SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution Coimbatore – 35

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A++ Grade Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

DEPARTMENT OF AGRICULTURAL ENGINEERING

Ms.J.Hemalatha
Assistant Professor
Department of Agricultural Engineering
SNS College of Technology
Coimbatore-641035

Why GIS is Needed ….

Maps are :

- ✓ still difficult to update
- ✓ storage is a problem
- ✓ likely to fade, torn and shrink
- ✓ human to interpret the relationship between features with
- ✓ static data shown on the map …

… where as GIS :

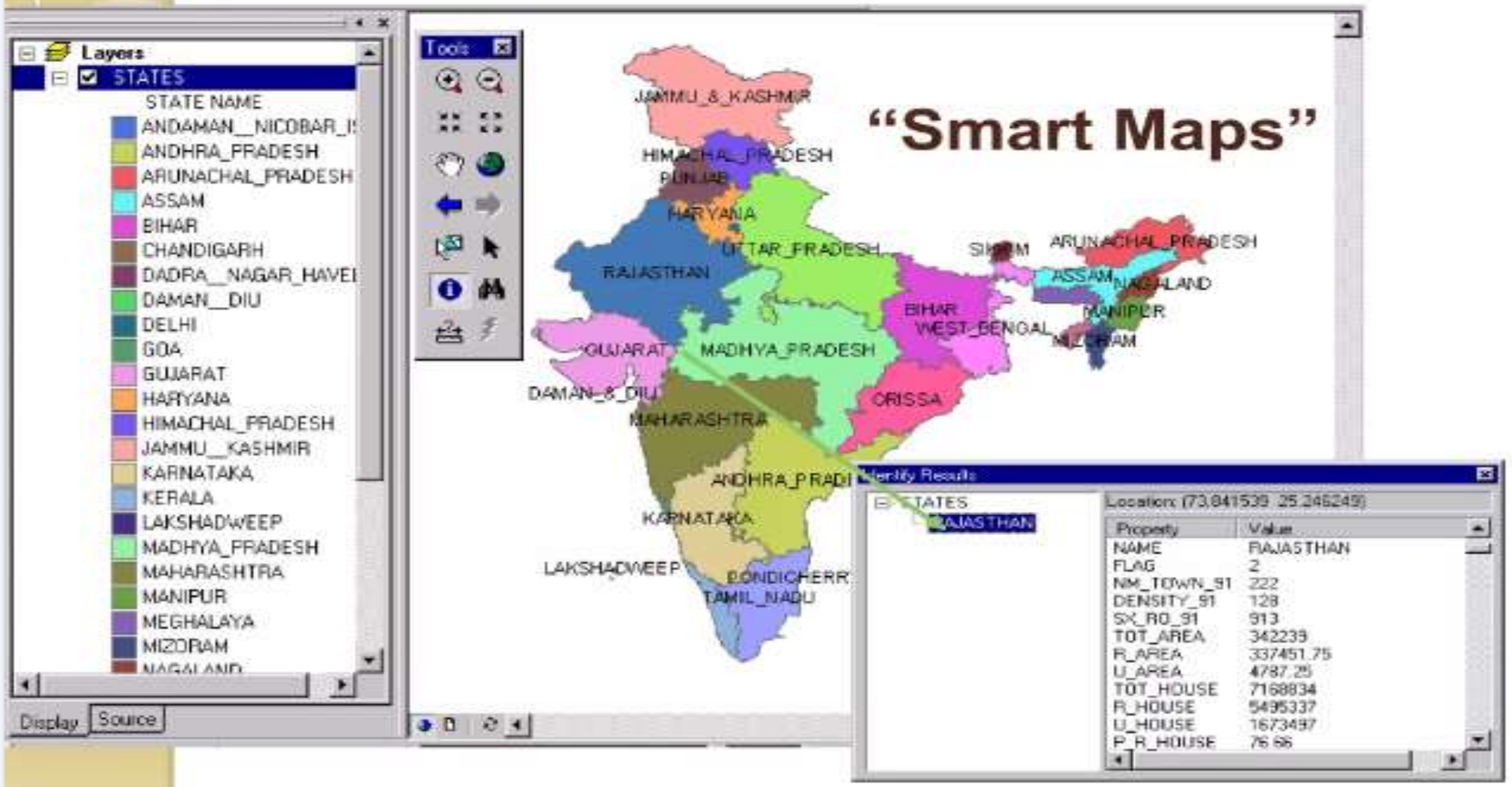
- ✓ makes maps dynamic
- ✓ displays map information
- ✓ interactively
- ✓ build the spatial relationship between features
- ✓ analyze to answer real-world problems

Why is GIS Needed ….

- ✓ On paper maps, each color, pattern, picture, or label gives you information about the features.
- ✓ But, the amount of information we can get from a paper map is limited to what is shown and so maps are static.
- ✓ GIS map display on a computer screen looks like any other map.
- ✓ However, with a GIS map display, we can get detailed information about each feature.
- ✓ With GIS you can find features based on their attributes and analyze feature locations to uncover relationships between them.

Visualization –

"Worth a Thousand Words"



Visualization

- ✓ After linking the attribute information to the themed layers the static maps becomes dynamic and they respond to user queries – ***Smart Maps***.

- ✓ The link between features and attributes is dynamic.

- ✓ The link between features and attributes is a two-way relationship, changing an attribute in the table automatically results in a change on the map.

Sources of GIS Data

- Digitized and Scanned Maps
  i. purchased, donated, Internet
  ii. created by user
- Data Bases – Tables of data
- GPS – Global Positioning System
  i. accurate locations
- Field Sampling of Attributes
- Remote Sensing & Aerial Photography

Sources of GIS Data

- Toposheet

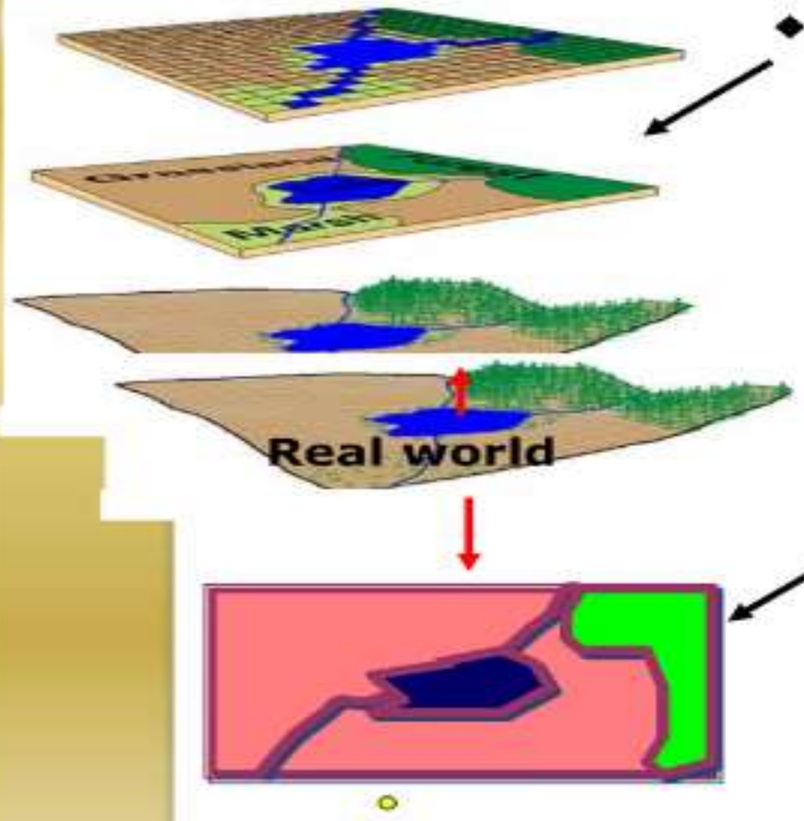
- Traced Road Map

Sources of GIS Data

- Satellite Image covering part of the earth

- Land Use / Land cover extracted from the image

Types of GIS Data



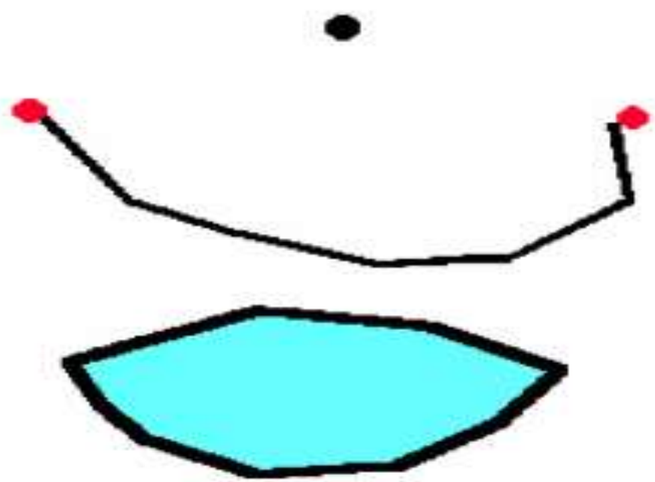
Two Main Types

- **Raster – *Grid***
  - "pixels"
  - a location and value
  - Satellite images and aerial photos are already in this format
- **Vector – Linear**
  - Points, lines & polygons
  - "Features" (house, lake, etc.)
  - Attributes
    - size, type, length, etc.

- Two types of data are stored for each item in t
  database
- 1. Attribute data:
  - Says ***what*** a feature is
    - Eg. statistics, text, images, sound, etc.
- 2. Spatial data:
  - Says ***where*** the feature is
  - Co-ordinate based
  - Vector data – discrete features:
    - Points
    - Lines
    - Polygons (zones or areas)
  - Raster data:
    - A continuous surface

Entity Representations

We typically represent objects in space as three distinct spatial elements:



Points - simplest element

Lines (arcs) - set of connected points

Polygons - set of connected lines

We use these three spatial elements to represent real world features and attach locational information to them.

Raster vs. Vector

Raster Advantages

The most common data format

Easy to perform mathematical and overlay operations

Satellite information is easily incorporated

Better represents "continuous"- type data

Vector Advantages

Accurate positional information that is best for storing discrete thematic features (e.g., roads, shorelines, sea-bed features.

Compact data storage requirements

Can associate unlimited numbers of attributes with specific features

Types of GIS Data

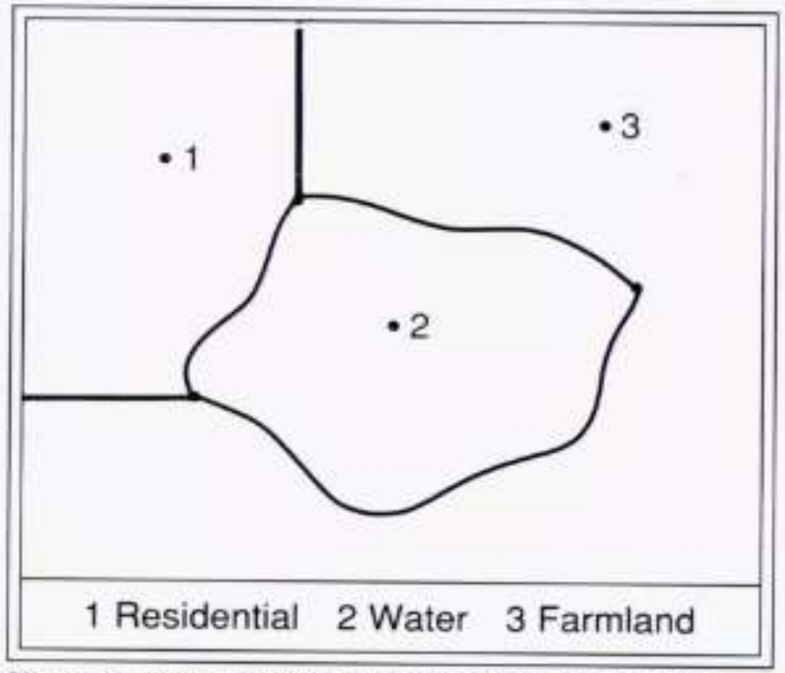


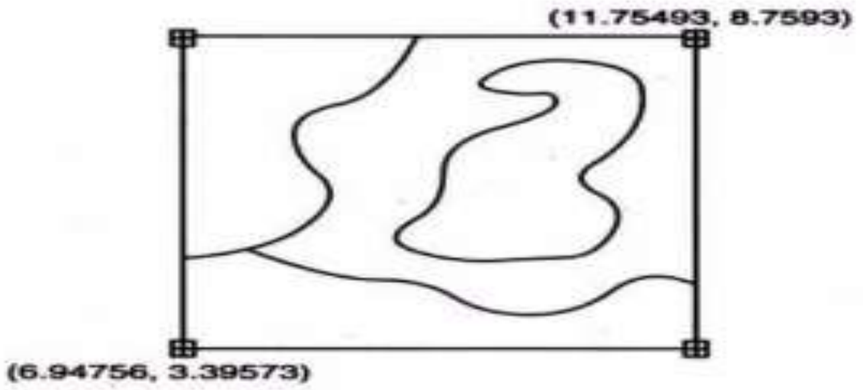
Figure 12. Example of the structure of a vector data file.

1	1	1	3	3	3	3	3	3
1	1	1	3	3	3	3	3	3
1	1	2	2	2	2	3	3	3
1	1	2	2	2	2	2	3	3
1	2	2	2	2	2	3	3	3
3	3	3	2	2	2	3	3	3
3	3	3	3	2	3	3	3	3
3	3	3	3	3	3	3	3	3

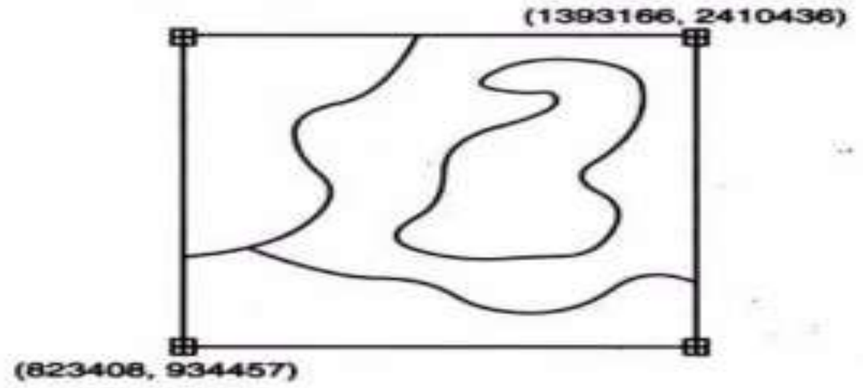
1 Residential 2 Water 3 Farmland

Figure 11. Example of the structure of a raster data file.

Example of geo-referencing



After TRANSFORM
(coverage in real-world coordinates)

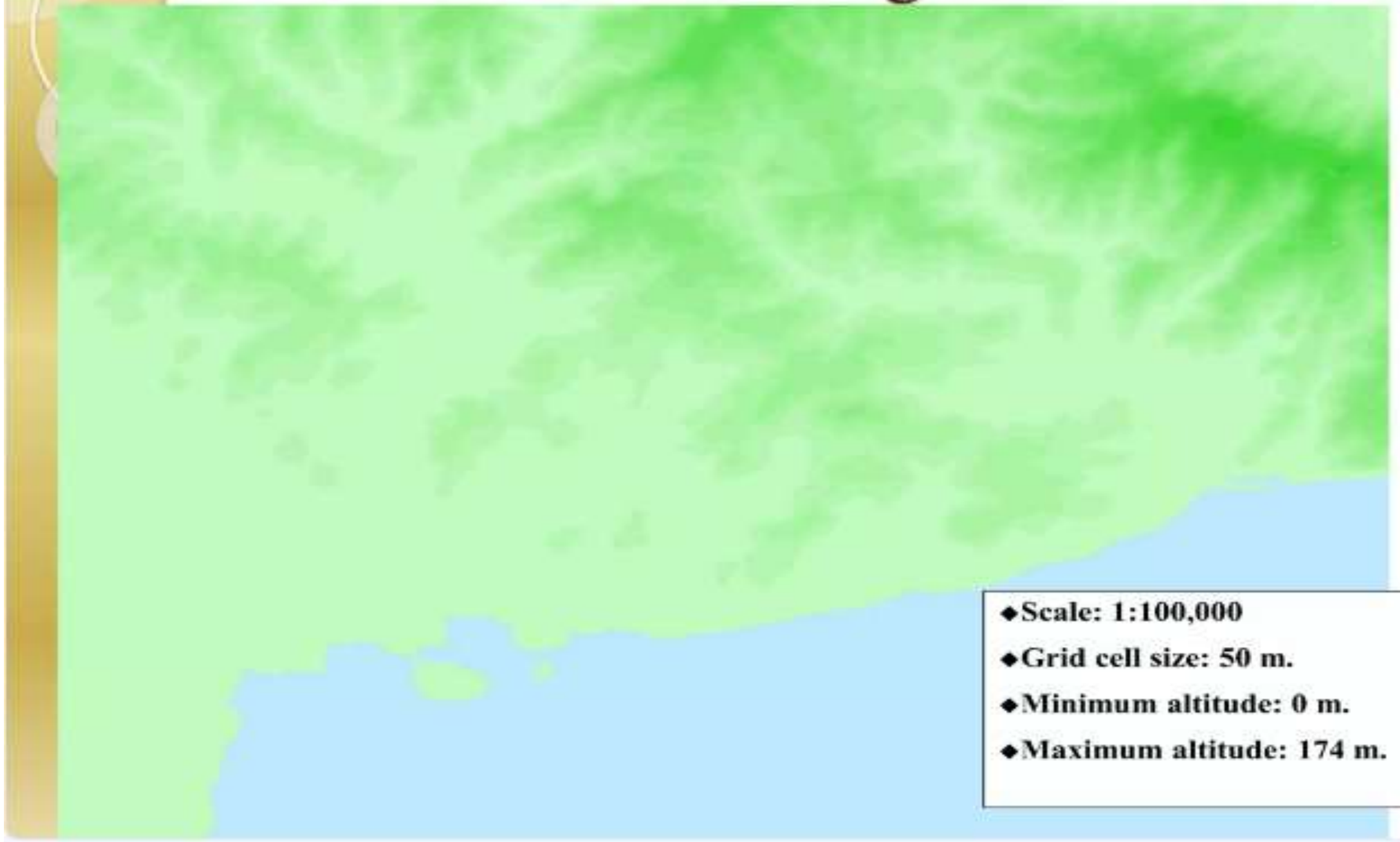


◆Source: ESRI (1997)

Layers

- Data on different themes are stored in separate “layers”
- As each layer is geo-referenced layers from different sources can easily be integrated using location
- This can be used to build up complex models of the real world from widely disparate sources

Raster data: Hastings



Example: Vector data