



Forestry Interventions for Ganga

25-26 May 2015, FRI, Dehradun

**Presentation by: Pankaj Mishra
Survey of India**

www.surveyofindia.gov.in

26 May, 2015



ORGANIZATION:

- 08 Zone offices
- 22 Geo-spatial Data centers
(Covering 29 States, 7 UTs)
- 04 Printing groups
- 06 Specialized directorates

1. SOI Role as Data Supplier:

- a) Source data available with SOI
- b) Restriction Policies and Features available in data
- b) Licensing and Pricing Terms for data supply

2. SOI Role as Technical Consultant:

- a) GIS Layers required for the Project
- b) How to Prepare/Procure GIS layers?
- c) Identifying the other Requirements for GIS layers
- d) Desktop GIS /WEB GIS Platform and uses.

3. SOI Role as National Mapping Agency (NMA):

- a) Other GIS Projects with MOWR

Source Data Available with SOI :

Open Series Maps (OSM) and DEM:

Scale: 1:50,000

Accuracy : 0.25 mm of the scale for Maps
±10 metre for DEM

Projection and Datum: UTM ,WGS-84

Format: *.dgn (Vector data), *.Geotiff (DEM data)

Data Currency: Updated up to 2006

Features : More that 660 features in the vector data

Note: Not GIS ready data rather it is CAD data without topology and attributes

1. Un-Restricted Maps : All data layers

2. Restricted Maps : All data layers except contour and spot heights ,
only Hill shade is shown

Note: Availability of OSM data for all the States/UTs is given in

SOI website: www.surveyofindia.gov.in

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Home

Thematic

Search

Data Layers

☐ ANDHRA PRADESH

☐ ARUNACHAL AND MEGHALAYA

☐ ASSAM AND NAGALAND

☐ BIHAR

☐ CHATTISGARH

☐ DELHI

☐ GUJARAT

☐ HIMACHAL PRADESH

☐ JHARKHAND

☐ KARNATAKA

☐ KERALA

☐ MADHYA PRADESH

☐ MAHARASHTRA AND GOA

☐ ORISSA

☐ PUNJAB AND HARYANA

☐ TAMILNADU

☐ UTMZ GDC

☐ UTTARAKHAND

☐ UTTAR PRADESH

☐ WEST BENGAL AND SIKKIM

☒ India States

☒ India Restricted Limit

☒ India UTM Grid 50K

☐ India UTM Numbers 50K



0 50000 m

Proj: 1 20775438 6975934 + 5168459 (m)

XYMin: 42°58'56.44"E, 6°57'13.37"N XYMax: 128°4'30.82"E, 18°3'33.10"N

72°54.31'N 10°57'24.40"E



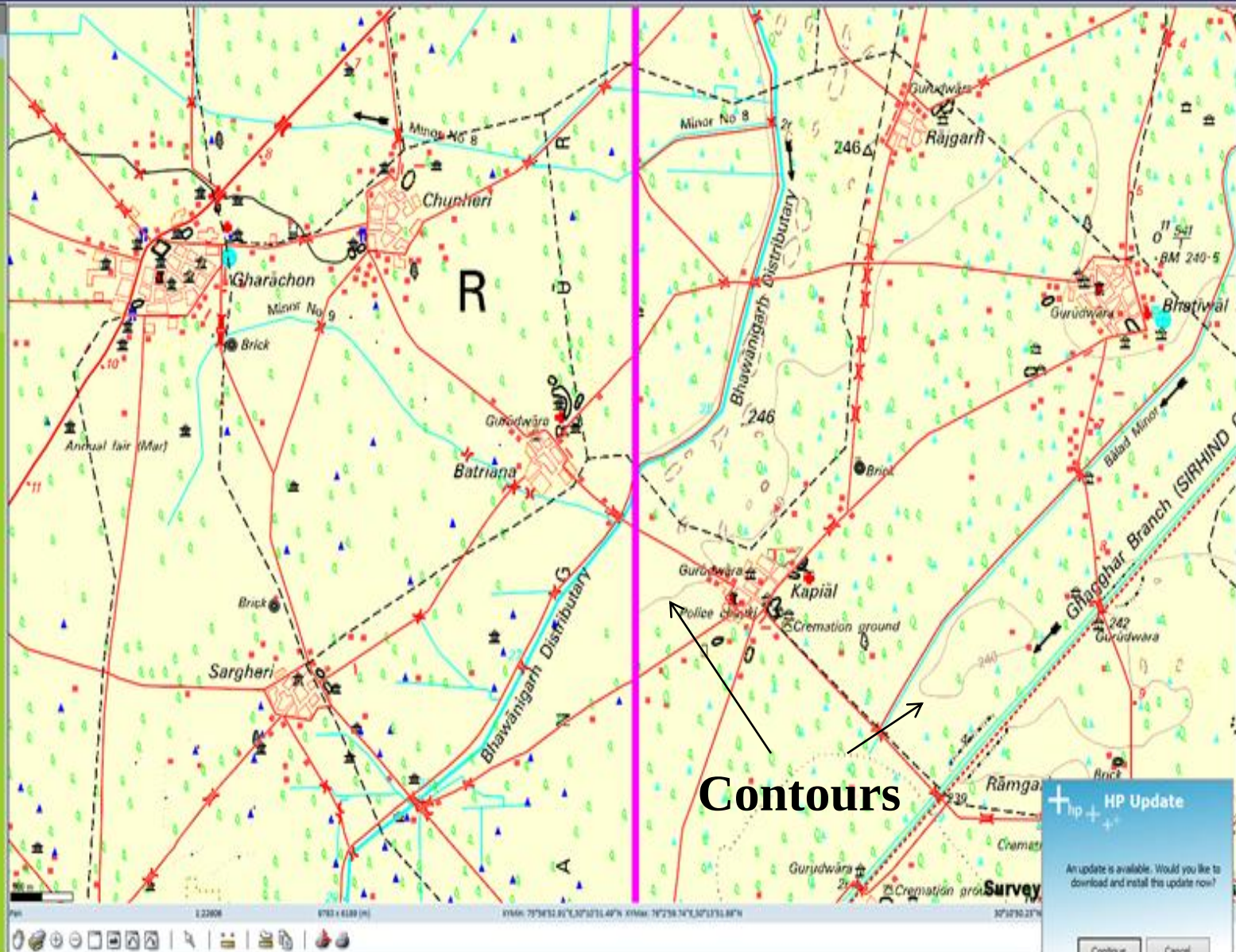
Survey of India - Digital Maps

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Home Thematic Search

Data Layers

- ☐ ANDHRA PRADESH
- ☐ ARUNACHAL AND MIZORAM
- ☐ ASSAM AND NAGALAND
- ☐ BIHAR
- ☐ CHHATTISGARH
- ☐ DELHI
- ☐ GUJARAT
- ☐ HIMACHAL PRADESH
- ☐ JHARKHAND
- ☐ KARNATAKA
- ☐ KERALA
- ☐ MADHYA PRADESH
- ☐ MAHARASHTRA AND GOA
- ☐ ORISSA
- ☒ PUNJAB AND HARYANA
- ☒ Habitation
- ☒ Hydrography
- ☒ Roads
- ☒ Railways
- ☒ LandCover
- ☒ Utilities
- ☒ Boundary
- ☒ Contour
- ☐ TAMILNADU
- ☐ TMZ GDC
- ☐ UTTARAKHAND
- ☐ UTTAR PRADESH
- ☐ WEST BENGAL AND SIKKIM
- ☒ India States
- ☒ India Restricted Limit
- ☒ India UTM Grid 50K
- ☒ India UTM Numbers 50K



HP Update

An update is available. Would you like to download and install this update now?

OSM data: List of Features

Sl No.	CATEGORY	Feature Types
1	BUILDINGS (Annotation Buildings, Annotation Places)	Building (Hut, Block), Buildings religious (Temple, Gurudwara, Tomb, Mosque etc.) , Antiquities (Fort, Cave, Battle field, Mughal kos pillar etc.), Buildings others (PO, PS, Hospital, Dispensary, RH, IB, CH, VH etc.)
2	HYDROGRAPHY (Annotation Hydrography)	River Bank (Broken/unbroken/unreliable) Other River feature Stream (Dry/perennial/Non-perennial single/double etc.) Broken Ground Ravine Canal (Perennial/Non-perennial/Disused/UC etc.) Drain (Perennial/Non-perennial/Disused/UC etc.) Canal Infrastructure Tank/Lake ,Waterfall, Rapid (Rapid on single/double stream), Well (dry/lined/unlined) Other water feature (Tube well/pump house, Hand pump, Over head tank, Swamp/Marsh, Reeds in perennial water) River Embankment (Tank/Protective Embankment) Hydro associated features (Field bund across stream etc.)

OSM data: List of Features

Sl No.	CATEGORY	Feature Types
3	COMMUNICATIONS (Annotation Roads, Annotation Railways, Annotation Aerodromes)	Roads (1 st /2 nd /Others importance Roads, Motorway/Highway, Pack track/ Cart-track/Footpath plains/hills, Track follows stream bed/boundary etc.) Road Bridge (On Roads/Track/Footpath) Road Structure (Ferry, Pontoon, Causeway, Viaduct, Road Tunnel, Ford, Turning/Passing point, Pass, Toll etc.) Road Distance Stone (in km/Miles) Rail Line (Broad/other gauge single/double rail lines) Rail Bridge (On Rail line) Rail Structure (Mineral line, Level crossings, Tunnel, Railway sidings, viaduct railway) Rail Station (Station hut, Station Enclosure) Road Embankments and cuttings Rail Embankments and cuttings Aerodromes (Helipad, Landing strip, Aerodrome)
		Land cover (Forest Reserved/Protected, Wooded area, Forest Riband, Forest fire line, Scrub area, Orchard, Plantation, Tea/Coffee garden, Betel/Vine on trellis)

OSM data: List of Features

Sl No.	CATEGORY	Feature Types
5	UTILITIES (Annotation Utility)	Transmission Structure (Main power line pylon, Rope way terminus) Transmission lines (Telephone line, Main power line, Ropeway etc.) Pipe lines (Oil/Gas/Water/Karez etc.)
6	BOUNDARIES (Annotation Adm. Div. names)	Administrative divisions (Village, Municipality, Subdivision/Tahsil/Taluk, District, State, Country) Administrative boundaries (International/State/ boundary with/without pillars demarcated/undemarcated, LOC/LAC, Cantonement boundary, Open limit, Wall or permanent Fence etc.) Pillar (Boundary pillar main/subsidiary/unlocated/Trijunction)

OSM data: List of Features

Sl No.	CATEGORY	Feature Types
7	HYP SOGRAPHY (Annotation Hypsography)	Contours (Thick/Thin/Intermediate on land/snow, approx/unreliable thick/thin on land/snow, Form line/sub-feature, Bathymetric, Fathom line, Breakline, Depression (in plains)) Mountain (Mountain, depressions, scarp or cliff, river terraces, terraced scarp, isolated rock masses, Boulder, rocky knob, sheet rock, rock outcrop, river gorge etc.) Mud volcanoes (Crater, Pinnacles, Mud vent/flow) Sand features (Step face of sand hill, sand hill/dune, Shifting sand dune, Ground clear of sand, Conical top of dune, Flat sandy area, Elevated flat sand area) Height points (Benchmark Geodetic/Tertiary/Canal, Relative height position, spot ht. position, Triangulation point/station etc.) High mountain features (Morain medial/lateral/terminal, Scree, Rock couloirs, Rock fall, Hanging Glacier, Pass in permanent snow, Ice fall, Crevasses due to uneven bed/movement of ice stream, Ice pinnacle, Bergschrunds,

SOI Licensing Terms for Digital data:

- Digital License: For vector data
- Publishing License: For Raster data
- Internet License: For Raster data
- Value Addition License: For Vector data
- Single License: For one user
- Multiple License: For Multiple users

Pricing for OSM Data and DEM

- OSM Vector data: (in *.dgn format)
 - i. Topographical map Full sheet (Single)- Rs. 5500/-
 - ii. Topographical map Full sheet (Multiple)- Rs. 16,500/-
- DEM (± 10 metre) in Geo-tiff:
 - i. For one Topo-sheet (Single)-Rs. 2750/-
 - ii. For one Topo-sheet (Multiple)- Rs.8250/-

GIS data/layers Required:

1. Digital Elevation Model . (No Bathymetric data)
2. Rivers, Stream drainage network, Canals.
3. Administrative setup up to Tehsil level.
4. Transportation Layer. (Road, Railway , Waterway)
5. Land use and Land cover data. (Man-made, Natural)
6. Delineated catchment area.
7. Slope and aspect map of the terrain.

Preparation of GIS Data/Layers

1. Preparation of the Data Model.
 - a. Real world objects or Features required
 - b. Geometry of Features
 - c. Attribute Fields with each Feature Type
 - d. Domain values for attribute fields
 - e. Data specifications for GIS Layers (Accuracy, updation mechanism, source info etc.)
2. Migration of the OSM data into Topologically structure GIS data as per the above data model.
3. Populating the attribute fields with values.
4. DEM layer can be directly used for the GIS processing.

Other Key Requirements:

1. Satellite Imagery for updating the features as per the data specifications of the Final data model.
2. Field data collection for Geo-rectification of the Imagery (If procured).
3. Field data collection for populating the latest attribute field values.
4. Technology Platform for migrating the Features available in OSM data to GIS Ready data with new data model.
5. Desktop/WEB GIS Platform for Processing the GIS layers as per the project requirement.

WEB GIS

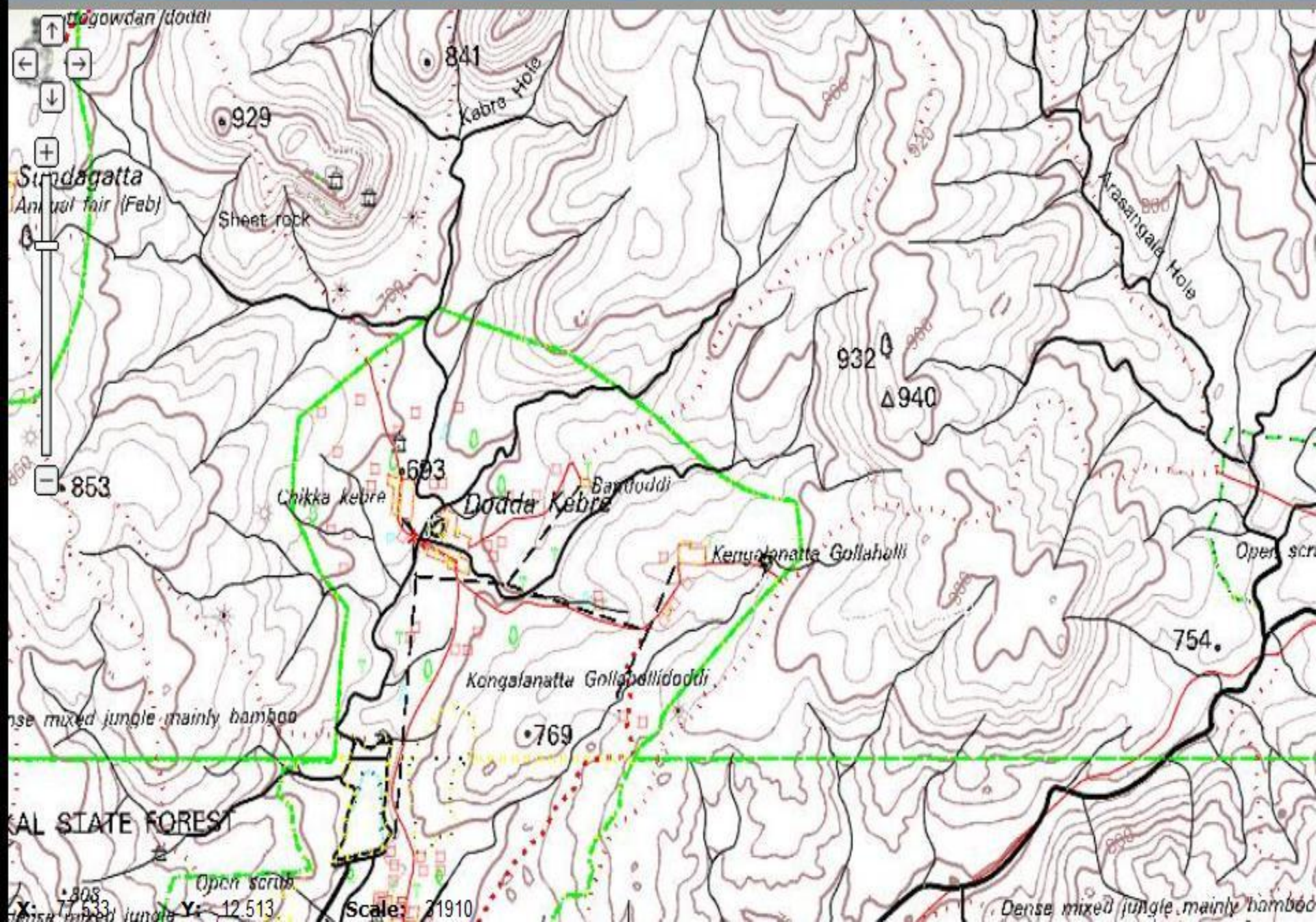
- Facilitates easy and efficient integration of GIS datasets
- GIS Data layer/category as service
- Imagery data products as a service
- Offers need based data visualization
- Offers GIS data processing services based on user requirement.

Example: WEB GIS

OSM vector Data as Service

+

BHUWAN Imagery as service





X: 78.827 Y: 18.374 Scale: 21.589



Layers

Metadata

Discover

Data

Tools

Search

Bhuvan

AndhraBoundaries

AndhraContour

AndhraHabitation

AndhraHydrography

AndhraLandcover

AndhraRailway

AndhraRoads

AndhraUtilities

BoundariesPartMaharashtra

ContourPartMaharashtra

HabitationPartMaharashtra

nsdi

India GeoPortal

Map Data
With PAN
Imagery



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India GeoPortal

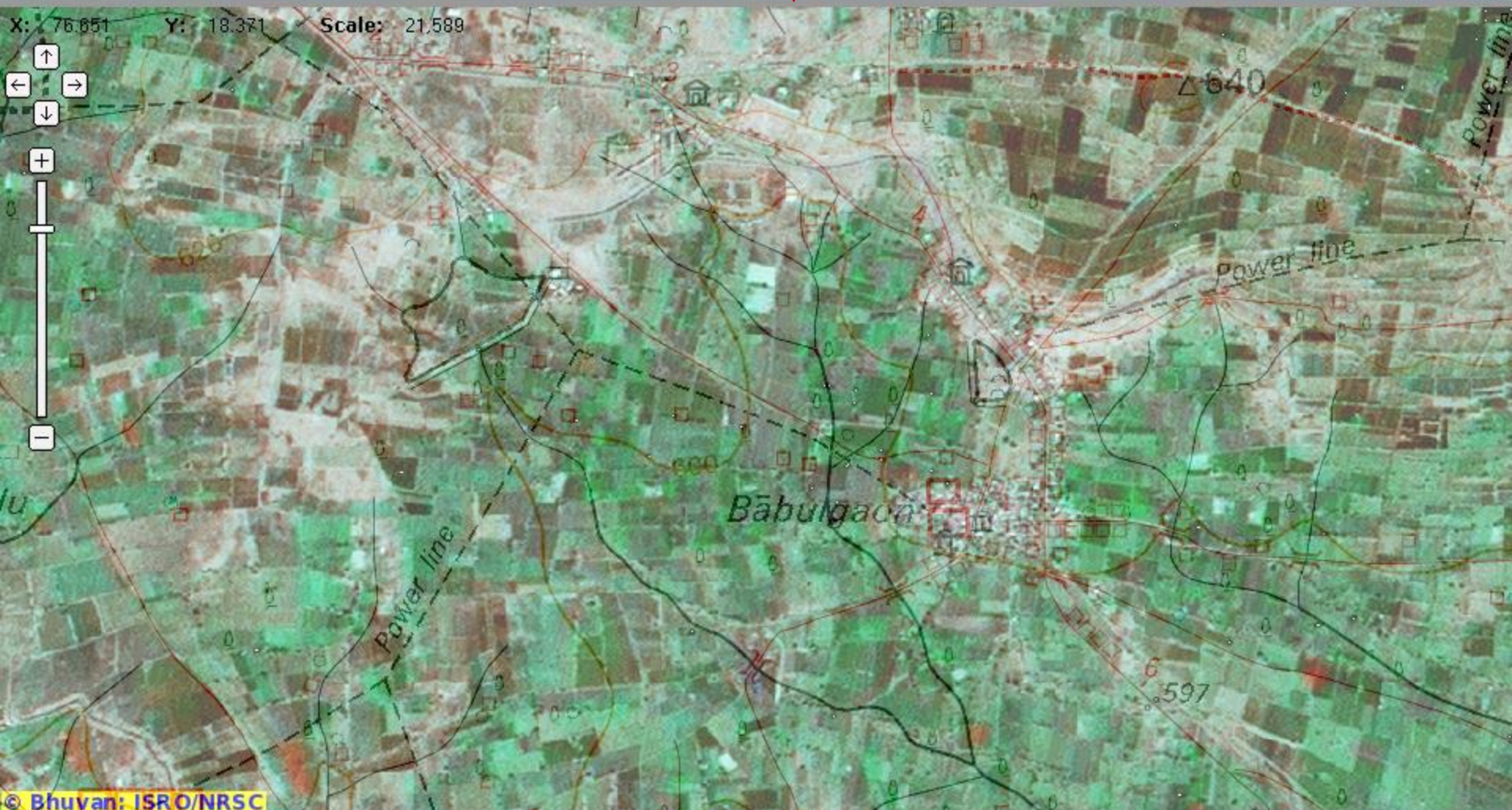
X: 76.651 Y: 18.367 Scale: 21,589



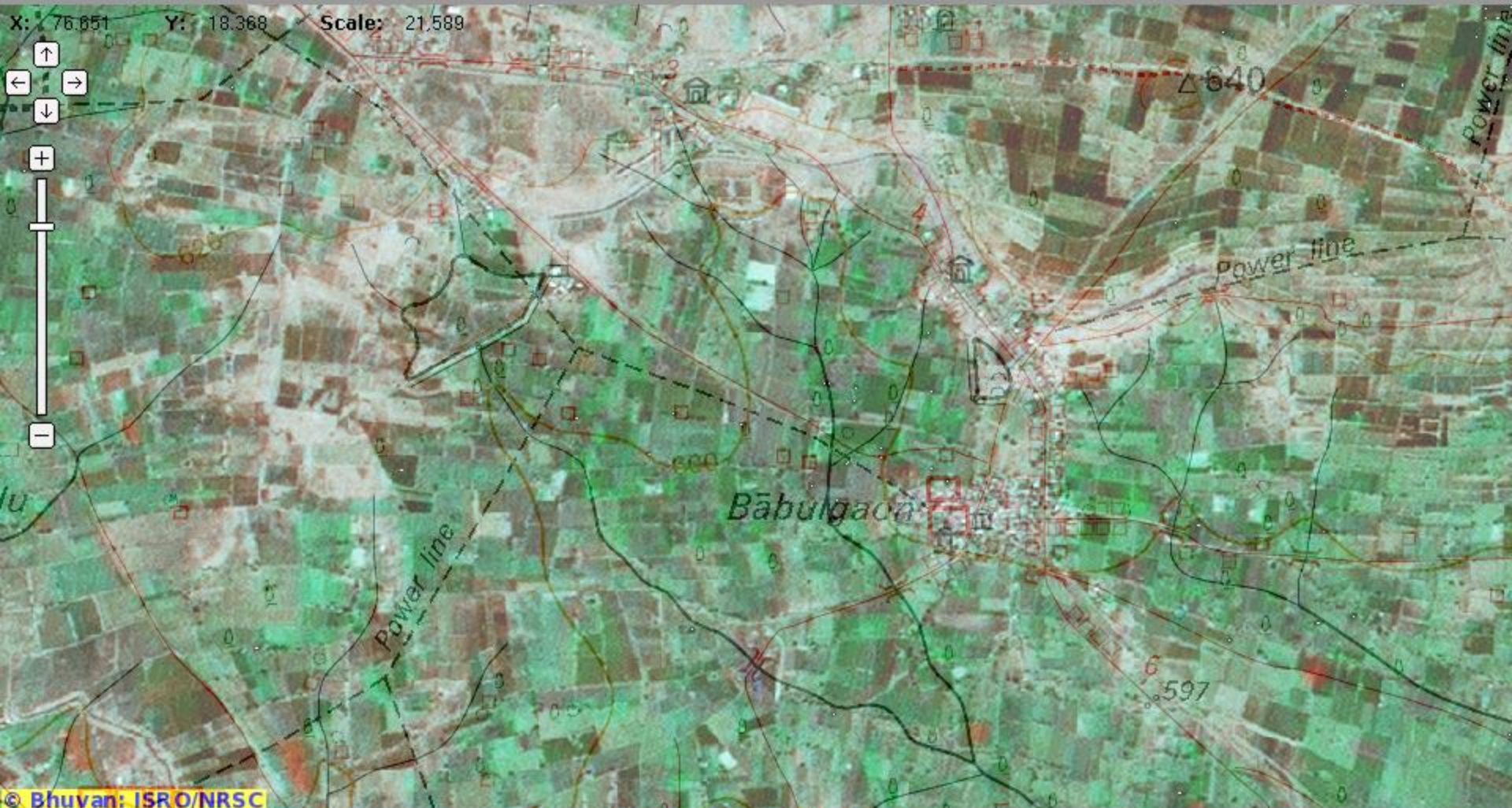
nsdi

India GeoPortal

X: 76.851 Y: 18.371 Scale: 21,589



X: 76.851 Y: 18.368 Scale: 21,589



Similar GIS Projects underway at Project Proposal/Final stages with Ministry of Water Resources (MOWR)

1. Preparation and supply of GIS layers for more than 2500 topographical maps to CGWB (MOWR).
2. Collaboration on GIS mapping for National Mission for clean Ganga (NMCG, MOWR).
3. Country wide DEM preparation for 0.5 meter and 3.0 meter resolution for MOWR.

High Resolution Mapping of River Ganga Basin

Large scale mapping of River Ganga and its tributaries in five major states namely Uttarakhand, Uttar Pradesh, Jharkhand, Bihar and West Bengal to generate Geo-Spatial Database covering major towns and cities along the course for an area of approx. 2,50,000 km²

Core Objectives:

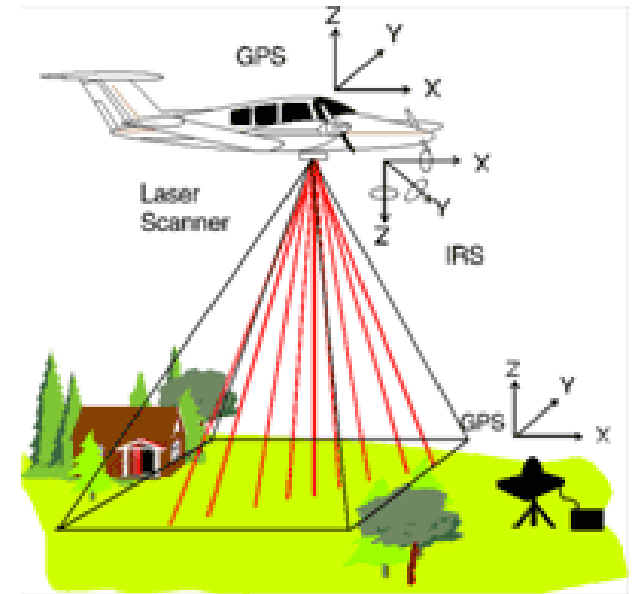
- **Establishment of SDI with robust data centre and disaster recovery site (including all hardware & software requirements with & high speed networking) and Web GIS Portal for River Ganga Project .**
- **Provision of Web based Base Map Services based on 1:50,000 SOI Re-engineered Topo-Graphic datasets, Freshly acquired Large scale Topo-graphic datasets i.e. 1:10,000/1:4000 scales.**
- **Digital elevation model of Fundamental Vertical accuracy of 0.5 m or better over the basin area for various hydrological studies**
- **Support of Image Service at top of Base Map Service from low resolution (5.6m) to high resolution (0.5m).**
- **Preparation of Data Model and Generation of geospatial datasets as per the new data model strictly as per the requirements of NMCG.**
- **Seamless Integration of various related datasets on River Ganga and setting up of GIS Framework and mechanism of data updates and service delivery.**

Deliverables of Mapping

- Ground control and reference points information
- LiDAR Raw and processed data along with all associated files & Meta data
- Raw and Processed Orthophotos(12 cm GSD) & DEM (vertical accuracy better than 50 cm), contour of 0.5/1.0 m for the plain areas of Ganga basin
- Topographic map at 1:10,000 Scale with 0.5/1.0 m contour interval in digital form (.shp format) of the Plain areas of Ganga Basin
- Topographic map at 1:25,000 Scale with 10-20 m contour interval in digital form (.shp format) in the hilly terrain of Ganga Basin
- Outlet/vent of sewerage and other discharges from all dwelling units, industrial, commercial and all types of other institutions will be mapped, from the source outlet to the public drainage network.
- All the public drainage network in the project area will be integrated with the present project mapping.
- River Bathymetry data along the river course
- DTDB & DCDB of the area as per feature based Data Model of Sol
- Two hard copy prints of each map on good quality material

Technology

- LiDAR Technology & Digital Images are the chosen method of Survey
- Survey Goal – Preparation of 1:10 k map with 0.5/1.0 m contour and DEM of the project area for further application and analysis by stake holders, user agencies.



- Uses
 - Flood mapping studies
 - Geomorphological studies
 - Structural mapping
 - Fault zone identification
 - Landslide studies



Role of Survey of India

- **Provision of ground control.**
- **Selection of Agency for Project execution.**
- **Coordination of clearances.**
- **Collection of LiDAR data and Digital aerial Images in a secured manner.**
- **Supervision of data processing till generation of DTM/DEM and 1:10 K map of the area.**
- **Quality assurance and Field Verification**
- **Setting up of Data Centre**
- **Training of staff and Officer's of NMCG in different arena of geospatial technology**
- **Support for Maintenance/ Management of Geospatial Data for 2 Years after handing over of the deliverables of the Project and Data centre to NMCG**

Project Implementation

Sl.No.	Target	Timelines	Remarks
1.	River Ganga basin GIS Version 1.0	6 months by October, 2015	To build functional system at top of existing GIS systems and enhance with respect to functional objectives mentioned above
2.	River Ganga basin GIS Version 2.0	2015-2016	To Enhance the system capability with 0.5 m FVA, DEM and image service with ortho-photo of resolution 20cm or better
3.	Base Line Data	2016-2017	To establish full fledged GIS system with geospatial dataset having required features



Thank You

Questions ??

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