National GIS framework and its utilization for mapping applications

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What is Geographical Information Systems (GIS)?

GIS is a information system that captures, stores, manages, presents, and analyzes data that is linked to location.

- Capturing geographical data
  GPS (lon/lat), Remote sensing (satellite images)

- Storing and managing geographical data
  Databases (e.g., Msaccess, Sql Server)

- Presenting and analyzing geographical data
  Mapping software and its extensions

> Beyond Simple Maps...
> GIS is a visual language
> GIS is not just a map
> GIS as a new fashion
A Paradigm shift using GIS

- Presenting huge volumes of data in most perceivable manner...> decision making becomes easier.

- Focus on Visualization of data/services through Maps/Pictures ....> Shift from reading to Seeing

- Emergence of a new language .....> potential to reach masses.

- Concept of Integration Enforcing Discipline.......> addressing Standards

 .................. many more
What can GIS do?

- Can create a fancy map ("spatial data visualization")
  - by overlaying multiple features
  - by mapping lon/lat (x/y) or addresses ("geocoding")
  - by showing a trend over time and create a movie
  - by showing 3D view with rotation

- Can be used to do advanced spatial statistical analysis

- Can be used to develop policies involving spatial issues (infectious disease, location decisions, transportation, etc.)
National GIS

- National GIS has been conceptualized as a service across the nation in a mission mode.
- To strengthen systematic integration of data from different sectors.
- Extensive Spatial data development and management
- Dissemination using web based approach for spatially enabled decision making.
National GIS - Web based Dissemination System with GIS functions like navigation, query, analysis, print.
All India Mosaic of IRS AWIFS (Satellite Data) 56m
Quick-Bird Sample for Gzb Town (Near Mohan Nagar Junction)
Stakeholders of National GIS

- **SOI**
  - Base frame work data
  - Surveying

- **DOS**
  - Satellite Images
  - Wasteland Mapping

- **Others**
  - FSI- Forest Cover
  - SLUSI- Soil
  - CGWB-Ground Water

- **Non-Spatial Data**
  - RGI- Census 2001
  - Educational Survey
  - Health Survey

- **NIC**
  - Facilitator
  - Integrator
  - Standardization
  - Dissemination-Enterprise
Enterprise GIS Setup

- Internet Cloud
- NIC HQRS
- Mirror @ Planning Commission
- Spatial Database Server
- NSDB - Vector Data Server
- IWS - Raster Data Server
- NIC State Units
  - SDI @ NIC State Units for Update / Value addition
  - NIC State Units
  - NIC State Units
  - NIC State Units
  - NIC State Units
Spatial Data

Non-Spatial Data

Web Based GIS Application

Internet

Web Services like WMS, WFS

Thick Client – GIS

Local Data

Application Server

Thick Client – open Source/Proprietary

LAN

LAN
Key GIS Implementations

- Dissemination using Enterprise GIS Architecture
- GIS for Health
- GIS based Election Management
- Emergency Planning and Response system
- Value Added services for operational MIS services.
Web GIS for Village Level Mapping of Demography and Amenities
Agricultural Marketing Network

- Mapping of around 7000 agricultural Markets.
- Daily Arrival of commodities.
- Price Index
- Market Profile
- Demand Supply Chain
Distributed Mapping or geo-enabled services to present and analyze information from “Geo-Servers” using different vendors technology and rendering methods.

RDBMS / GIS / ‘non-GIS’

= Features Servers

⇒ Objects ⇒ GML/XML ⇒ Rendering

Clients

 Imagery = Map Server

BaseMap = Map Server

Topo = Map Server

Raster = Map Server

Network = Map Server
Upward linkage to International Standards

WMS Service from GIS.NIC.IN

WMS Service from WWW.DENIS.NL

WMS SERVICE – OGC Compliance
GIS BASED EMERGENCY PLANNING & RESPONSE SYSTEM FOR MAJOR HAZARDOUS INDUSTRIES

- Offsite emergency planning tool developed using Map Objects.
- Chemicals modeling using ARCHIE/ALOHA integrated with MO. Over 2000 footprints generated.
- Implemented in 40 districts & hazardous Industries.
- Response Inf. data sheets for 463 chemicals.
GIS for Election Management
Open Source Initiatives
Better civic services to citizens at large through computer assisted mapping of utilities

Utility Mapping model implemented for Delhi. This model is further replicated in the six cities as follows Mumbai, Chennai, Kolkata, Bangalore, Hyderabad and Ahmedabad.
GIS for Health
History

Location can influence health

Hippocrates
(c. 3rd century BC)

Dr. John Snow
(1813-1858)

Digital recreation of Dr. Snow’s hand-drawn map
Cholera outbreak, London, 1854
How GIS can help to resolve health issues

Health issues contain many complex underlying relationships between population, environment, economic and social factors.

GIS has the ability to capture:

i. locational concepts
ii. Proximity
iii. Accessibility
iv. Connectivity
v. Density of Transport

GIS is an ideal tool to analyse such relationships, and has increasingly been put to use by public health researchers and policy makers looking at health issues.
Major applications for GIS in Health

- **Spatial epidemiology** - understanding health problems

- **Environmental hazards** - Investigating environmental hazards / risk factors

- **Modeling Health Services** – Modeling Health Service provision and delivery

- **Identifying health inequalities** - eg. Comparing mortality rates at different locations

- **Data access** – Data Integration
JANSANKHYA STHIRATA KOSH
(National Population Stabilisation Fund)

ABOUT JSK
Overview
What is JSK all about?
How is JSK Different?
Functions of JSK
Membership & Donations
State Level Health Data
State Level Health Data
District Level Health Data
Events
JSK's Strategies

POPULATION FUNDAMENTALS
World Population
India's Population
Why Population Matters
Population Concepts Explained
Economic Data
Population
Population
Extraordinary
Impact

State level Health Facility GIS Maps
India Political Map

Click on any state configuration below to see the distribution of PHC's at a state level.

The State level map also contains links to the following information:
- A link to District level Health Data
- List of each district within the State

Click on the Map below to see the distribution of PHC's at a district level.

Since this exercise is based upon the existence of districts at the time of surveys, the data does not include the establishment of new districts in the last few years.

Rank of Surendranagar District

Overall Rank within the Country according to the Study*

Total Districts Studied in the Country: 565

On the Basis of Women Having Three and More Children

On the Basis of Contraceptive Prevalence Rate

On the Basis of Under 5 Mortality Rate

On the Basis of Vitamin A Deficiency

All districts have not been assessed due to nonavailability of data for some districts.

*Source: Ranking and Mapping of Districts, IIPS 2005
IIPS: International Institute for Population Sciences, Mumbai. It is an autonomous institution under the administrative control of the Ministry of Health and Family Welfare, Government of India. It offers academic courses in the area of population studies.
Online GIS for Health facilities Mapping
To summarize

✓ Understanding the relationship between location and health can be greatly assist us in understanding, controlling and preventing disease and in better health care planning with more efficient and effective resource utilization. This should ultimately lead to better healthcare outcomes and improved health for everyone.

✓ However, for GIS to become one day a mainstream technology in the health sector like today’s spreadsheet and database packages, we still need to combat many data availability / quality barriers as well as cultural and organizational barriers, including spatial illiteracy among health workers while making the tools cheaper and much easier to learn and use.

✓ National GIS has triggered the process of integration of data from various sources and shall greatly help in accomplishing the delivery of effective and efficient implementation of health programmes through GIS.

Good epidemiologic science and good geographic information science go hand in hand
Thank You

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