What is ILWIS?

- ILWIS is a geographic information system with image processing capabilities.
- Therefore, ILWIS allows you to manage, analyze and present geographical data.
- ILWIS manages both vector and raster data.
ILWIS Objects

- Data objects
- Service objects
- Special objects
- Container objects
Data Objects

Data objects are maps, tables and columns; that is the GIS materials to work with. Data objects can be created, edited, displayed, etc., and, most important, operations can be performed on them. By default, all your data objects (except columns) in the current directory are listed in the Catalog by a name and an icon.
Data Objects

- Raster maps
- Polygon maps
- Segment maps
- Point maps
- (Attribute) Table
- Columns
Service Objects

Service objects are used by data objects; They contain accessories required by data objects besides the data itself. Service objects define, for example, the set of possible values of the data (domain), the colors assigned to the data, and, coordinate information for the data object.
Service Objects

- Domains
- Representations
- Georeferences
- Coordinate systems
Special Objects

Special objects are objects with special functions within ILWIS. They can be used to display data, calculate with data, or make it easier to work with data.
Special Objects

- Histograms
- Sample sets
- Matrices
- Two-dimensional tables
- Filters
- Functions
- Scripts
Container objects

Container objects are collections of data objects. Container objects in its simplest form are (ASCII) lists with references to the object definition files of the data objects they contain. Container objects themselves thus do not store the data files of data objects.
Container objects

Map View
Map List
Annotation text
Layout
Object Collection
Structure of Spatial Data in ILWIS
Attribute data

Spatial data: where is it?  Attribute data: what is it?

<table>
<thead>
<tr>
<th>Landuse</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>500</td>
</tr>
<tr>
<td>Forest</td>
<td>300</td>
</tr>
<tr>
<td>Grassland</td>
<td>200</td>
</tr>
</tbody>
</table>

Geographic data in a GIS

Combining spatial and attribute data
Linking Data

ILWIS divides data into 3 types:
• Class data
  – Data that can be identified by type
• ID data
  – Data that has an unique identification
• Value data
  – Data that consists of values
Displaying Data

- All objects are displayed as Icons in the User Interface
- Vector and raster maps are displayed in a Map Window
- Tables are displayed in a Table Window
- Combinations of maps are displayed and stored in a Map View
- (Multiple) Map Views with annotation are stored in a Layout Window
Starting ILWIS

Control menu icon
Title bar
Menu bar
Standard toolbar
Object selection toolbar
Command line
Minimize button
Maximize button
Close button
Operations/Navigator pane
Status bar
Scroll bar
Catalog
User Interface

Navigator

Operation tree

Operation list
User Interface

Menu bar

Standard button bar

Object selection toolbar

Command line

Status bar

Hide/show all objects in the Catalog
User Interface

Catalog
Display Options Window
Map window buttons

- Entire map
- Redraw
- Measure distance
- Pan
- Zoom in
- Zoom out
- Normal
- Add layer
- Remove layer
- Save view
Table Window buttons

- Copy
- Paste
- Delete
- Print
- Properties
- Update all columns

- New Graph window
- Goto first record
- Goto previous record
- Goto record
- Goto next record
- Goto last record
<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>100</td>
</tr>
<tr>
<td>Agriculture (irrigated)</td>
<td>150</td>
</tr>
<tr>
<td>Airport</td>
<td>600</td>
</tr>
<tr>
<td>Bare rock</td>
<td>50</td>
</tr>
<tr>
<td>Bare soils</td>
<td>50</td>
</tr>
<tr>
<td>Forest</td>
<td>75</td>
</tr>
<tr>
<td>Grassland</td>
<td>75</td>
</tr>
<tr>
<td>Lake</td>
<td>?</td>
</tr>
<tr>
<td>Riverbed</td>
<td>?</td>
</tr>
<tr>
<td>Shrubs</td>
<td>50</td>
</tr>
<tr>
<td>Urban centre</td>
<td>1000</td>
</tr>
<tr>
<td>Urban periphery</td>
<td>750</td>
</tr>
<tr>
<td>Min</td>
<td>50</td>
</tr>
<tr>
<td>Max</td>
<td>1000</td>
</tr>
<tr>
<td>Avg</td>
<td>290</td>
</tr>
<tr>
<td>StD</td>
<td>355</td>
</tr>
<tr>
<td>Sum</td>
<td>2900</td>
</tr>
</tbody>
</table>
Map View
Data input

• Importing data
  – Vector (ILWIS or GeoGateway import)
  – Raster (ILWIS or GeoGateway import)
  – Table
• Digitizing (tablet or on-screen)
• Enter data in ILWIS
Data output

- Hardcopy (Layout Window)
- Export
  - Layout as .BMP
  - Different widely used packages
Lake Naivasha (Kenya) False Color Composite 2000
With farm locations

Legend

Lake Naivasha
Help

• Topic Pane
• Navigation pane
  • Contents
  • Index
  • Search
  •Favorites
• Toolbar
Available Documentation

• ILWIS User’s Guide
• ILWIS Applications Web pages
  – www.itc.nl/ilwis
ILWIS Web pages

ILWIS Applications

The ILWIS Application pages are intended to give you ideas and show examples of the type of research that can be performed with ILWIS.

For every case study in the ILWIS 2.1 Applications Guide, you can find a summary, a brief explanation and some output pictures. The ILWIS 2.1 Applications Guide consist of 25 case studies in various disciplines such as geomorphology, geology, hydrology, environmental management, urban survey, soil survey, land use planning and cartography. This reflects more or less the scope of education and research at ITC.

--> All applications are also supposed to work with ILWIS 3.0I <--

Applications in Earth Sciences:
- Applied geomorphology and natural hazards
  1. Hazard, vulnerability and risk analysis
  2. Flood hazard analysis using multi-temporal SPOT-XS imagery
  3. Modelling cyclone hazard in Bangladesh
  4. Modelling erosion from pyroclastic flow deposits on Mount Pinatubo
  5. Statistical landslide hazard analysis
  6. Deterministic landslide hazard zonation
  7. Seismic landslide hazard zonation
- Engineering geology
  8. Creating an engineering geological database
- Surface hydrology
  9. Irrigation water requirement
  10. Data analysis for irrigation
  11. Determination of peak runoff
  12. Morgan approach for erosion modelling

See also the ASTER/ALR and AHAR research projects of the ITC WIES division. ASTER/ALR and AHAR are small dedicated programs built on top of ILWIS.

Hydro-geology
- 13. Assessment and planning of subsurface pollution in the Rhine-Rems
10. Data analysis for irrigation

Point data of an irrigation command area in Haryana has been collected on water depths (during dry and wet season) and electrical conductivity. Part of the area is negatively affected by salinity and waterlogging. The objective of the study is to analyze the causes for these common problems in command areas.

First, the outcome of various interpolation procedures of the point data has to be evaluated before relations between EC and distance from canal, EC and vegetation index, water table fluctuations and distance from canal can be analyzed. The findings of the study has to be put in output maps, graphs and tables. The case study is based on actual data collected by the Central Soil Salinity Research Institute in Karnal, Haryana, India.

Introduction and basic data

To familiarize yourself with the area, you will display the SPOT bands, the polygon map of the area, and inspect the point data. Then, you will create a false color composite and an Normalized Difference Vegetation Index (NDVI) image.

For the data points in the area, the following data have been collected:

- elevation,
- pH,
- height of water table in October,
- height of water table in January,
- EC values.

Point interpolation