcview project. You can consider the project as a filing cabinet and each document is stored in a different drawer, according to its type.

The types of documents you will use in Arcview are:

A View - an interactive map showing your data

A Table - shows tabular representations of your data

A Chart - shows graphical representations of data

A Layout - allows you to put together tables, charts and views so that you can print out or present your data

Each of these documents have elements or objects associated with them:

e.g. a View is made up of different geographical layers, called Themes

The project, the documents and the objects all have a set of attributes associated with them called properties.

- A **Project** has properties (name, selection colour)
- A **View** has properties (Map units, name, comments)
- A **Theme** has properties (description, name, label field).

Making a project.

When you open up Arcview, you are shown a project window. To look at the list of documents of a particular type, click once on its icon in the left-hand side of the project window.

e.g. **Click on the table icon**

A list of tables would appear here.

At the moment the filing cabinet is empty.

How to save a project


Click on the Save button.

Write a name for your project. Click on OK.

The name of the project now appears in the top of the window.

Help

You can get help in three ways:

1. **Menu** - Help Contents
2. Help using the  button (**Contextual help**) and highlight a menu or button in the Arcview window.
3. Help **Search** for a key term.

Views

Making a view

For GIS users, the major function of a GIS is to show your data in map form. In Arcview this is done through using View documents. To make a view:

Highlight the View icon in the project window.

Click on the New button.

Elements of a View

A **View** has :

- a **Menu** - these list all the functions you can do with a view or elements of a view
- a **Table of contents (TOC)** - this is the grey area on the left which contains a list of all your data and how it is represented.
- a **Display** - this is the white area in the centre that contains all your data.

View Properties

You can set view properties by clicking on the View menu and selecting **Properties** option. This allows you to :

- **rename** the view
- Add **comments** to the view
- Set the **map units** and the **distance units**
E.g. , your map may be referenced in metres and you may want to measure distances in Kilometres.

Note when you change this, you see the current scale of your map in the scale window.

Adding data to a view - Themes

Views are made up of **Themes** or layers of geographical information. Themes can be from many different data sources:

- Arc INFO Coverages.
- ArcView Shape Files.
- Satellite images.
- Point data saved in a table (e.g. GPS points).
- ARCINFO raster GRID data.

To display a theme, you need to click on the **Add theme** button:

To add an Arcinfo coverage: **Make sure that Data type is set to Feature Data Source.**

Now click on the directory where your data are stored and select the data set you wish to add.

To add more than one theme at a time, use the mouse button with the Shift button.

Click on OK.

The data are shown in the table of contents.

You can make a theme **visible** and **active**.

To make a theme **visible** (i.e. so you can see it in the display)

Click on the little check box.

To make it **invisible**, **turn the check box off.**

An **Active theme** is one highlighted in the table of contents. You can make a theme active by highlighting it in the table of contents (TOC). Click anywhere in the area of the theme in the TOC. When you make a theme active, it allows you to :

- **Zoom** to the extent of this theme
- Look at the associated **attribute table** for the active theme
- Look at the active theme's **properties**
- **Hotlink** to documents related to the active theme.

You will notice that many of the buttons and menu items in the view become enabled when you have an active theme. Again, you can make more than one theme active at a time using the shift button.

Theme Properties

You can set a themes properties by making the theme active and selecting Properties from the Theme menu. A dialogue box appears.

You can change all the theme's properties in here.

- Name
- Definition
- Text label position
- Scale of view thresholds
- Hotlinks

The main property you will be interested in is the name of the theme







By default the file name from the source data is used when you add a theme to a view, but you can call this anything you like - and you should endeavour to make the theme name more meaningful for any users.

To change the theme name, click on the name field and type the new name in. When you press OK, the TOC is updated with the new name. Note: this does NOT change the file name of the data, it only changes the reference to the theme in this view.

Note you can open up the same data source in more than one view, or twice or more in the same view; it can then be used to show different expressions of the same dataset.

Zooming and Navigating around the view

There are many ways you can zoom in to different parts of your display.

1. **Zoom in** button: Zooms in by two 
2. **Zoom out** button: Zoom out by two 
3. **Zoom in** tool : Click and drag 
4. **Zoom to active theme** - if you have made a theme active in the table of contents, you can zoom to the selected one: 
5. **Zoom to extent** of all themes: 
6. **Zoom to selected features** of active theme: 
7. **Pan** - using the hand tool, you can grab a part of the image and move it around the view.
8. Type a **new scale** in the scale box. The view resizes to that scale around the centre point of your current display.

Exercises

1. Start Arcview and save the project
2. Make a new view. Set the properties to Decimal degrees Units, and kilometres distance units
3. Add the following themes: roads, rivers, lakes.
4. Experiment with the Zoom in and zoom out tools. Look at the scale bar. How does this change?

Symbolising information


Aims

To show how data can be symbolised and new legends be saved.
This is preparation for creating legends in when cataloguing new data.

Notes

Presentation of your data in the most easily understandable form is one of the primary aims of using Arcview. Arcview gives you many ways of presenting your data.

We shall look at the **Legend Editor** here.

To open the legend editor, you need to make your theme active and then either double click on the theme in the TOC or select the  button.

You can represent your theme as:

- a **single symbol** - e.g. a road
- a **unique classified symbol** - based upon the categories of your dataset:
E.g. roads classified by road type (gravel, tarred, dual carriageway, single track)
- a **graduated classified symbol** (based on categories splitting your data into a few classes)

E.g. Population of villages in 5 classes; those between 0-1000, 1001-2000, 2001-3000 etc.

- **charted** - e.g. the proportion of people working in agricultural, industry and services, with the population total as the symbol size.

Symbols are presented for all types of features; lines, points, annotation and polygons. You alter what symbol is used and how the symbol appears in the **Palette manager** - choose **Show Symbol Window** from Windows menu.

You can vary the:

- **point** symbol (type, size, orientation)
- **line** symbol (width, pattern)
- **text** symbol (font, size, type)
- **colour** (of foreground, background, text or outline)
- **pattern**

To change the symbol for each class:

1. Double click on the symbol

A palette appears:

2. Choose the correct palette manager to edit your symbol:
3. Choose a symbol
4. Choose a colour

Notice how your choices in the palette manager are automatically updating the legend symbol you have chosen.

You can also save and load legends.

Save using the **Save** button in the legend, saves the current legend as an **AVL** file which you can reload at any time. It is attached by default to the current dataset and the field in that dataset, but can be applied to similar datasets.

Other ways of manipulating the look of a legend:

- **Labelling** - If your original data was coded, then you do not need to recode the attribute table, but can just attach a label to a legend in Arcview
- Click on the **Label** to update and type in a new value.
- Using **ready-made palettes** -Arcview has some created palettes listed in the **colour ramps** option at the bottom of the legend.
- If you don't like the legend, click on the **Undo** button and start again.

In **Classify** – you can find a whole different number of ways to represent your data: You can have different **numbers** of classes.

You can classify:

- **By equal area**
- **By Natural Breaks**
- **By Equal Interval**
- **Quantile**
- **Standard Deviation**

Once you have finished updating all fields, click on the **Apply** button in the legend editor to commit all the changes to the legend to the view itself. Notice how the changes are shown in both the TOC and in the representation of the dataset in the display.

Click on **Close** to close the legend editor and return to the view.

Exercises

1. Load the sample.shp file into the view
2. Show the legend with Unique values for the substrate dataset.
3. Experiment with the colours and symbols in the palette window
4. Show the survey.shp file. Classify it with Graduated Symbols classification.
5. Load the Population of Congo theme – Experiment with the different types of classification types and the numbers of classes – how differently can you show the data.

Access

Aims

To guide through the basics of Access databases

To understand concept of tables, queries, forms and reports, and to show how relationships work

Notes

Opening Access

To start Access, you click on the Access icon in Program Manager.

Introduction to a "Database"

Access is a program allowing you to manage your database data. A series of documents can be stored in a database. There are several different types of documents in an Access Database. You can consider the project as a filing cabinet and each document is stored in a different drawer, according to its type.

The types of documents you will use in Access are:

A Table - this contains the original data

A Query - this is where you have combined data from one or more tables to answer a problem

A Form - this allows for easy to use data entry, or for having buttons and graphics such as those of the Arcview main interface.

A Report - allows you to present data from your database in a print out or export format (e.g. a Word File or HTML document)

Each of these documents have elements or objects associated with them:

e.g. a Table is made up of different columns

Making a database

When you open up Access, you first create the file that will contain the database. Then a database window will occur. To look at the list of documents of a particular type, click once on the tab across the top.

e.g. **Click on the table icon**

A list of tables would appear here.

At the moment the filing cabinet is empty.

How to save a project

Access will automatically save itself routinely, so you do not have to worry about saving the whole database.

Individual changes in structures (e.g. for forms, queries, or tables) do need saving and you will be asked at the appropriate time.

Tables

Always in Access, the first job is to create the tables that will contain your data. Click on the table icon and select the New button

Elements of a Table

A **Table** has :

- Columns - these are the attributes of a dataset. They need defining before data can be entered
- Rows - these are the records of the table and can be added once the structure has been decided.

Forms

Forms allow you to look at the data

You can create simple forms using the Form Wizard

Features to look at :

- Button
- Combo boxes
- Text
- Adding from a field list

Various tools exist to allow you to change the appearance of the form

- Selecting data
- Aligning Tools
- Font
- Background colour

Relationships

This is the key to how the tables are joined in the database.



Click on the relationship button

There are several forms of relationship set up between tables. These are:

1-1 - where one record in one table is linked to one record in another

1-many - where one record in one table is linked to many in another

many-1 - where many records in one table link one in another

The method of linking is through common fields in each table. In the TANGIS metadatabase, there are three linked tables, linked in a 1 - many relationship

Datasets - Vectors - Vector Fields

ID numbers link the tables together. So that is why in the forms, you can see the Datasets ID in the vector form, and the Vector ID in the Vector Fields form. You can also see why it is vital that you use unique ID numbers for each record, and that you always put an ID number in these fields.

Use of relationships

- In setting up meaningful queries
- In being able to have linked sub forms inside a table
- In order that the reports can be written effectively.

Queries

The purpose of queries in the project are:

- To combine data
- To filter data
- To update tables
- To show data ready for a report
- In the GIS, we use a query so that all the relevant data are ready for Arcview to use.

Reports

The purpose of the reports are where the catalogues are created.

You can manipulate the look of a report using various text boxes, pictures.

The TANGIS catalogues are of two types:

Tabular report – the short catalogue is built this way

Columnar report – the long catalogue has this.

Because of the Relationships for tables, a sophisticated report can be built up easily.

Maintenance of the Access database

There are various tools to manage the database.

Compression - the Access database can often contain "holes" where data have been moved or deleted. You can save a lot of space on your hard disk by using the compression tool.

In the **Database** window, click on the **Tools - database utilities** menu, and click on **Compact Database**.

Part Three: Detailed structure of system

Understanding the structure of the TANGIS database and facilities

Aims

This section deals with showing the structure of the database for TANGIS. It aims to show what documents are needed to make the system run effectively.

Notes

The Lake Tanganyika Biodiversity Project (LTBP) has a GIS database allowing all users to access the different types of data without learning how to use GIS. The Metadatabase managers job is to make this as easy as possible and provide all the supplementary details for people to use the system effectively.

We have structured the data inside the TANGIS directory

- Programmes
- Administration documents and tools
 - administration documents
 - GIS network with GIS contacts.mdb inside.
 - Manual & training documents.
 - Scripts
 - Web Page data.
- Data directory
- Database Directory
- Metadata directory
- Extras directory including
 - Banner
 - Codenames
 - Legend
- Temp directory
- New_data directory
- Archive directories

You are able to use the Access data structure to organise system management correctly.

Programmes - are stored in the main directory. All four versions are stored in here.

Administration documents/tools - these include the manuals for TANGIS, the protocol documents and training courses, also the Web Pages and newsletters and other tools and documents to assist with your administration of the system

Data Directory - all data will be in here - this will also include the Info directory that deals with GRID attribute data.

Metadata Directory - this contains only the full Metadatabase and can have the cut down version of the metadatabase for CD distribution.

Extras

- **Banner** - this contains the LTBP logo which loads at the beginning of a TANGIS session and in the layouts
- **Codenames** - Code files are created to explain codes used in some fields in the database.
- **Legends** - all .avl legend files are stored in here and should not be stored in any other location.

Temp directory - this is used as a default directory in TANGIS and stores some temporary files.

New data directory - this is for the metadatabase manager to store un-catalogued information.

Archive data directory - the metadatabase manager should store a copy of all datasets when he receives them in this directory. This eases archiving procedure at the end of a period. The archive directory should be deleted when all the data is backed up on CD.

The **programs** you have available to you are:

- Arcview 3.0 a
- Arcview 3.1 with Spatial Analyst, Network Analyst extension
- MapInfo GIS
- Paint Shop Pro
- Gear CD writing software
- Surfer for Windows

As well as the main PC, the **Hardware** for the system includes:

- MO drive for reading LARST images.
- An A3 printer
- The laptop with 3 batteries and external mouse
- A link between a car battery and the laptop.

Computer maintenance

Aims

This is to give the metadatabase manager more confidence in maintaining the data, hardware and software of their machine.

Notes

The system runs on Windows NT & Windows 95.

You have a complete set of software CD's and manuals for the system.

The computer disks are partitioned in the following way:

Drive	System	Contains	Size
A:	Floppy disk		1.5Mb
C:	FAT (for Windows 95 & NT)	Windows 95	1000 Mb
D:	NTFS	Windows NT files	1.34 Gb
E:	NTFS	TANGIS	2.32 Gb
F:	CD Drive		
G:	CD Reader and Writer		
	MO Drive	Can be attached at any time and allocated a letter	

Deleting the temporary files

You may need to create space on your drives, you can generally do this in the following places without fear of deleting important information:

- NS cache
- Any \temp directory
- Recycle Bin

Shutdown and start-up

It is vital that you close down and start-up the machine correctly each time you use it.

Shut down - This can be done by going to the Start Menu and clicking on Shut Down. Make sure you select the correct option.

- There is no password protection on the machine.
- Some tools do not load correctly, but do not affect performance; just click on OK.
- If you use Windows 95, the shut down procedure is the same, but the machine generally takes less time to do it.

Part 4 – The metadatabase

Introduction to the Metadatabase

Aims

This section breaks down the metadatabase into its component parts. It shows:

1. How to enter the metadatabase
2. The use of buttons and drop down menus
3. The French and English Interfaces
4. The various sections - adding data, querying data, making catalogues and special data managers pages.

Notes

How to enter the metadatabase

You can enter through the icon on the start up menu or open Access and open the TANGIS\metadata\tangis.mdb file.

The first screen gives you three options:

- To work in English
- To work in French
- To Exit

The screens below work in exactly the same way, whether French or English.

The Interface gives you the option to

- Add new metadata (either digital or non-digital)
- Query the data or view all data
- Make catalogues
- Provide extra tools
 - To register the special studies
 - Alter the look up tables
 - Convert English fields to French and vice versa.
 - Assist in Archiving data
 - Convert data to Web page
 - Make a newsletter

To exit the metadatabase - click on the red exit button.

To change language - there is a button at the bottom of the main screen.

Note - always try to use the buttons in Access, not the menus at the top

Checking consistency in TANGIS

Aims

This section helps to ensure that integrity of the database, the connections to the GIS and the Web pages is maintained

Notes

It is vital that all the detail in the metadatabase are correct and complete. There are two main reasons for this:

1. Level 4 data will not work correctly within the TANGIS interface unless it has been correctly entered in the metadatabase.
2. The information transferred to the web page must be clear, concise and complete so that people looking on the web pages have an immediate idea of the quality, extent and detail available for a particular dataset.

The following steps must be taken to ensure that detail is correct.

Use the spell checker to check through all the records

Make sure the whole dataset works within TANGIS:

1. The legend file loads correctly
2. The theme is properly named
3. The description and processing appear in the Theme Properties
4. The maximum and minimum scale of display shows correctly and is useful.

In the metadatabase, check the short and long catalogue record

1. Check that the records are spelt correctly, are meaningful
2. Check the entries in the short and long catalogues do not go beyond the window allocated for each section

At the end of an entering session, ensure that the ID.XLS is correct.

The protocols in the manual assist with this.

Translation issues

Aims

1. To understand the issues involved in having a bilingual GIS system.
2. To know the fields which need translation.

Notes

All data needs to be entered in both French and English

The following fields must be checked routinely in the metadatabase:

- Long Name
- Description
- Processing
- Field Descriptions
- Main Application of use
- Source of data
- Copyright details
- Contact
- Extra information.

Use the button in the Data Managers page to look at the fields that need translation. When you see an empty field, this has to be entered.

Warning - this shows all the data – you must be careful as in some fields, entering the data once will allow it to be fed through all related records. A form has also been produced that will assist in the translation. You need to decide which one you are most comfortable using.

Other information that needs translating

- Legends must be stored in both English and French.
- Codefiles could also be translated

Tips:

1. We recommend that you use the form for long fields and the table for shorter fields.
2. Use the Copy and Paste facilities when you want to repeat the same information in another field.
3. When you are changing large amounts of information, highlight the records in the column you want changing and use the Find and Replace menu to change items.

Making catalogues & transferring the catalogues to the Web Pages

Aims

This section details how to:

1. Make the short catalogue
2. Make the long catalogue
3. Transfer the short catalogue to the web site
4. Transfer the long catalogue to the web

Notes

Because the metadatabase is in Access, the procedures for making the data catalogues are very simple and automatic.

However, the relationship between Access and the Internet is still not well developed, and a careful protocol must be followed to do this.

Catalogue pages in the Metadatabase

The short catalogue is made automatically – check the button marked "New records for short catalogue".

The web long catalogue differs from the normal catalogue in a number of ways:

1. It is in A3 format - this means that most datasets fit on one page. This is useful as when the data are exported to HTML, each record in the database comes out as one HTML file.
2. The catalogue is ordered in ID number order. This makes it easier for you to change the number of the file when you are preparing the data for the Web pages.
3. The format of the file is much simpler than the metadatabase. This makes the final HTML file clearer to use.

Follow the protocol in the manual.

Extra Notes

The page set up for the long catalogue should be A3. If not, when you create the catalogue, go to File Print set up and check that the paper size is A3. This ensures that all the data for the record is contained on one page.

Other web page duties

Aims

This section details the other web pages on the web site:

1. The introduction to GIS
2. The web page links
3. The newsletters
4. The LARST catalogue
5. Translation

Notes

Although the main part of the web page is the responsibility of the Systems Manager; they rely upon other people to provide new information. The Metadatabase Manager should assist in publishing the pages relevant to the GIS section.

This includes:

- Ensuring that all the links to the pages work. - this is easily checked by clicking on the hyperlink.
- Ensuring that the External Data Sources links are kept up to date:
This page contains a summary table and a list of items further down the page. First make a list of the new web sites, detailing the name, its full web site address and a brief description (if necessary). Then try to classify which special study theme it is most appropriate for (General if none) and star the site on whether you think it is good or excellent. Do not link to sites with limited or non-useful information.
Do not try to edit the web page - it is easier for the web page manager to do this.
- The newsletter - this is covered elsewhere
- The long and short catalogues - this has already been covered.
- The LARST catalogues have been maintained elsewhere and you should ensure that people are given correct details when trying to deal with them.
- Translate all pages so that the important information is in both French and English. This can be done through the project translator r using the Alta Vista, but you should read through in both languages to ensure that jargon has been translated correctly.

Part 5 – Support Services

Archiving, storage, backup and categorisation of datasets

Aims

In this section we will learn:

- Why archive?
- How to Back up using GEAR CD.
- The management of files during archive

Notes

Why Archive?

We archive data so that if in case of the computer breaking or the data being lost for some reason, we have an archive set.

The archive will also be linked to the 3monthly updates of the TANGIS system. The archive can also be an easy retrieval system if you want to give other users of the data a quick set up.

Ensuring Archiving is easily.

Several systems are in place to make archiving as easy a process.

1. Data directories

As well as the normal data directories where data are stored, there are also two extra directories for the metadatabase manager to manage the flow of data into the system

- The New Data folder allows new data to be stored until it has been properly archived.
- The archive data directory is where you keep a copy of data that has been created in between archives.

Every three months, the data are archived correctly and also can be written to CD's for further distribution to everybody working with the project.

2. Metadatabase fields

- Ensure that you are entering the date of entry into the metadatabase. Then when archiving occurs, you can simply read off the list of datasets in the archive management table

3. CD writing

- CD's can be written easily. Once made, copies can be made for distribution.

4. Protocols and Checklist

- use the manual to ensure that you have covered all the protocols for the export of data to the CD and for archiving.

The SS databases

Aims

In this section, you are going to have an introduction to the Special Study Databases and learn how to handle them within TANGIS.

It teaches you:

- How to be confident in setting up and maintaining ODBC links
- Ensuing an understanding of how the SS databases work
- Gain a dialogue between SS an GIS users to ensure that the GIS allows SS to answer their questions.

Notes

ODBC

Open Database Connectivity allows all users to get access to other databases without converting into a recognised GIS format.

Follow the pages in the manual for connecting an ODBC compliant database.

The advantages of ODBC -

- People can update their records separately using a user-friendly interface. The data can be relinked with Arcview
- You don't need to store an extra dataset in Arcview shapefile format.
- You can access several data tables or queries from one ODBC link.

Inside Arcview - the link is refreshed every time the project is opened. If changes are made while Arcview is open, you can update the table by clicking on the Table - Refresh menu item.

Data transfer process (co-ordination with national centres)

Aims

In this section, we go into detail about the proposed movement of datasets from the national co-ordinators to the metadatabase and back to the GIS outlets.

Notes

Proposed Timetable for routine updating of data

There should be a cycle of data transfer for the GIS, (which may need to fit into any strategy for the SAP). Below is an example strategy to ensure timely outputs. It is based on a quarterly update of the system.

Week	Job	Responsibility
1	Required database updates sent to National Co-ordinator (or to report no new data)	Database managers (National Co-ordinator to follow up if not sent by certain date)
2		
3	Full set of databases sent to MINATE	National Co-ordinators (MINATE to follow up if not sent by certain date).
4		
5	Database catalogued by MINATE	MINATE
6		
7	Newsletter and Web Pages Produced	MINATE
8		
9	Strategic Inputs sent to SAP co-ordinators	MINATE (Responsible parties of SAP to follow up if not sent by certain date)
10	TANGIS datasets available to all identified sites	MINATE (National co-ordinators to check with GIS sites and follow up if not complete by certain date).
11		
12		
13		

The details of the datasets required for routine updating needs to be finalised by the Special Studies. It should also be the responsibility of the Special Study Teams to decide on what national databases for current SS and lake monitoring are required, or whether there is a regional requirement for maintaining the databases. The GIS strategy can cope with either option. If there is a national co-ordinating strategy, then the above timetable could be used as a template. If there is regional co-ordination at the Special Study scale, then an additional tier can be put in place, that passes data directly to MINATE. Again, this needs to be carefully co-ordinated with other project activities.

During this period, new scientific datasets, or more general datasets can also be sourced by MINATE or other collaborators and sent to the regional metadatabase. For the best co-ordination of the distribution of the updated CD's, it is advisable that new datasets be collated by week 5 of the cycle.

Protocols for data transfer, web page update and language translation already exist either within the Access database used to catalogue the data, or in the written manual for the use for the metadatabase. They will form part of the training programme for the metadatabase managers.

Needs

- Set up a communication avenue between the national co-ordinators.
- Maintain a database of recipients of TANGIS and keep a record of when the data updates have been sent.
- Keep a database of which datasets have been ordered, by whom and when.

Handling data requests

Aims

In this section we will learn how to handle data and output requests.

Notes

There are likely to be two sorts of requests for data on top of the usual duties of passing on archived information to the GIS centres around the region.

Request for digital data

1. Follow the protocol in the manual
2. Make sure that you keep a record of which datasets you send where. Use the form in the Administration manual.

Request for paper maps

1. You need to establish a loan system for these maps.
2. Again, keep a record of what you send where. And have a method for recalling the data if you need to.

Newsletter writing

Aims

In this section we give some guidance on :

- The purpose of the GIS newsletter
- How to put together the GIS newsletter
- Inserting Images and making hotlinks.

Notes

Purpose of the GIS Newsletter

The GIS newsletter is the main source of communication for you to other GIS users in the region. It enables you to:

Tell people what datasets have been created for the LTBP

Tell people what data might be needed

Update on GIS programming which may have occurred (e.g. a new release of software or new programmes within the TANGIS interface.

Update on hardware/software and personnel contacts details.

Writing the Newsletter

Follow the protocol in the manual on to whom write the newsletter, but bear in mind the following points:

- Remember who you are writing for - not necessarily GIS experts, but people conversant with the project activities
- Try to make the newsletter as bright and interesting as possible, while not detracting from the important information you are getting across.
- Ensure that you keep the structure simple so that the conversion to HTML does not cause problems.

Synthesis

Hopefully by now you have a full understanding of:

- The role of LTBP's GIS
- Arcview and Access
- The TANGIS interface and its purpose
- The LTBP database of digital and non-digital data.
- The metadatabase and its uses
- The protocols and networks needed to sustain the system
- Your role within the system

The system is necessarily complex to cover the diverse needs of LTBP. However, the tools we have provided can ensure that all aspects of the job of metadatabase are covered by a routine, and that there are tools available to ensure that it can be done effectively and efficiently.

Managing the system now becomes your responsibility, but you can get support from various sources:

1. The manuals
2. Revising these training courses
3. The hardware and software manuals
4. The GIS network in the LTBP region
5. NRI
6. External web services and email groups