APPENDIX 2B

United Nations Convention to Combat Desertification

TRAINING IN GEOGRAPHIC INFORMATION SYSTEMS (GIS)

TECHNICAL NOTES

Elizabeth Charles-Soomer

Andrina Abraham

AGRICO LTD.
AGRICULTURAL CONSULTANCY & TECHNICAL SERVICES LTD.

Data Structures

Vectors:

This is the most common type of data model and is handled by most GIS software systems. A vector is based on a series of xy co-ordinates which define objects. Vector data structures are derived form the digitizing of hardcopy or scanned maps.

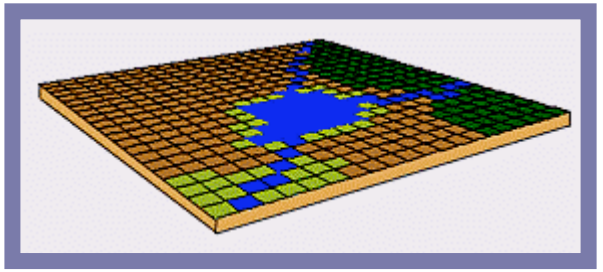
Vector Advantages

- Sharp images and high quality maps.
- Efficient in terms of storage (space)
- Very good for the analysis of networks such as roads, power, water and telephone lines.

Vector Disadvantages

- This process of data entry is time consuming and thus very labour intensive. It is also very prone to human error.
- Map Overlays are very slow as the geometry of each feature is stored separately as an individual record.

Rasters (and hybrids called quad trees



- The raster data model is a grid or pixel of cells, like a picture. A value is assigned to every cell that covers the data plane. However the result is a whole coverage which includes all elements rather than individual data base entries. Raster data is derived from satellite images, other remote sensed data, and scanned aerial photographs and maps.

GIS Representations

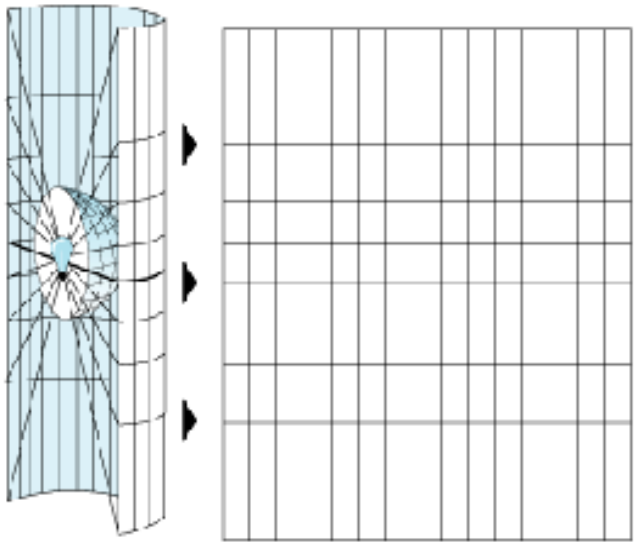
- Points: a school
- Lines: Roads and rivers
- Area or polygons: soil and geology groups

Geo-referencing

Planar Co-ordinate System- Longitude and Latitude

OR

Projected System



Projected System

Maps are flat, but the surfaces they represent are curved. Transforming three-dimensional space onto a two-dimensional map is called projection.

Projection formulas are mathematical expressions that convert data from a geographical location Latitude and longitude on a sphere or spheroid to a representative location on a flat surface. In a projected coordinate system, locations are identified by x,y coordinates on a grid, with the origin at the center of the grid. Each position has two values that reference it to that central location. One specifies its horizontal position and the other its vertical position. The two values are called the x-coordinate and y-coordinate. Using this notation, the coordinates at the origin are x = 0 and y = 0.

Importance of co-ordinate systems in GIS

- Provide true geographic locations for geo-positional accuracy
- Allows the GIS to produce maps at different scale
- Allows GIS to measure precise distance
- Allows for the accurate integration of data

- Important to convert all data to a common co-ordinate system. Therefore important to know what system your data comes from and the common system selected within you GIS
- Common ones:- Transverse Mercator, Universal Transverse Mercator, British West India Grid

Stages in the Development of a GIS Database

1. Scanning
2. Geo-referencing and tops up digitizing

   OR

   Adding map data using a geo-referenced map as a base
3. Creating identifiers

   OR

   Adding data directly
4. Editing

5. Joining Map and Attribute Database

OR

Adding Attributes directly to Map Database

Queries, Manipulation - buffering, overlaying, aggregating, Calculation etc**.**

7. Outputting – aspatial tables **OR** Map outputs