

Science & Technology for Disaster Management

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NATIONAL SPACE SYSTEMS

**LAUNCH
VEHICLES**

**INSAT
SATELLITES**

**IRS
SATELLITES**



**SPACE
TRANSPORT
ATION**

**COMMUNICAT
IONS,
METEOROLO
DISASTER MANAGEMENT,**

**NATURAL RESOURCES
MANAGEMENT,
ENVIRONMENT
MONITORING,...**

ISRO LAUNCH VEHICLES



SLV-3

WT : 17T

PL : 40kg

HT : 33M

**ASLV
GSLV**

WT : 39T

PL : 150kg

HT : 33.5M

PSLV

WT : 294T

PL : 1200kg

HT : 44M

WT

PL :

HT

: 402T

2000 kg

1995



IRS-1C

LISS3 - 23 / 70M,
STEERABLE PAN (5.8 M)
WiFS (188M)

1997



IRS-1D

LISS3 - 23 / 70M,
STEERABLE PAN (5.8 M);
WiFS (188M)

2003



RESOURCESAT-1 (IRS-P6)

LISS3 - 23 M; 4 XS
LISS4 - 5.8 M; 3-XS
AWIFS - 70 M; 4-XS

1996



IRS-P3

WiFS MOS, X-Ray

1994



IRS-P2

LISS2

1999



OCEANSAT (IRS-P4)

OCM, MSMR

2005



CARTOSAT - 1 (IRS-P5)

PAN - 2.5M, 30 KM

1988 & 1991



IRS-1A & 1B

LISS1&2 - 72 / 36M,
4 BANDS - VIS & NIR

2007



CARTOSAT-2

PAN < 1M

IRS SERIES

COMPONENTS OF GIS

Hardware
Software
Data
People
*Application/
procedures*



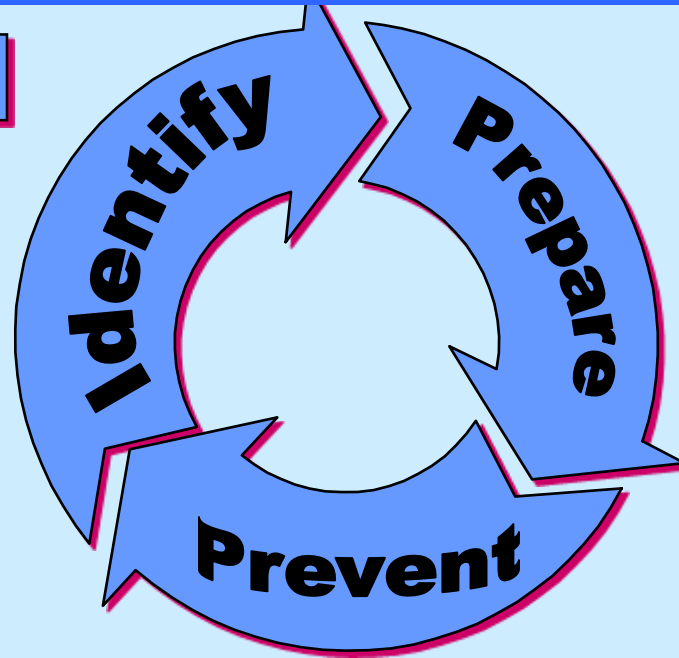
FUCTIONS OF GIS

- *DATA CAPTURE: inputting geographic and tabular (attribute) data*
- *STORAGE: two basic data models for geographic data storage. Vector and raster.*
- *QUERYING :finding specific features based on the location or attribute value*
- *ANALYSIS: interaction of spatial relationship between multiple datasets*
- *DISPLAY: visualizing the geographic features using a variety of symbology*
- *OUTPUT: display results in a variety of formats, such as maps, reports and graphs.*

ROLE OF GEOINFORMATION IN VARIOUS PHASES OF DISASTER MANAGEMENT

• Planning

- Planning – Activities necessary to analyze and document the possibility of an emergency or disaster and the potential consequences or impacts on life, property and the environment.
- This includes the hazard, vulnerability and risks analysis.
- mitigation, preparedness, response, and recovery needs.

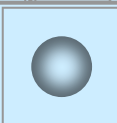
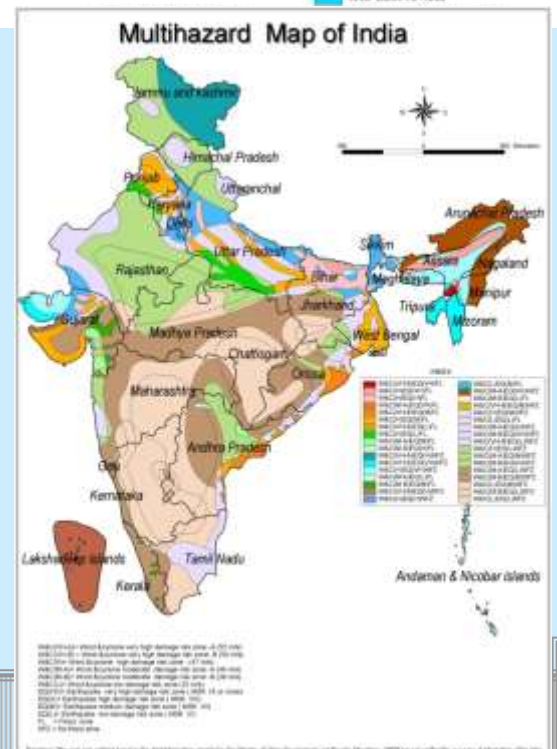
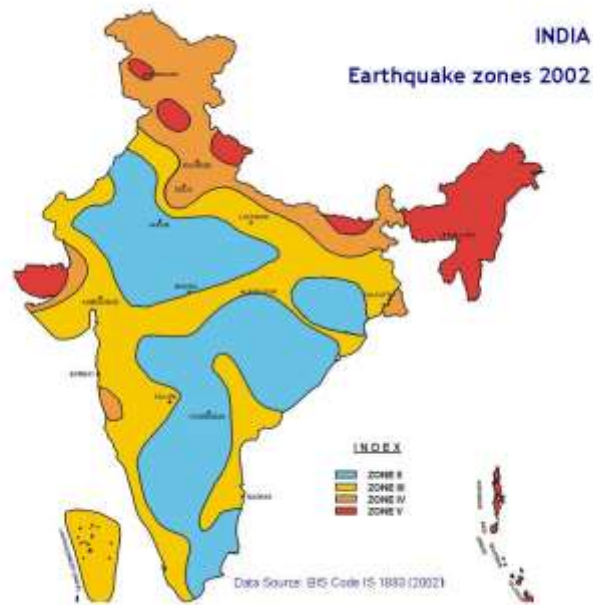


• Mitigation strategies and policies

- Mitigation strategies, policies and legislation based on evidences (analysis statistical facts & figures from various databases)
- Development of a national database for information sharing.

• Preparedness for response & recovery

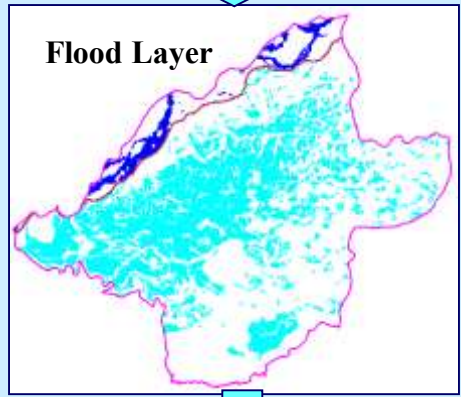
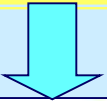
- Database/ Maps of existing skilled human & material resources for emergency response.
- Develop preparedness plans based on risk, available skill & resources.
- Converting Disaster Management plans into electronic documents for easy accessibility and easy updating.
- Rapid Damage assessment using Remote sensing , GPS and GIS Technology
- Needs assessment
- Recovery Planning



Disaster Mapping - Flood Damage Assessment



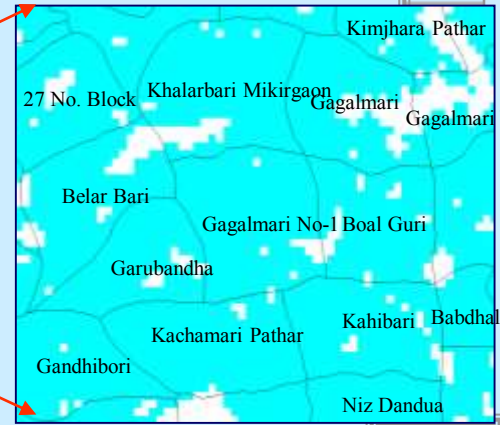
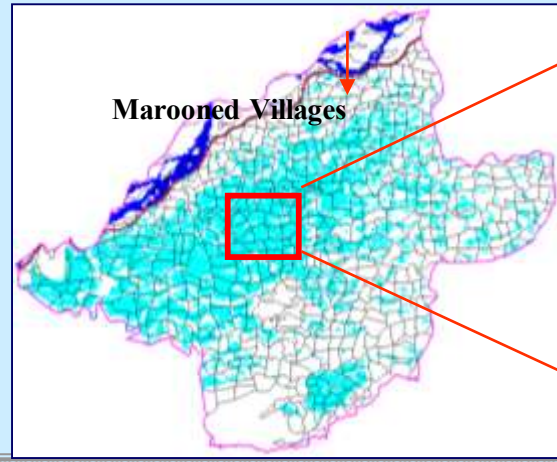
Database layers



Flood Layer
Village Layer

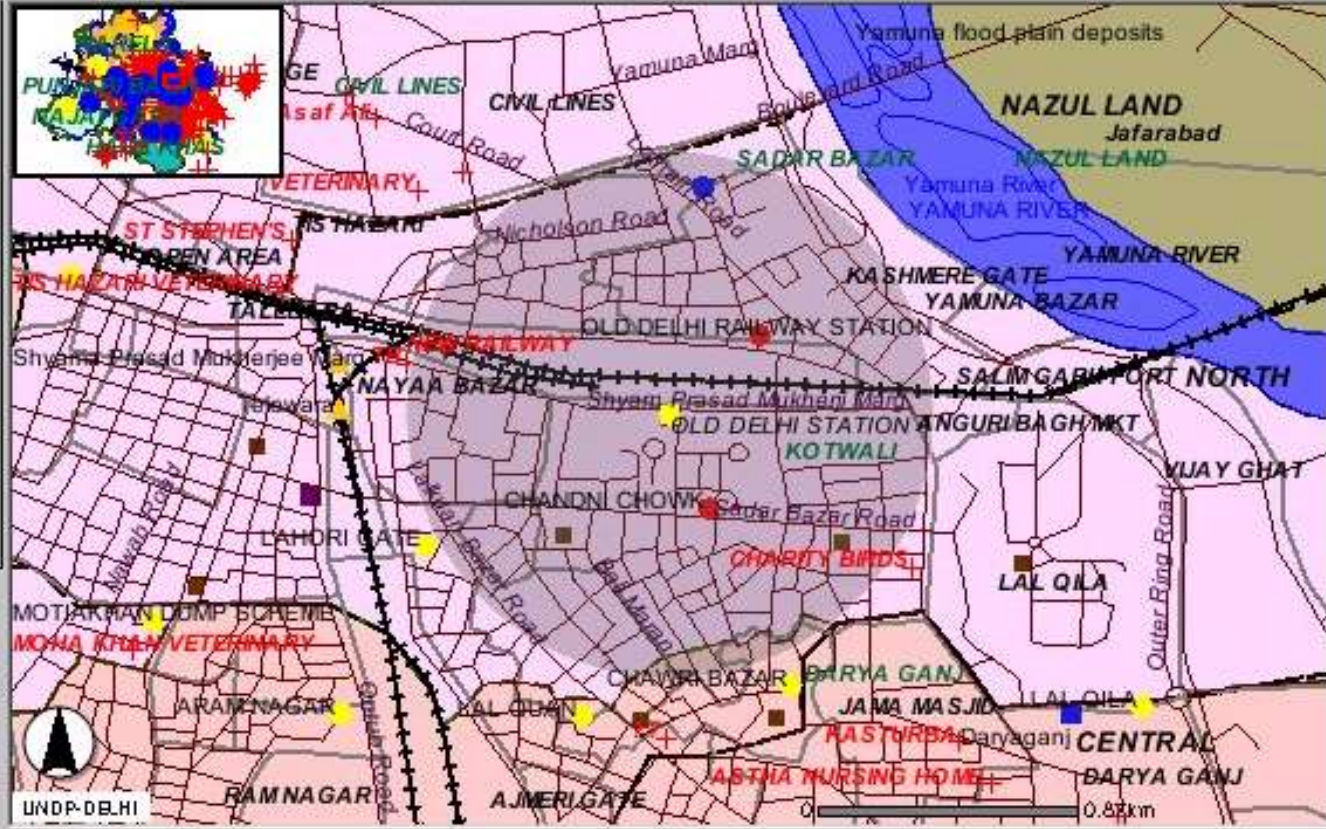
Integrating in GIS

Marooned Villages



Damage Assessment

Risk and Capacity Analysis for Delhi



- Legend**
- Selected Features
 - theBufferPolygons
 - theBufferTarget
 - IDRN RESOURCES
 - + HOSPITAL
 - ▲ FIRE STATION
 - POLICE STATION
 - RAILWAY LINE
 - ROADS
 - RAILWAY STATION
 - POST OFFICE
 - DC OFFICES
 - RIVER AND WATER

- DRAINS
- INDUSTRIAL AREAS
- LOCALITY
- POLICE BONDARY
- TEHSILS
- VILLAGES
- DISTRICTS

POLICE STATION

Rec	STATION	CATAGORY
1	OLD DELHI RAILWAY STATION	Police Station
2	CHANDNI CHOWK	Police Station

UNDP-DELHI

0 0.8km

HAZUS_EARTHQUAKE LOSS ESTIMATION

Potential Earth Science Hazards

- Ground Shaking*
- Response Spectra
 - PGA

- Ground Failure*
- PGD - Settlement
 - PGD - Lateral Spread

Damage

- Induced Damage*
- HazMat
 - Debris

Buildings
(Essential Facilities)

- Lifelines*
- Transportation
 - Utility

Loss

- Casualties*
- Fatalities
 - Injuries

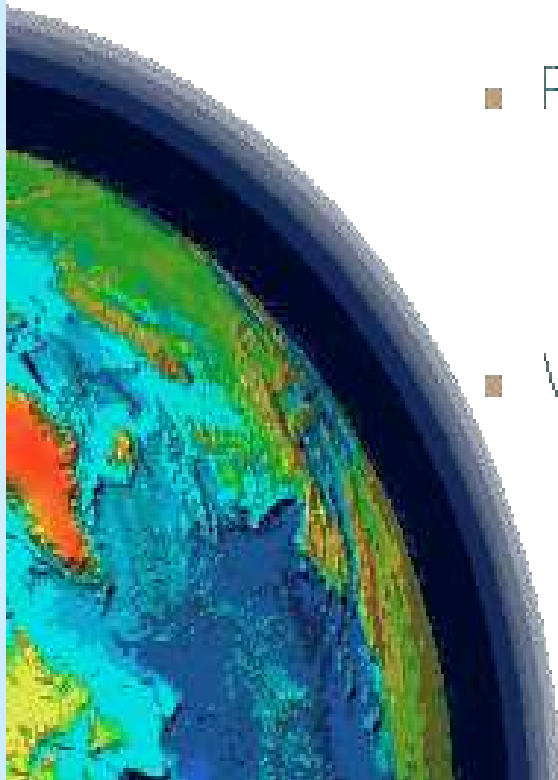
- Economic*
- Capital
 - Income

- Shelter*
- Households
 - Short-Term

- Emergency*
- Loss of Function
 - Restoration Time

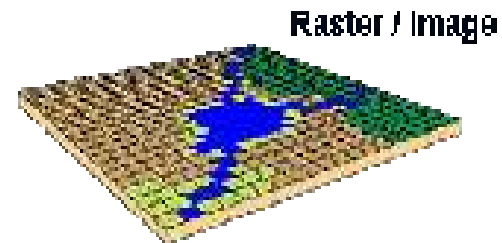
RASTER AND VECTOR

Types of GIS data



- Raster

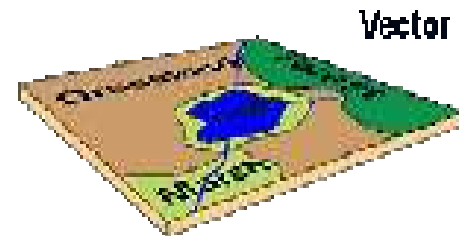
- ◆ Basic unit is a grid cell (or pixel)



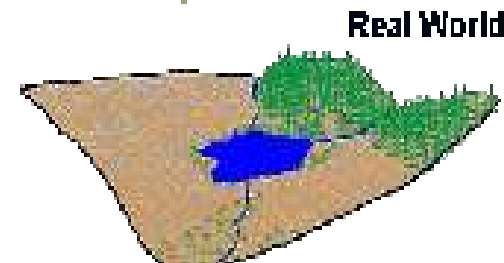
Raster / Image

- Vector

- ◆ Basic unit is a coordinate pair (x and y location)



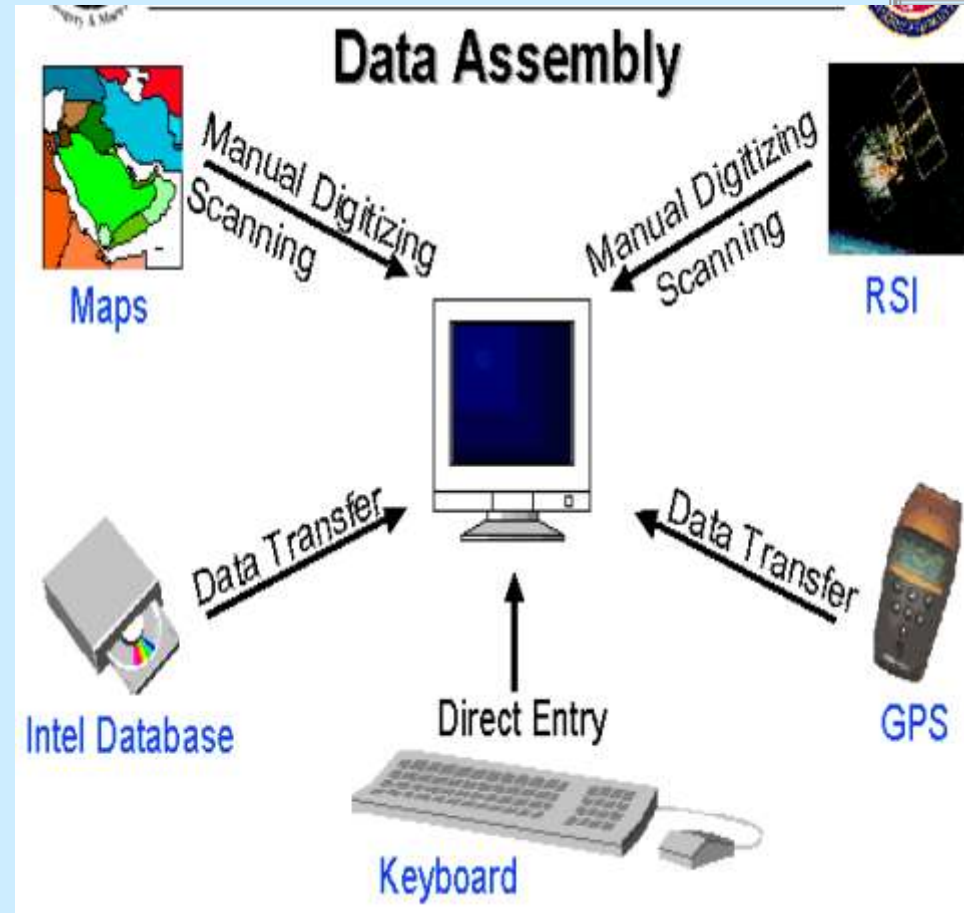
Vector



Real World

DATA CAPTURE

- *manual digitising and scanning of analogue maps*
- *image data input and conversion to a GIS*
- *direct data entry including global positioning systems (GPS)*
- *transfer of data from existing digital sources*



Emergency Operations Centre (EOC)



LINKS

www.esri.com

<http://gisserver.nic.in/nsdiportal/>

www.gisdevelopment.net/

www.geographynetwork.com

www.nrsa.gov.in

www.earth.google.com/download-earth.html

www.wikimapia.org/

THANKS

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