

Types of Input

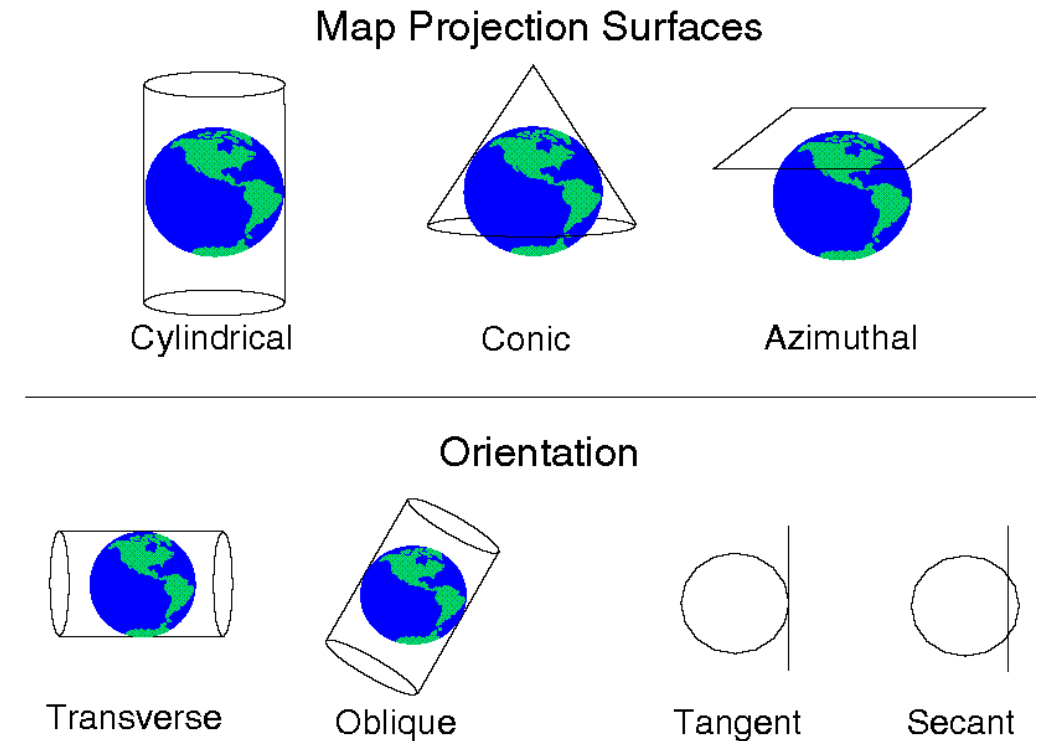
GIS in agriculture –scale

- farm level - used in agricultural applications - managing crop yields, monitoring crop rotation techniques, and estimate soil loss from individual farms or agricultural regions.
- Area level - evaluation of storage systems and drainage network systems, assess groundwater, and basin level demand and supply and water stress and drought vulnerability visualize watersheds, and in many other hydrologic applications.
- Regional/zonal level – interaction of variation in weather and resources management issues and prioritization management / policy decisions
- Scale : Scale is a statement of relationship between distances on map and surface. Relationship between distances on map and surface.
A1:100; 1:1000; 1:10000; 1:25000; 1:50000

Map projections are carried out in

- Area preservation equal area or equivalent projection
- Shape preserving – conformal, orthomorphic
- Direction preserving – conformal, orthomorphic, azimuthal (only from a the central point)
- Distance preserving – equidistant (true distance between one or two points and every other point)

Universal Transverse Mercator (UTM) coordinate system uses “zones” that each have their own central meridian. Used on topographic maps, geological maps, and U.S. Geological Survey maps.



1. Input

- converting data from paper maps into computer files on compatible format - digitization.
- A hard copy of map or survey plan is transferred into a digital medium through the use of a CAD program, and geo-referenced.
- Geographic information is extracted from Ortho-rectified images from orbital satellites, Helikites and UAVs.
- Digitization is carried out directly from images rather traditional tracing the features and separate digitizing tablet.

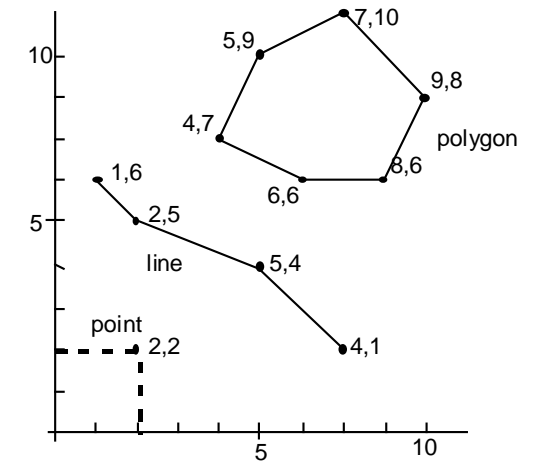
Data capture —entering information into the system that consumes much of the time due to editing - to remove errors such as undershoots and overshoots & processing.

- Existing maps on paper or PET film can be digitized or scanned to create digital data. A digitizer produces vector data as an operator traces points, lines, and polygon boundaries from a map. Scanning a map results in raster data that could be further processed to produce vector data.
- Field Survey data can be directly entered into a GIS from digital data collection systems available on survey instruments.
- Cameras, digital scanners, LIDAR and other sensors from aircraft and satellites platforms are part of data collection mission.
- Workstations are used to digitize features directly from stereo pairs of digital photographs. They allow data to be captured in 2 and 3 dimensions. The elevations measured from a stereo pair using principles of photogrammetry

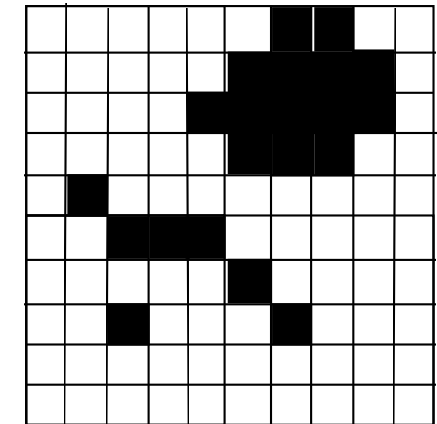
Data representation (house- Raster data) and Continuous fields (elevation – Vector)

Vector data - Geometric objects – points, lines, polygon

Raster data - Image file composed of pixel (grid cell)



Polygons Two-dimensional polygons are used for geographical features that cover a particular area of the earth's surface. geometries are linked to a row in a database that describes their attributes.



Attribute data

Name: Hotel

Location: Powai

Telephone: 2576 7684



Advantages and disadvantages

- Vector data can be easier to register, scale, and re-project and more compatible with relational database environment. They are part of a relational table as a normal column and processes using a multitude of operators.
- Vector data is smaller for storage and sharing than raster data. Image or raster data can be 10 to 100 times larger than vector data
- non-spatial data can also be stored besides the spatial data represented by the coordinates of a vector geometry

2. Manipulation

- Spatial data is referenced to a geographic coordinate systems (latitude/longitude) on different scales (scale of 1:100,000; 1:10,000; and 1:50,000).
- They must be transformed to the same scale either as temporary transformation or a permanent one required for analysis.
- Transformation include projection changes, data aggregation, generalization and weeding out unnecessary data.
- The tabular data associated with spatial data can be manipulated with help of data base management software.