Space based Information Support for Decentralized Planning (SIS-DP)

Empowering Panchayati Raj Institutions and Stakeholders for Decentralized Planning

Nagaraja Ravoori,

Project Director, SIS-DP

Chief General Manager, RC, NRSC

National Remote Sensing Centre

nrsc

Space Based Information Support for Decentralized Planning (SIS-DP)

Goal:

Empowering the Panchayati Raj Institutions (PRIs) and the Stakeholders with Space Based Information Support for Decentralized Planning and Governance in the country.

Objective 1

To generate and provide 'Satellite Image Maps' for the entire country as base for decentralized planning.

(High resolution, true color, Ortho-rectified, merged satellite data products)

Objective 2

To prepare thematic & base layers on 1:10000 scale using 'Satellite Image Maps', slope classes maps and Cadastral maps vectorization & geo-referencing

Objective 3

To create databank: comprising of 'Satellite Image Maps', thematic and base maps, slope class maps; and organize census data, climate data, cadastral maps, stakeholder's data and available legacy thematic & base data on GIS platform.

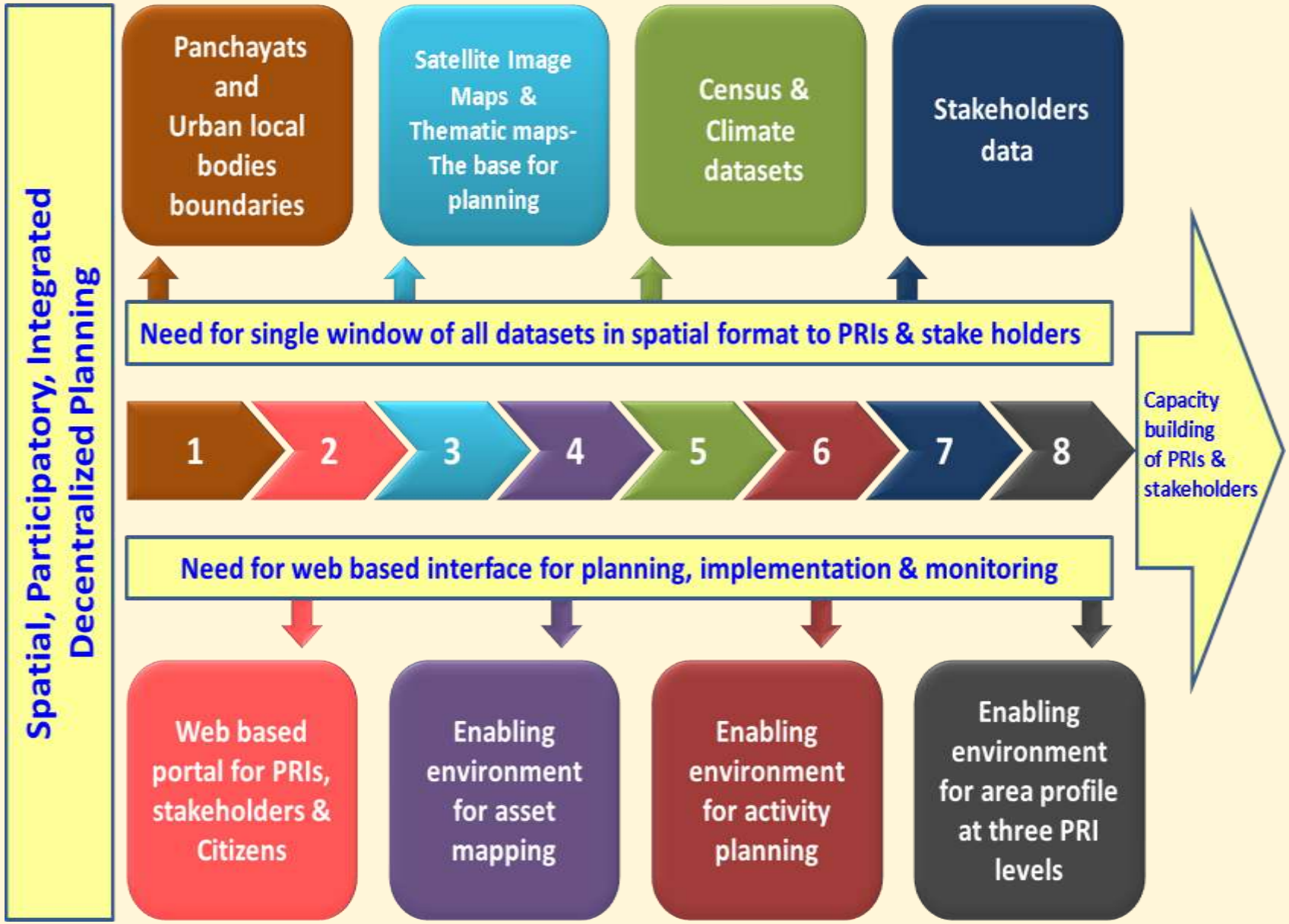
Objective 4

To develop comprehensive web portal as per PRIs & stakeholders needs for decentralized planning, governance, outreach to the citizens and data dissemination.

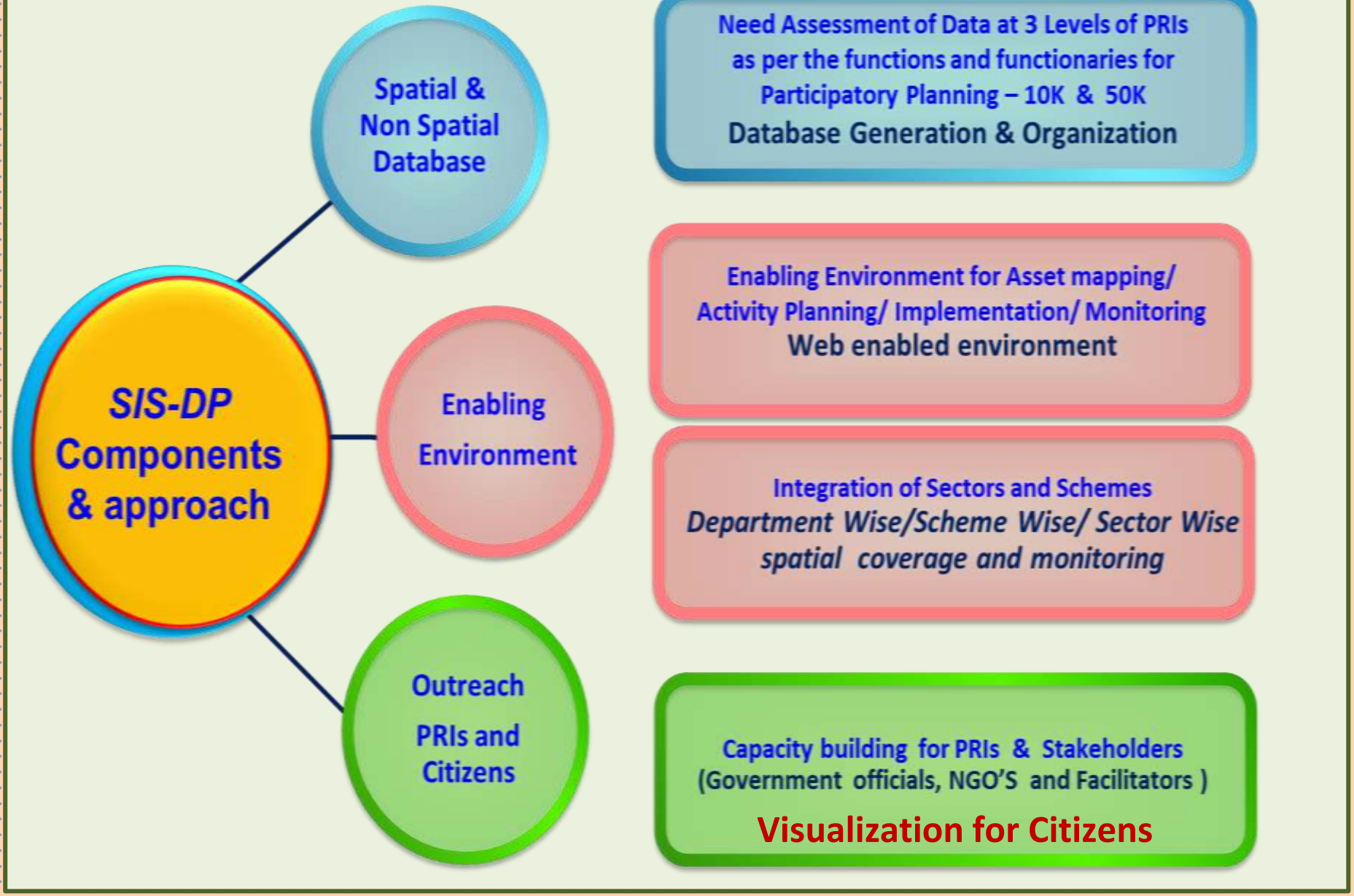
Objective 5

To build Capacity of PRIs & stakeholders for the use of Space Based Information in Decentralized planning and governance.

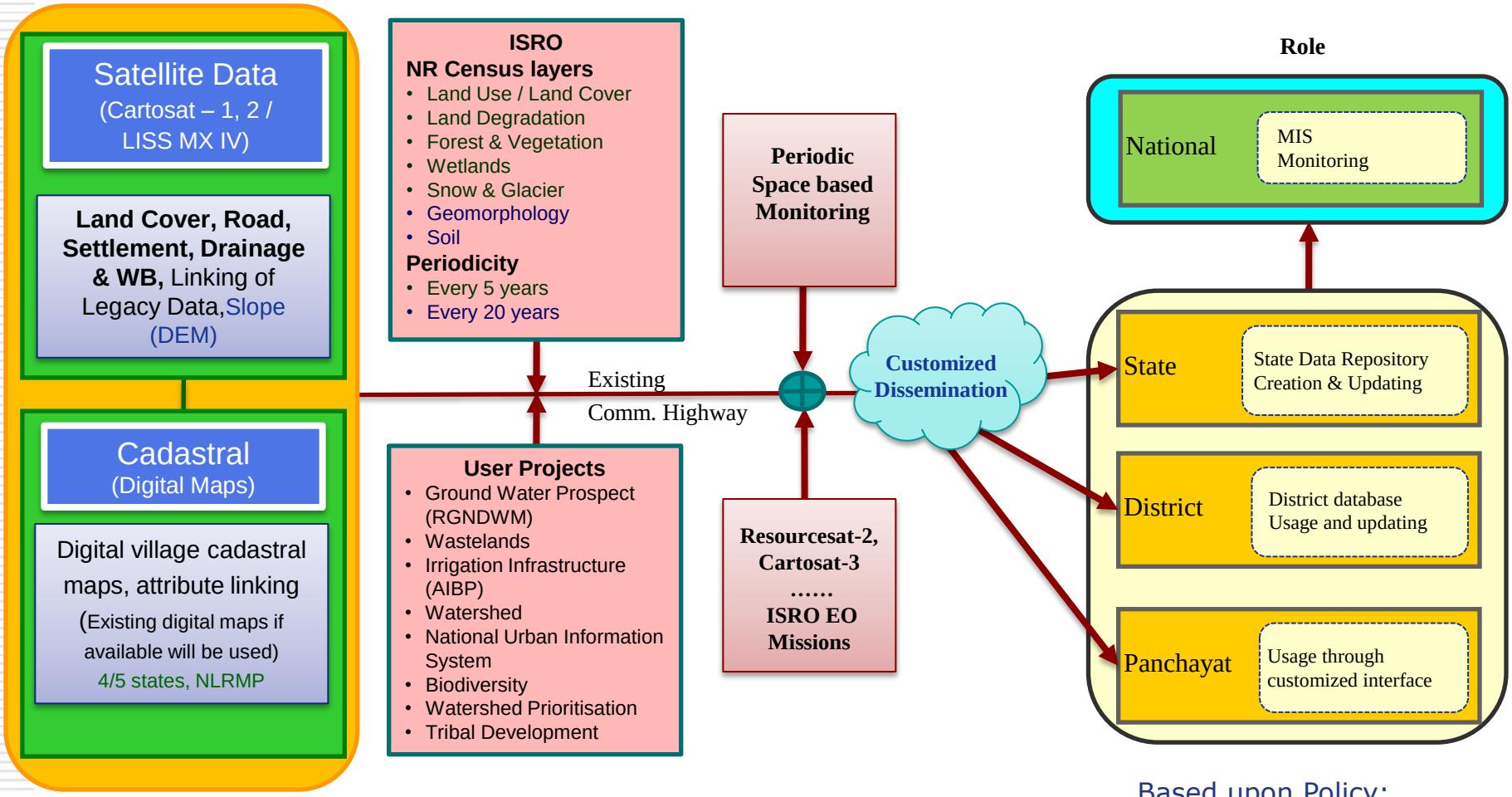
THE CURRENT REQUIREMENTS: DATA & ENABLING ENVIRONMENT



SIS-DP APPROACH



SIS- DP



New (1:10K)	Existing/ongoing (1:50K)	Assured Continuity	New

SIS-DP Conceptual Framework

1. Database Generation and Organization
Spatial & non spatial data
NRSC & States Centres / partners

2. Enabling Environment for PRI's
Web Based System for PRIs – Four modules
NRSC / ISRO

3. Outreach
PRIs & Citizens
NRSC & States Centres /partners

Earth Observation Images

Thematic Data

Field Data

Administrative Data

Cadastral Maps

Infrastructure Data

Climate Data

Socio-economic Data

SIS-DP Database

Asset Mapping & Activity Planning

PRIs, State Centres, NGOs, Citizens

Capacity Building

State Centres & NRSC / ISRO

Village (Gram Panchayat) & Urban local bodies

Block (Panchayat Samiti)

District (Zilla Parishad)

Implementation & Monitoring

PRIs, State Departments

Geo-Visualization

Search , Access, Understand

NRSC / ISRO

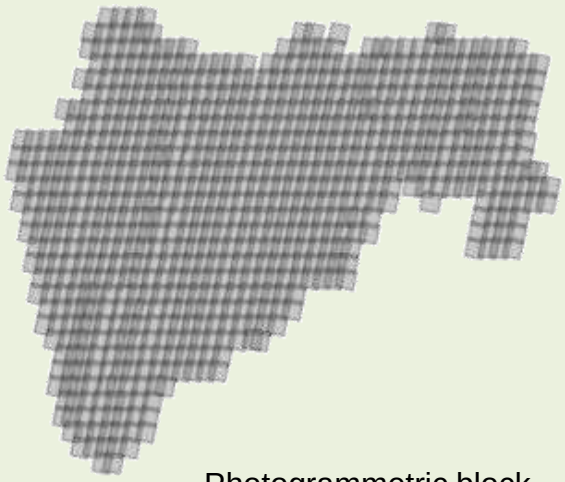
Identification of sector wise issues at all levels of PRIs

STATE-WISE DEM / ORTHO-IMAGE GENERATION – METHODOLOGY & STATUS

Methodology

- Creation of State-wise Photogrammetric block
- GCP Identification
- Multi ray Image points
- Triangulation
- L1 DEM Generation
- DEM Editing (break-lines/Mass pt editing)
- Mosaic of Cartosat-1 Orthoimage
- LISS IV Ortho-rectificaiton
- Fused product generation

DEM Generation

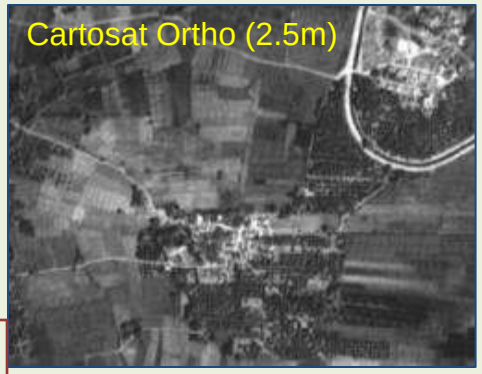


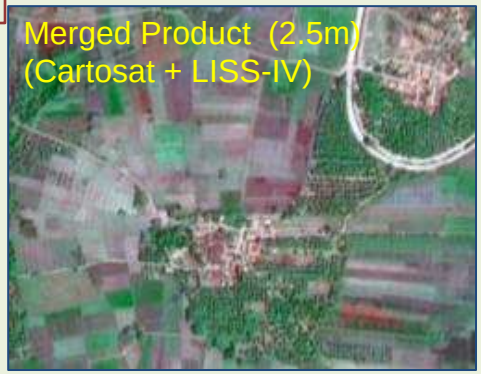
Photogrammetric block Maharashtra

DEM of Maharashtra

CartoSAT-1 stereo pairs > 11,000
ResourceSAT-1 scenes > 12,000
ResourceSAT-2 scenes > 500

Satellite Data Products

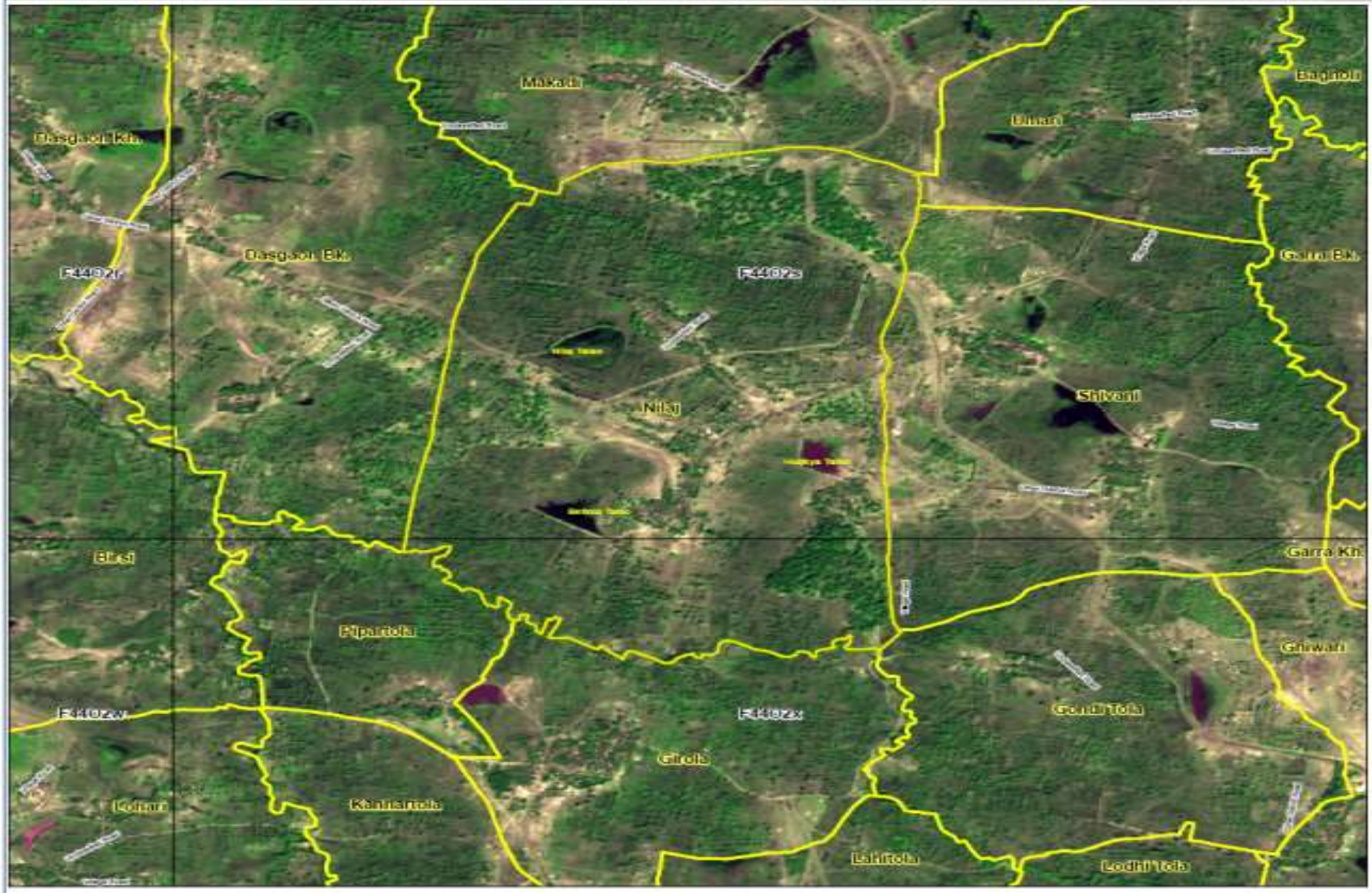




STATUS OF DATA PROCESSING

No of states / UT	% completed
States (29) / UT's (7)	100

Satellite Image of Gram Panchayat - NILAJ



Satellite Data Information:
The satellite image is an ortho-rectified geocoded natural color product generated by process of merging CARTOSAT-1 PAN (2.5m) and RESOURCESAT-1 LISS IV(5.8m)

Karandi
Bhatmarali

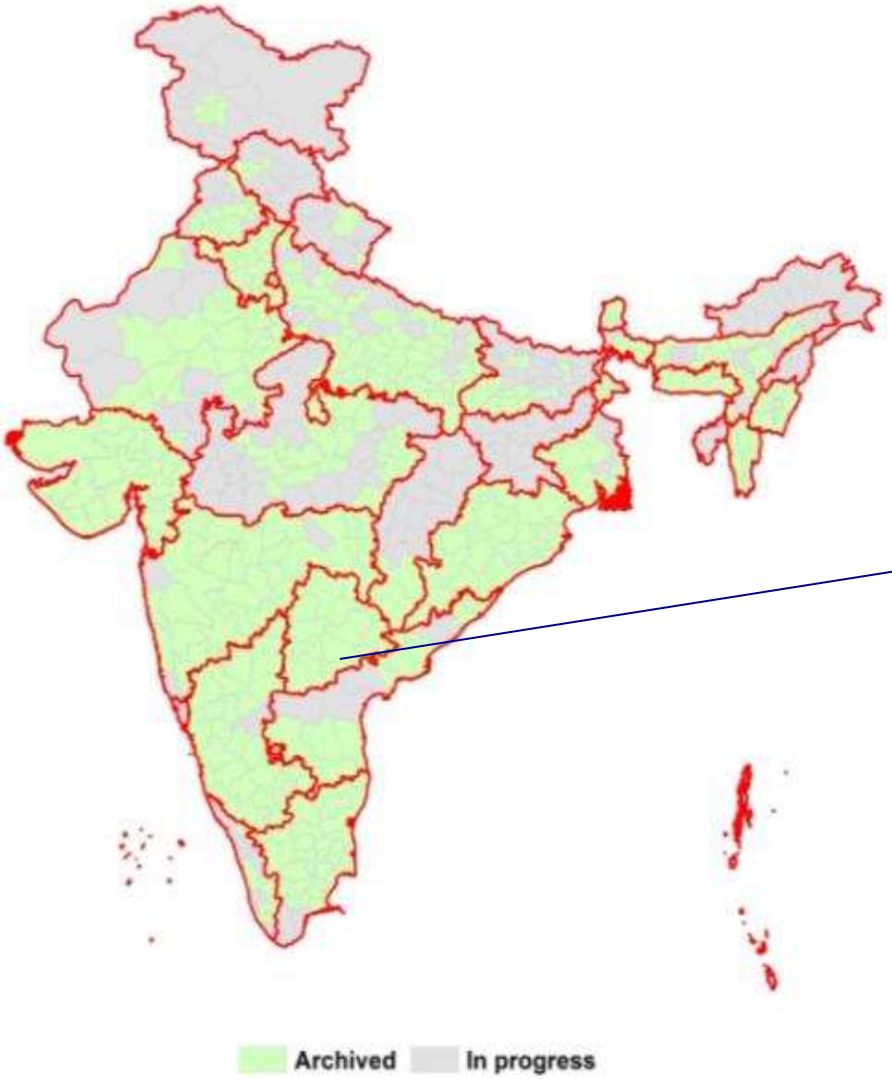
High Resolution Satellite Images - 1

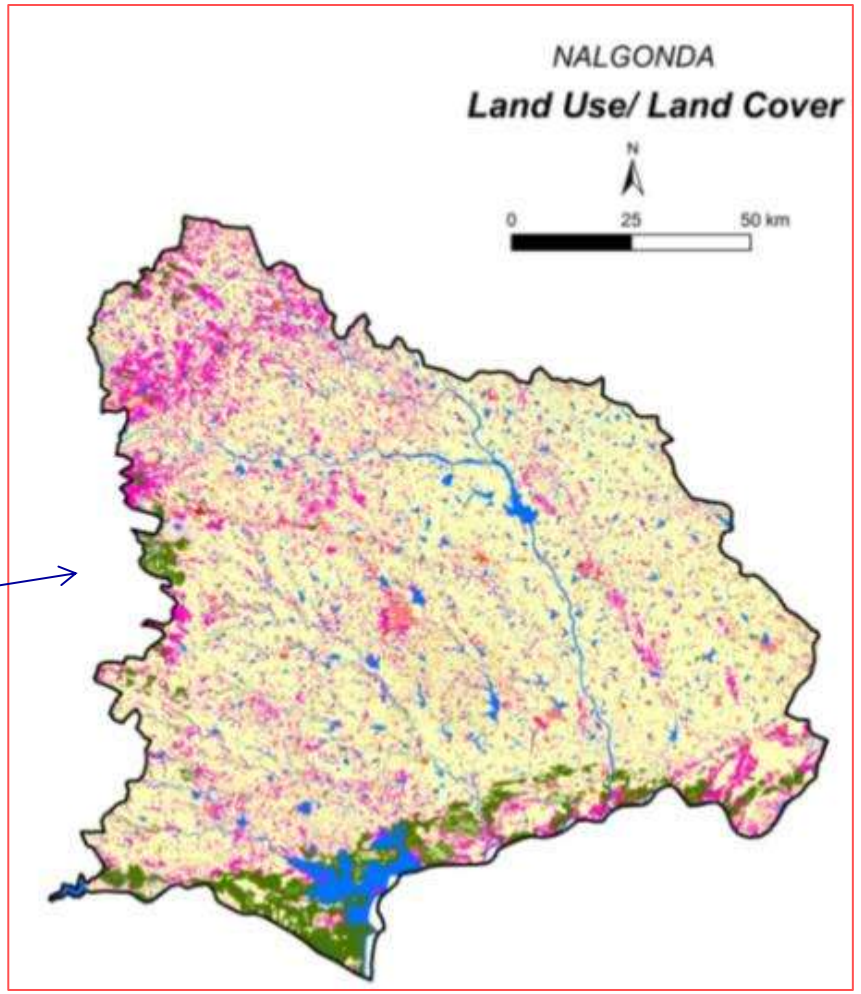
High Resolution Satellite Images - 2

Status of archival of Thematic Mapping at 1:10k

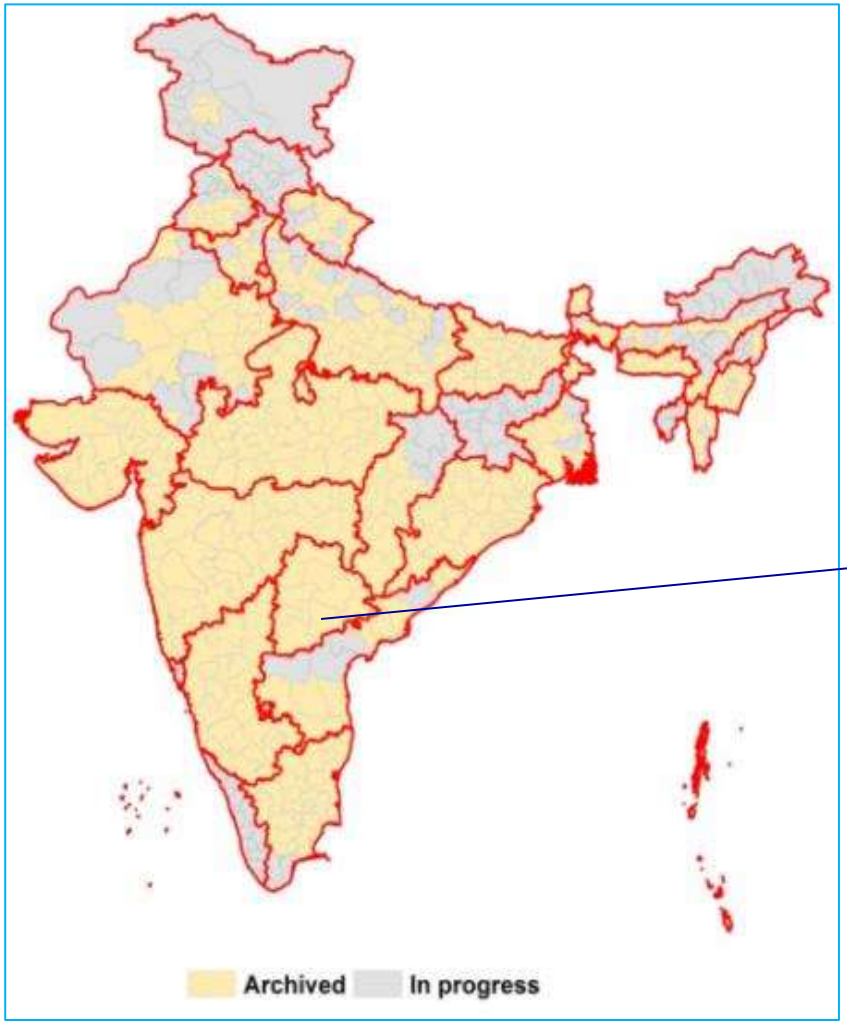
S.No.	State	No. of Districts	*LULC*	*Road*	*Railway*	*Drainage*
1	Andhra Pradesh	13	13	13	13	13
2	Arunachal Pradesh	17	17	17	NA	12
3	Assam	27	27	27	27	27
4	Bihar	38	38	38	38	38
5	Chattisgarh	27	22	19	14	27
6	Gujarat	33	33	33	33	33
7	Goa	2	0	2	2	2
8	Haryana	21	21	21	19	21
9	Himachal Pradesh	12	9	4	4	4
10	Jharkhand	24	11	24	24	0
11	Jammu and Kashmir	22	13	13	6	8
12	Karnataka	30	30	30	30	30
13	Kerala	14	14	14	11	11
14	Maharshtra	36	35	35	35	24
15	Madhya Pradesh	51	51	51	51	51
16	Meghalaya	11	11	11	NA	11
17	Mizoram	8	8	8	NA	8
18	Manipur	9	9	9	NA	9
19	Odisha	30	30	30	30	30
20	Punjab	22	22	22	22	22
21	Rajasthan	33	32	32	29	32
22	Sikkim	4	4	4	NA	4
23	Tripura	8	0	0	0	0
24	Nagaland	11	0	11	NA	11
25	Tamilnadu	32	32	32	32	32
26	Telangana	10	10	10	10	10
27	Uttar Pradesh	75	75	75	75	75
28	Uttarakhand	13	13	13	5	13
29	West Bengal	20	20	20	20	20
30	Chandigarh	1	1	1	1	1
31	Delhi	11	11	11	11	11
32	Dadar & Nagar Haveli	1	1	1	NA	1
33	Daman & Diu	2	2	2	NA	2
34	Puducherry	4	4	4	3	4
35	Lakshdweep	1	1	0	NA	0
36	Andaman Nicobar	3	3	0	NA	0
	Total	**676**	**643 (95%)**	**637 (94%)**	**598 (90%)**	**629 (93%)**

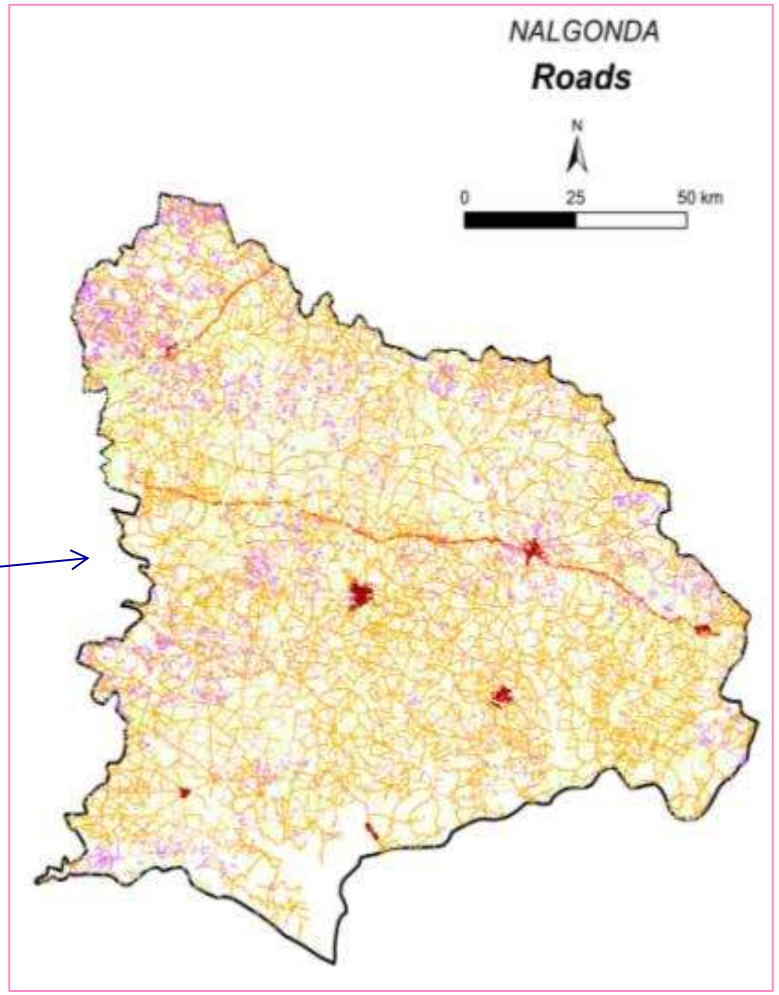
LAND USE/LAND COVER – ARCHIVAL STATUS





ROADS – ARCHIVAL STATUS

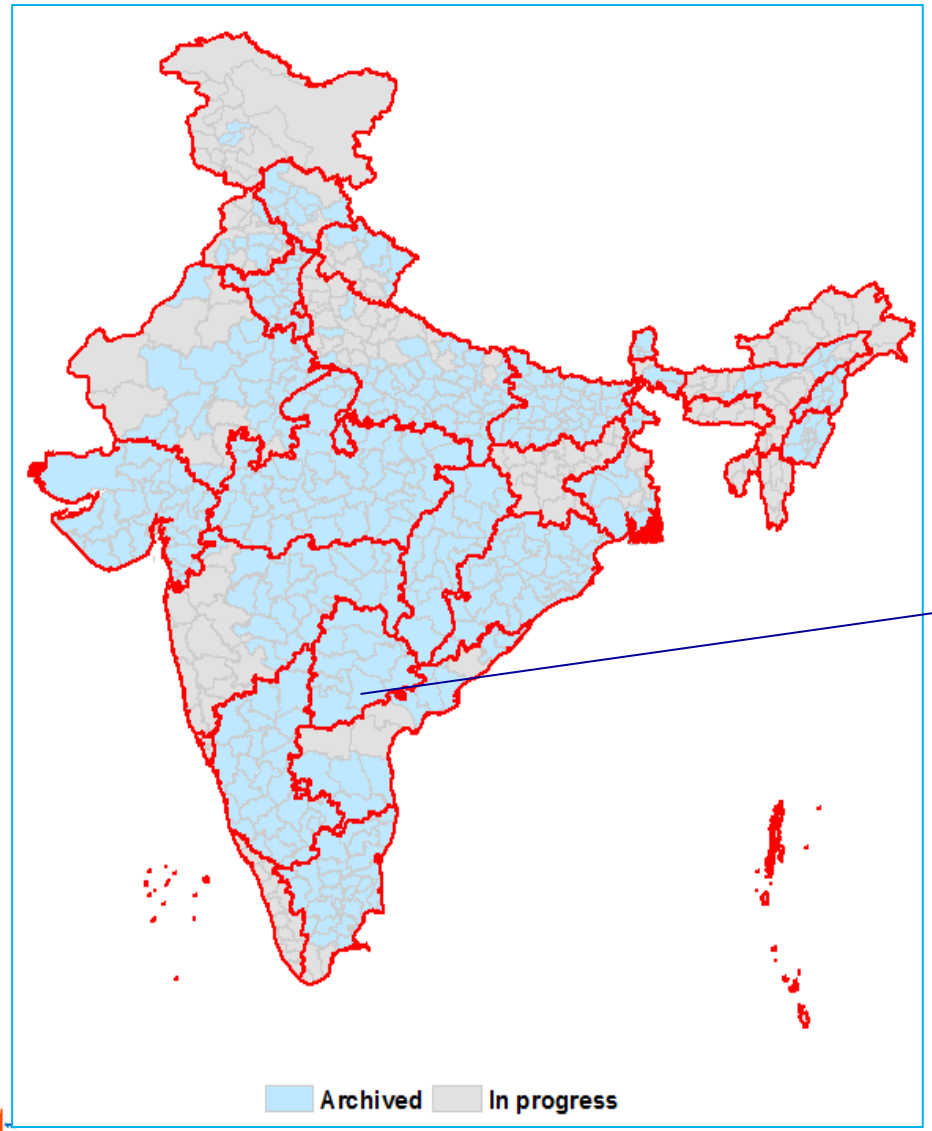


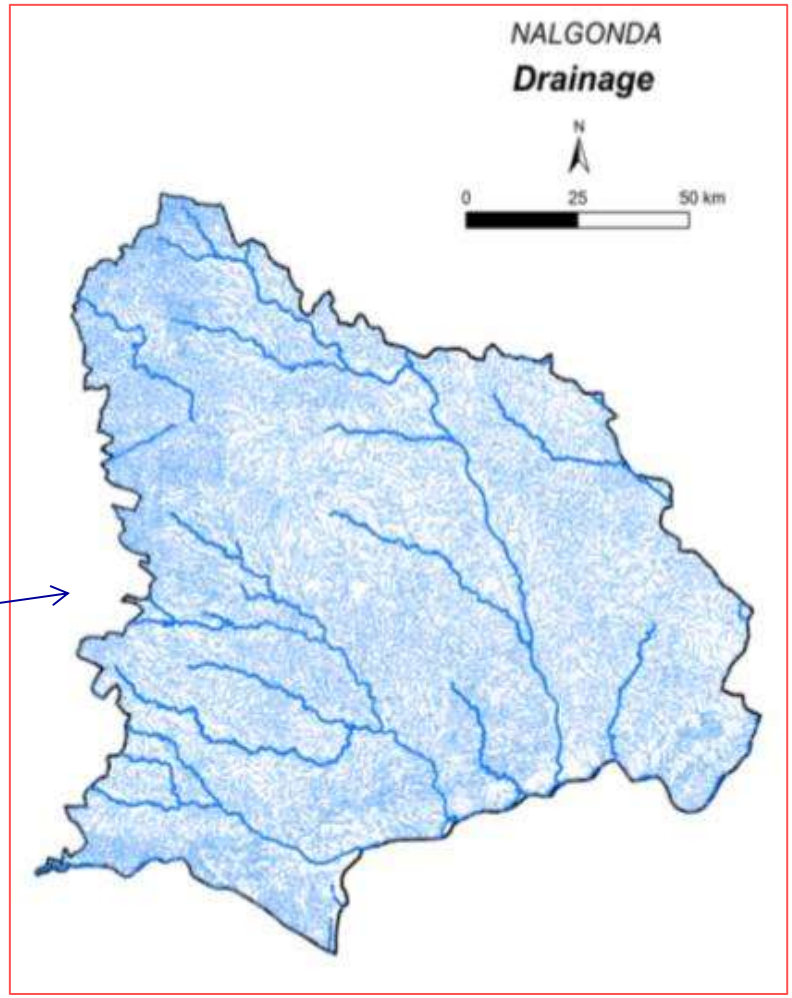


Legend

National Highway	City Road
State HIghway	Kutchha Village Road
District Highway	Cart Track
Pucca Village Road	Foot Path

DRAINAGE – ARCHIVAL STATUS

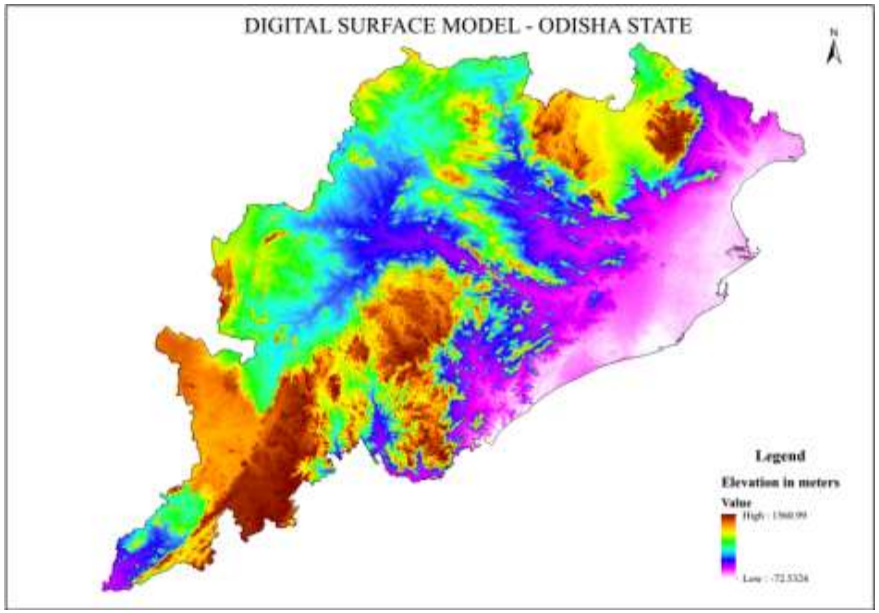


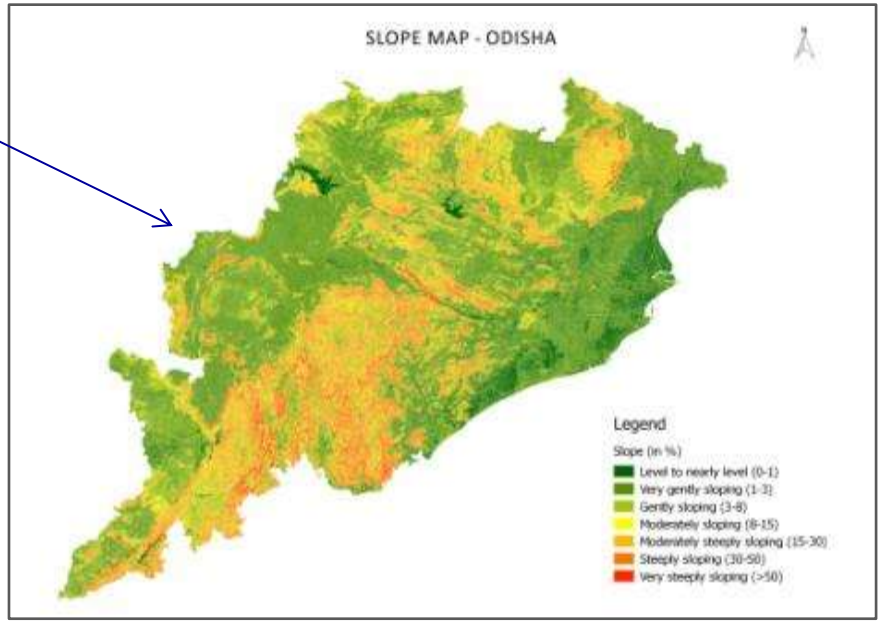


Legend

- River
- Stream
- Main Canal
- Branch Canal
- Distributory Canal

SLOPE CATEGORY – ARCHIVAL STATUS

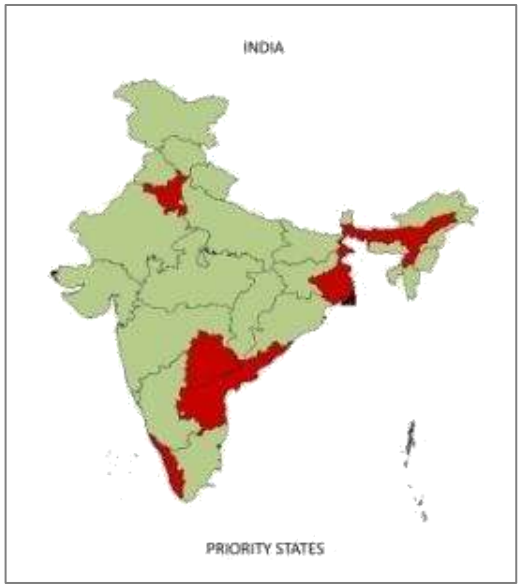




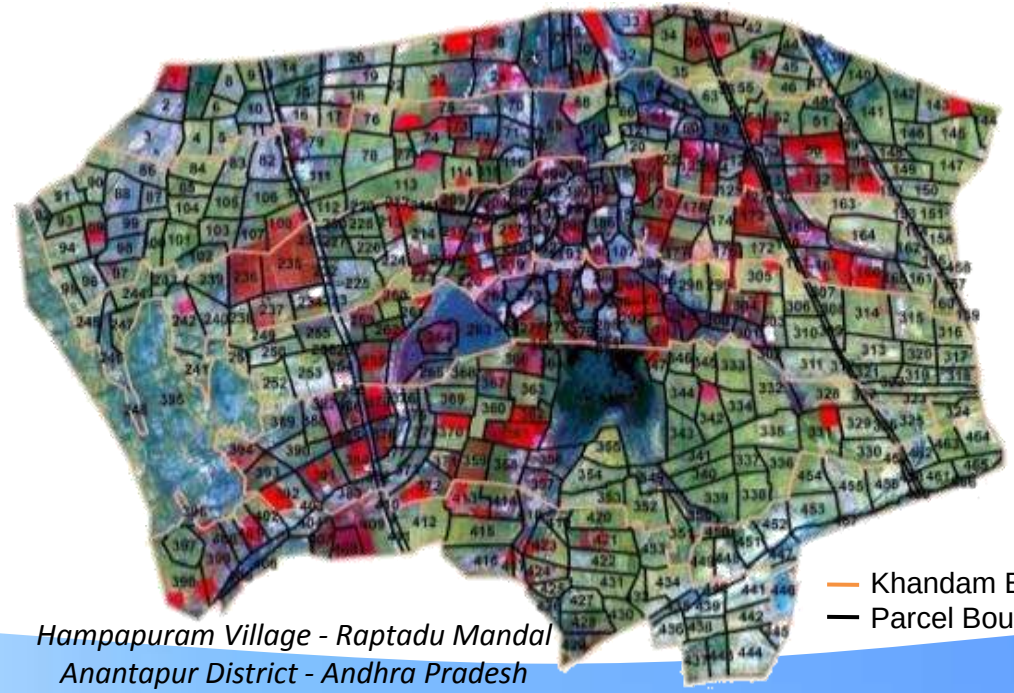
Legend (In %)

- Level to nearly level (0-1)
- Very gently sloping (1-3)
- Gently sloping (3-8)
- Moderately sloping (8-15)
- Moderately steeply sloping (15-30)
- Steeply sloping (30-50)
- Very steeply sloping (>50)

CADASTRAL OVERLAY STATUS



STATE	Number of Villages – Total	Number of Villages – Overlaid	Percentage of Villages
Andhra Pradesh	17385	12580	**72.36**
Assam	21225	18409	**86.73**
Haryana	7094	7030	**99.09**
Kerala	1593	1092	**68.55**
Telangana	10932	9350	**85.53**
West Bengal	4028 / 40203	2500	**62.06**
TOTAL	**62229**	**50961**	**81.89**

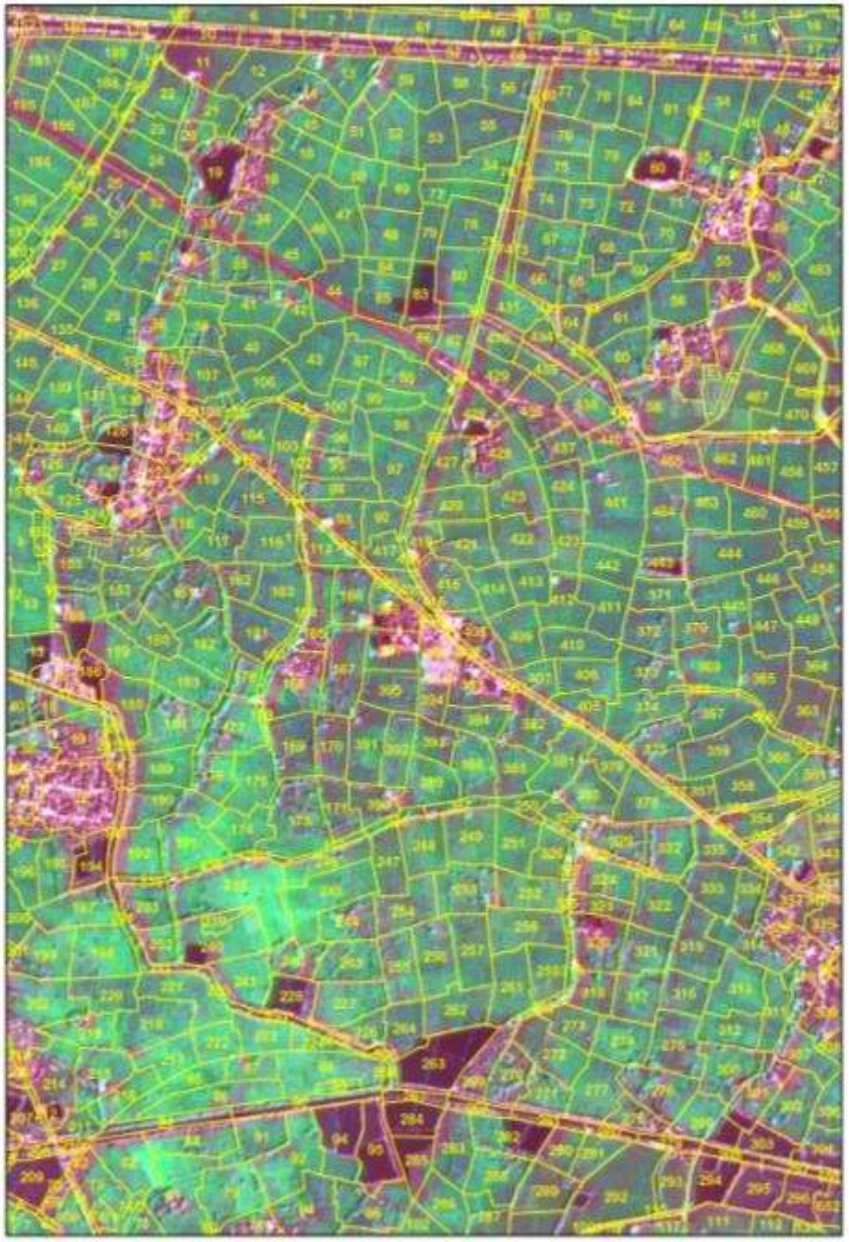


Hampapuram Village - Raptadu Mandal
Anantapur District - Andhra Pradesh

CADASTRAL OVERLAY – Andhra Pradesh

Cadastral Overlay - Andhra Pradesh Krishna District

Cadastral Overlay - Andhra Pradesh East Godavari District



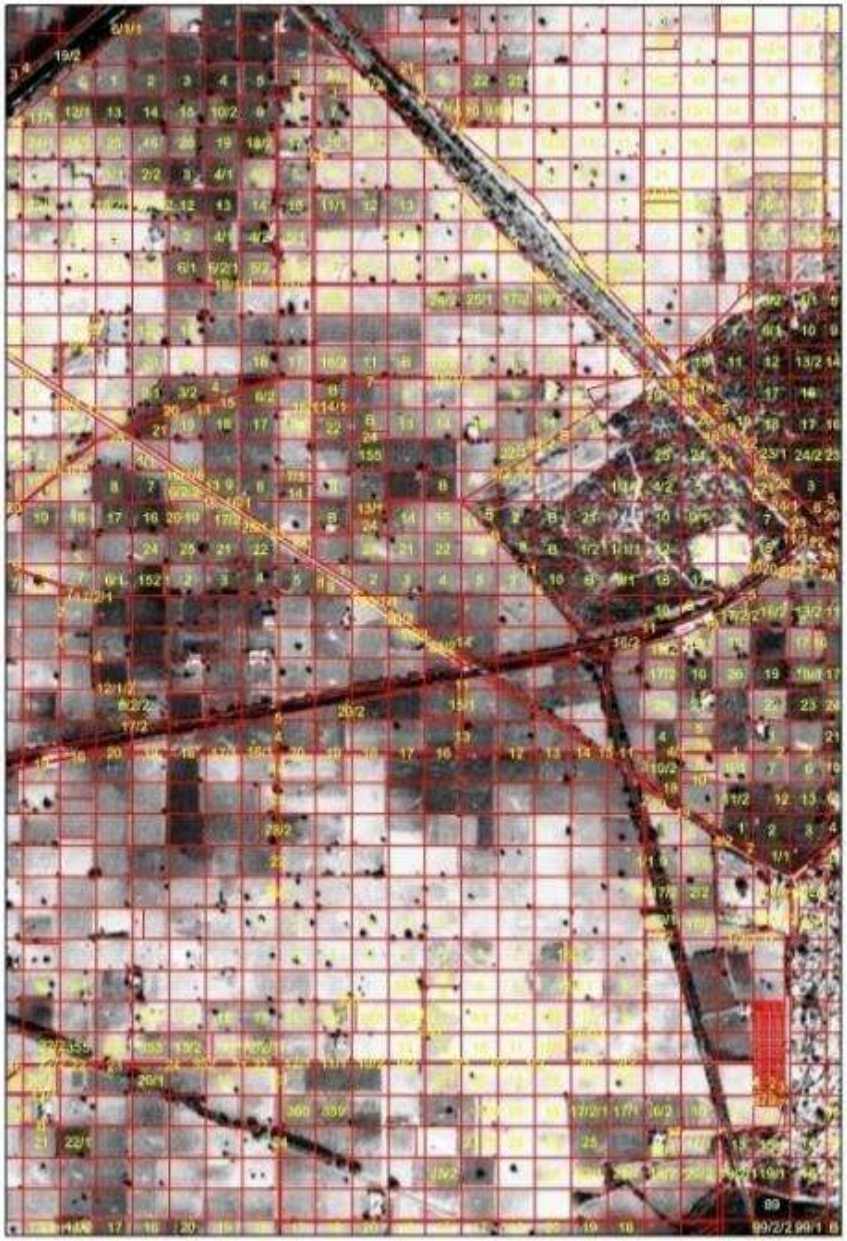
CADASTRAL OVERLAY – Telangana

Cadastral Overlay - Telangana Warangal District

Cadastral Overlay - Telangana Adilabad District

CADASTRAL OVERLAY – Haryana

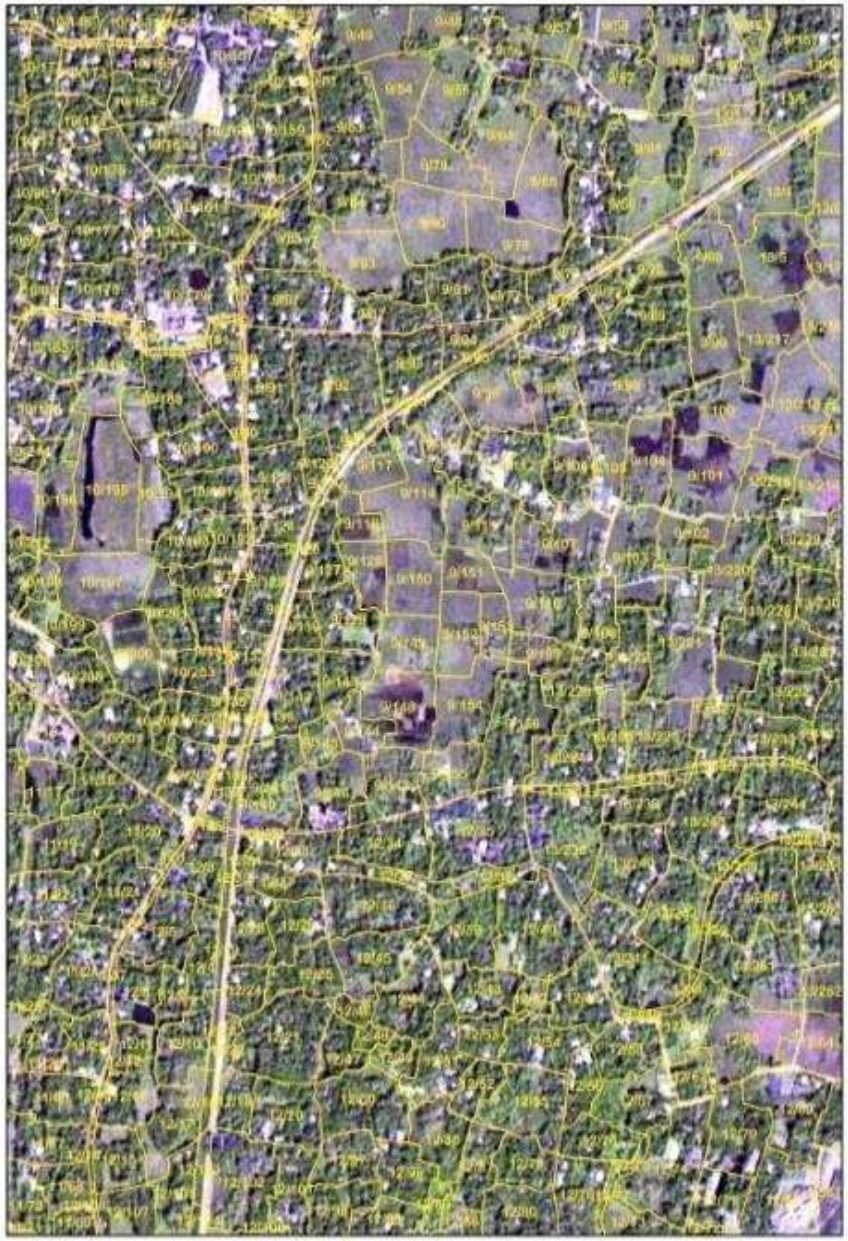
Cadastral Overlay - Haryana : Fathehabad District



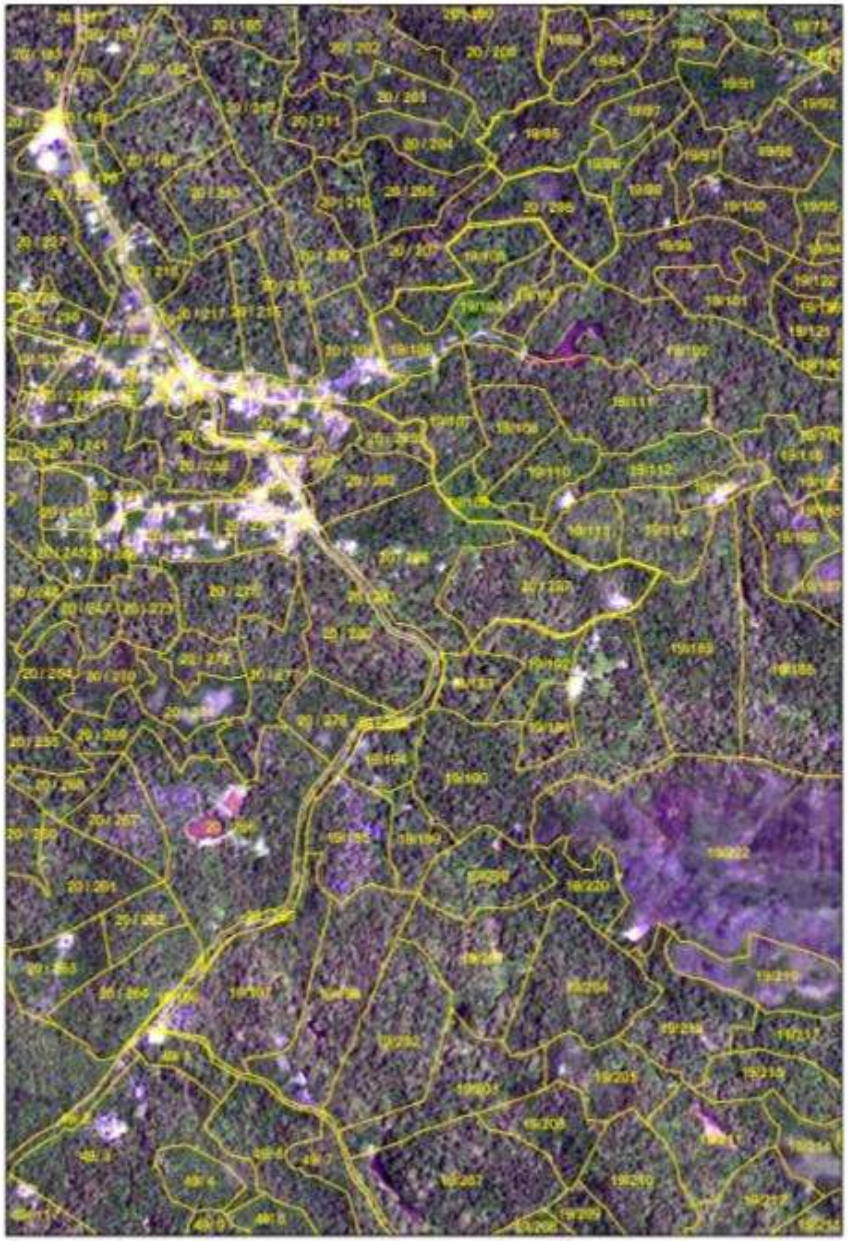
Cadastral Overlay - Haryana : Gurgaon District

CADASTRAL OVERLAY – Kerala

Cadastral Overlay - Kerala: Alappuzha District

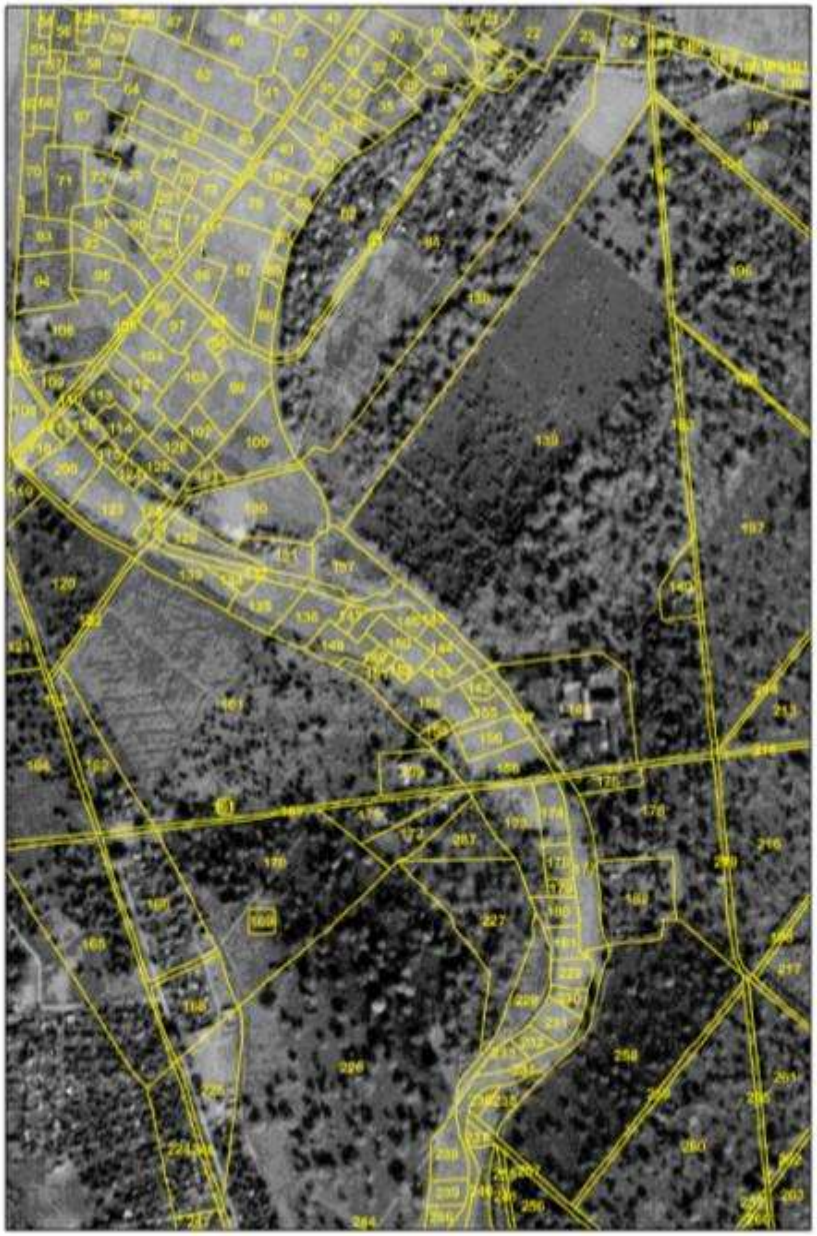


Cadastral Overlay - Kerala: Idukki District

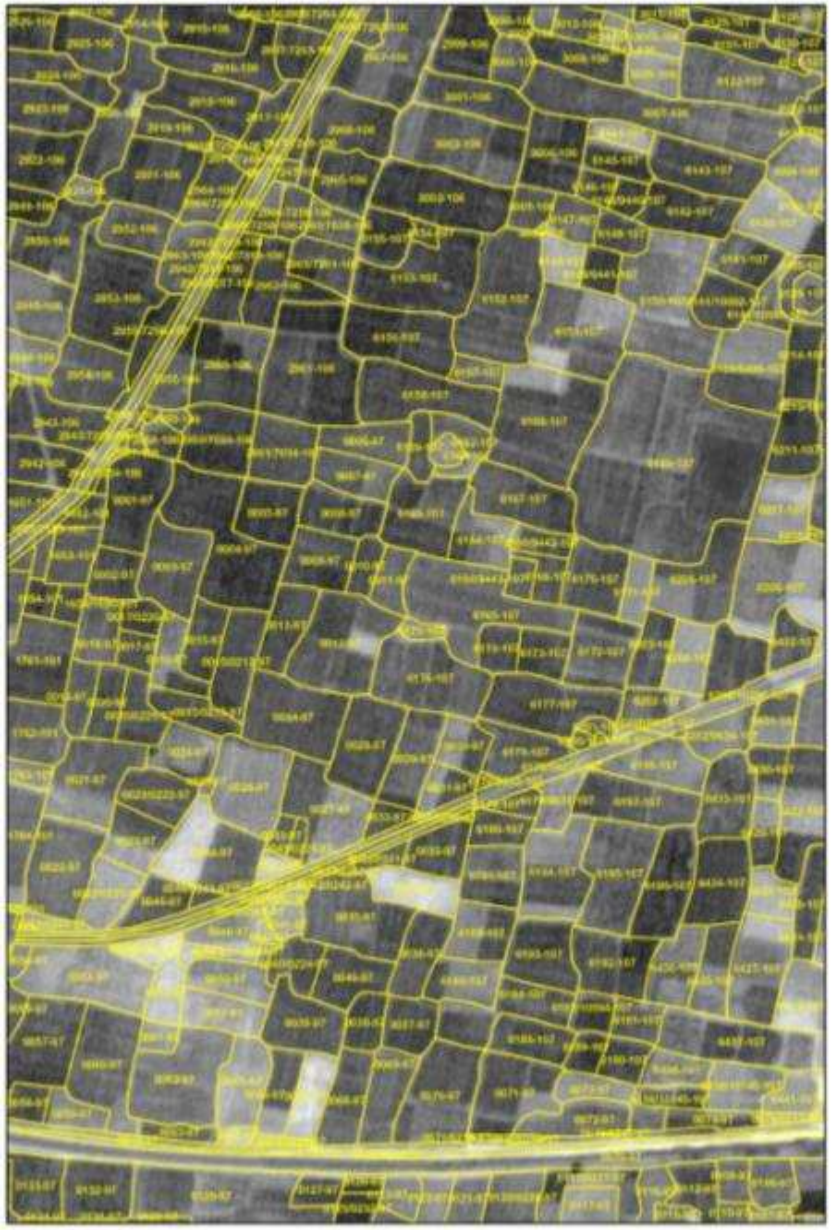


CADASTRAL OVERLAY – Assam and West Bengal

Cadastral Overlay - Assam : Sonitpur District



Cadastral Overlay - West Bengal : Birbhum District



Space Based Information Support for Decentralized Planning (SIS-DP)

Accomplishments

- Ortho Product Generation - 100% Completed
- Bhuvan Panchayat V 2.0 Released
- Publishing 1:10000 Scale Maps in Portal - 80%
- 6 Major Pilot Studies Carried Out
- Data Dissemination to 13000 GPS
- Capacity Building of 1100 PRI officials.
- Country Wide Asset Mapping & Capacity Building *initiated*
- Publications – 6 Reports

Way Forward 2016 - 2017

- Data Dissemination through Portal
- Pilot Studies in a Block per State
- Updation of Satellite Imagery
- Capacity Building - *SIRD, NGO, Academic institutions*
- Asset Mapping & Activity Planning
- Bhuvan Panchayat V 3.0 Release
  - *Integration with Panchayat Enterprise Suite (PES)*
  - *Advanced Spatial Planning Tools*
  - *State Specific Planning Process*

Status of Publishing Maps in Portal in %

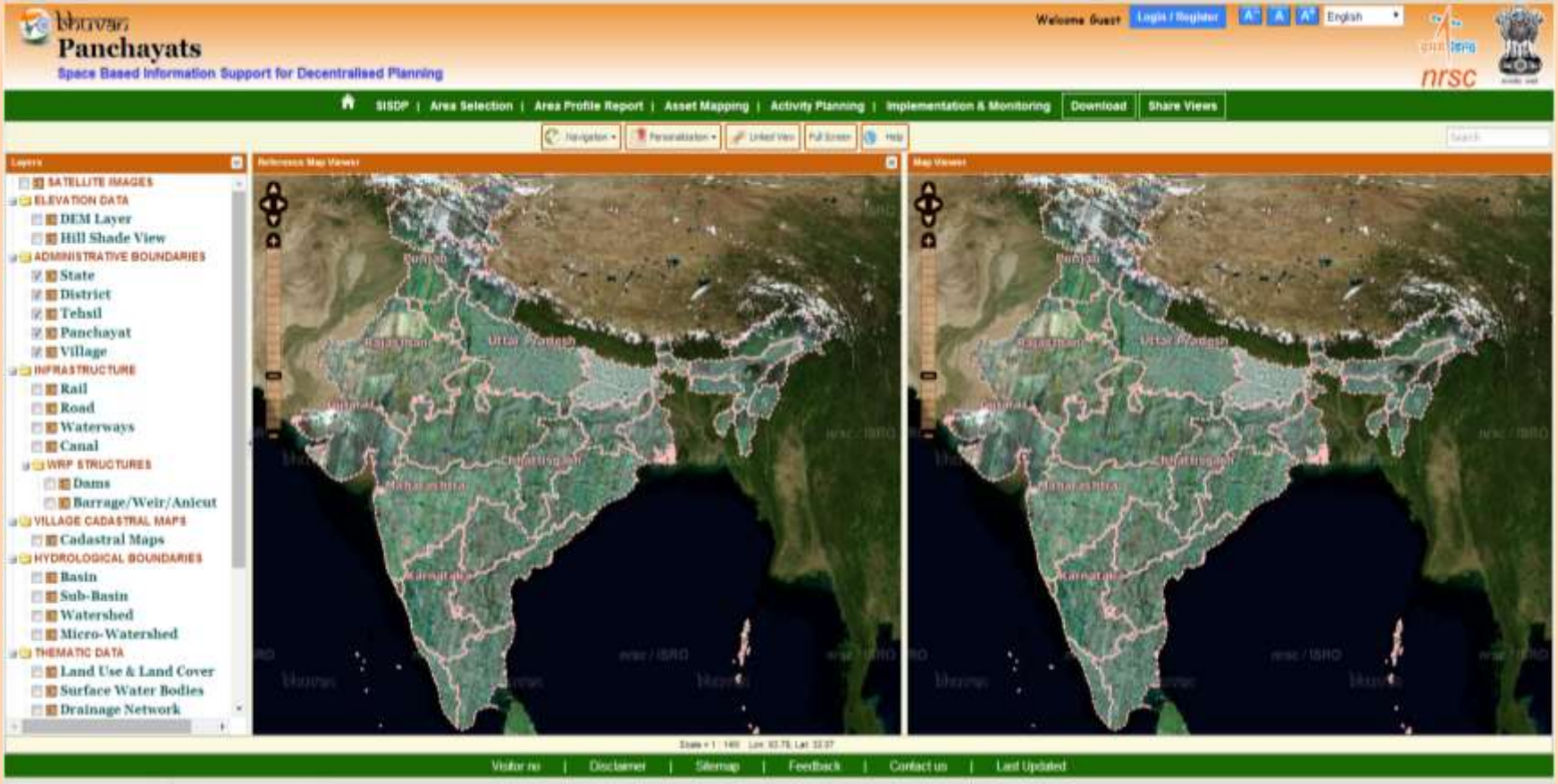
	Sep 2015	Mar 2016
LU/LC & Settlements	78	100
Infrastructure	82	100
Drainage& Wat. Bodies	75	100
Slope	80	100

Pilot Studies (6000 Assets)

Luni, Jodhpur, Rajasthan (45 GPS)
Jayapur, Arajiline, Varanasi , UP (3 Villages)
Chityala, Nalgonda Dist, Telengana (2 GPS)
Mallur, Kolar, Karnataka (5 GPS)
Nalhati, Birbhum, West Bengal (25 Villages)
Wardha, Chandrapur & Nagpur, Maharashtra (7 GPs)
13 GPs in 10 states by MoPR

bhuvan
Panchayat Portal

Space Based Information Support for Decentralized Planning (SIS-DP)



http://bhuvan-panchayat.nrsc.gov.in/

Enabling Environment – Bhuvan Panchayat Portal

MODULES

- **Area selection**
- **Area Profile Report**
- **Asset Mapping**
- **Activity Planning**
- **Implementation & Monitoring**
- **Download Reports**

FEATURES

- Planning window for citizens & PRI
- Inventory of Assets across the Nation
- Planning option from 17 CSS and other Schemes
- Dissemination of spatial & non-spatial information

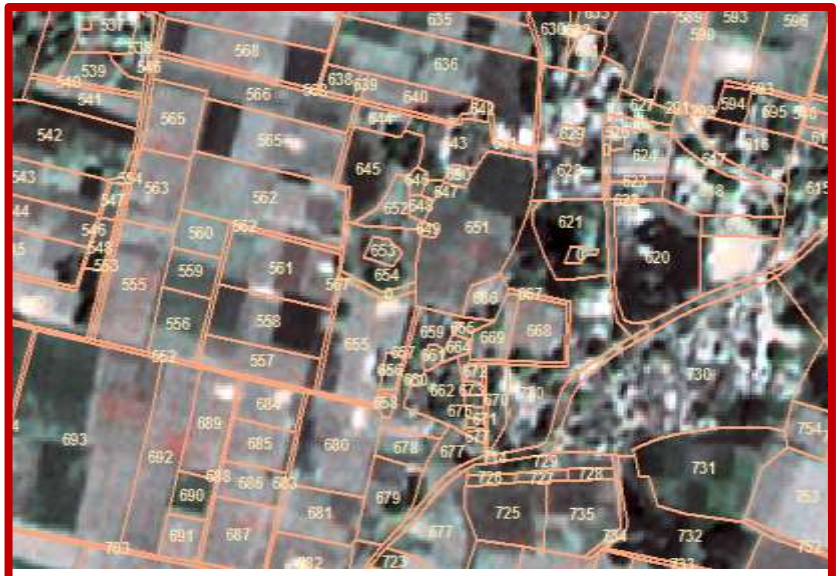
Integration of schemes:

- Saansad Aadarsh Gram Yojana (SAANJHI)
- Backward Regions Grant Fund

Bhuvan Panchayat Portal Release :

- **Ver 1.0 released on March 2014**
- **Ver 2.0 released on November 2014**

Mobile App for Asset



*Cadastral Map of **Jayapur Panchayat** Overlaid on High Resolution Satellite Image (2.5m)*

*Assets Mapped through Mobile app for **Jayapur Panchayat**, **Varanasi***

*adopted by Prime Minister **Shri Narendra Modi** under **SAANJHI***

Classification of SIS-DP Assets

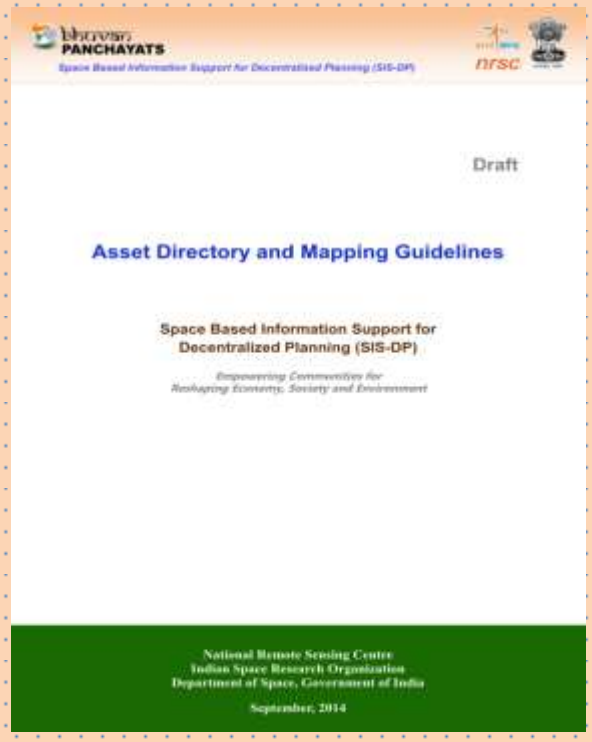
Asset Summary

Groups: 5

Subgroups: 25

Asset-Groups: 73

Assets : 281



Asset Classes

Civic Amenities/Infrastructure Assets: 46 Asset Groups

Governance Assets: 7Asset Groups

Productive Assets: 9 Asset Groups

Human Resources and Livestock Assets: 2 Asset Groups

Natural Resources Assets: 8 Asset Groups

2:23 pm
GPS
Internet
Compass
Govt. of INDIA
APSAC
Govt. of AP
bhuvan panchayat - ap
Smart Village
Re-survey
Start Survey
Map Assets
Declaration
End Survey
Send
View Assets
Line Dept Data
Summary Report
Helpline
Help
Exit
Profile
Logout
Help
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Area Profile and Resource Inventory

This information provides an overview of an area under eight heads:

1. Identification details
2. Major Issues and Constraints in the area
3. Priorities of the area
4. Ongoing Projects
5. Village & Town Directory: 2011
6. House Listing & Housing Census Schedule: 2011
7. Assets - Natural resource assets, Productive assets, Civic amenities /Infrastructure, Human resource & livestock assets, Governance assets
8. Mapping of Vulnerable areas / Groups / Assets

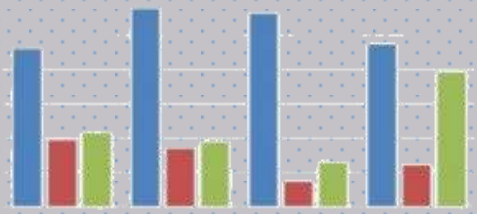
The Area Profile and Resource Inventory provides a snapshot of the area; it highlights key information on natural resources, various types of assets, socio-economic details, disaster prone areas, other major priorities and constraints in an area.

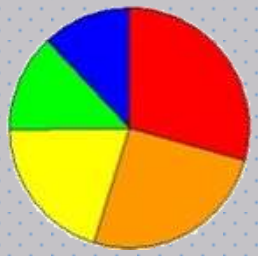
These are represented in the form of Tables, Maps and Charts.

Village & Town Directory

Census 2011

House Listing & Housing Census Schedule





Class of Agriculture	Area
Area under crop	64
Plantations	56
Agro horticulture	23
Agro Forestry	2

DP Process & Activity Planning

Activities → Sectors → Ministries → Schemes

Activities for rural areas (29)

Activities for urban areas (18)

1. Land and Water Development Activities
2. Productive Activities
3. Civic Amenities and Infrastructure Development Activities
4. Social Welfare Activities
5. Governance Activities

- MoPR
- MoRD
- MoUD
- MoDW&S
- MoP
- MoWR
- MoA
- MoEF
- MHA
- MHUPA
- MHRD…

17 Flagship Schemes of Government of India: 2013-14

1. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA 2.0)
2. Integrated Watershed Management Programe (IWMP)
3. Indira Awas Yojana (IAY)
4. Pradhan Mantri Gramin Sadhak Yojana (PMGSY)
6. National Rural Health Mission (NRHM)
7. Integrated Child Development Services (ICDS)
7. Nirmal bharat abhiyan (TSS)
8. Mid-Day Meal Scheme (MDM)
9. Sarva Siksha Abhiyan (SSA)
10. Jawaharlal Nehru National Urban Renewal Mission (JNNURM)
11. Accelerated Irrigation Benefit Programme (AIBP)
12. National Social Assistance Programme (NSAP)
13. Backward regions grant fund (BRGF)
14. National Rural Livelihoods Mission (NRLM)- Aajeevika
15. Rashtriya Krishi Vikas Yojana (RKVY)
16. National Rural Drinking Water Mission (NRDWP)
17. Rajiv Gandhi Panchayat Sashaktikaran Abhiyan (RGPSA)

Capacity Building

General Curriculum for all levels of Panchayats

- About Bhuvan Geo-Panchayats
- Geo-visualization and available data for decentralized planning
- Spatial data: Satellite imagery, Resource layers, Assets, Attributes
- Non-spatial data: General Village/Block/District Characteristics, Meteorological data, Census 2011 amenities and village & town directory, Major issues of the village
- Asset mapping: asset mapping using point, line & polygon, attribute editing, uploading photographs of assets.
- Activity Planning & monitoring: 29 activities, Planning using spatial & non-spatial data, finding an existing scheme, monitoring the progress of an activity
- Availability of different Schemes
- Profile of the area
- Panchayat & citizen login
- Share views

Gram Panchayat Curriculum

- How to take data from portal
- How to map assets in a village
- How to plan activities at gram Panchayat level
- Area Profiler - Snapshot of the panchayats which includes size of the population, structure of the population, animal wealth etc. in the area
- Finding the gap or the priority areas
- How to incorporate suggestions in planning
- How to share views

Panchayat Samiti (Block) Curriculum

- How to take data from portal
- Visualization of the desired area in terms of availability of assets, climatic conditions, natural resources
- Considering the different village level development plans
- Consolidation of village development plans
- Feasibility analysis of consolidated plans
- Spatial Distribution of assets and considering availability of assets for more than one village using proximity, buffer analysis.
- How to check the availability of assets in vicinity
- How to plan activities at Block Panchayat level
- Synergy between all activities, funds and schemes
- Implementation and Monitoring of activities
- How to incorporate suggestions in planning

Zilla Parishad (District) Curriculum

- How to take data from portal
- Consolidation of block level plans
- Feasibility analysis of gram Panchayat plans passed by block
- Sector wise analysis of proposed plans and analyzing the funds available within same sector
- How to check the availability of assets in vicinity
- How to plan activities at Block Panchayat level
- How to incorporate suggestions in planning
- Implementation and Monitoring of activities – Scheme/Sector wise

Scale of Operation

Number of Elected Representatives in the three tiers Panchayats in the Country + PIA, NGOs

Category	PRI No.	General	SC	ST	Total	Women
Village Panchayats	232913	1851166	490986	314324	2656476	975116
Intermediate Block level Panchayats	6094	112371	32898	11340	156609	58094
District Panchayat	537	11311	2734	1649	15694	5779
Grant Total	**2,39,544**	**19,74,848**	**5,26,618**	**3,27,313**	**28,28,779**	**10,38,989**

Estimated no. of functionaries requiring training & data

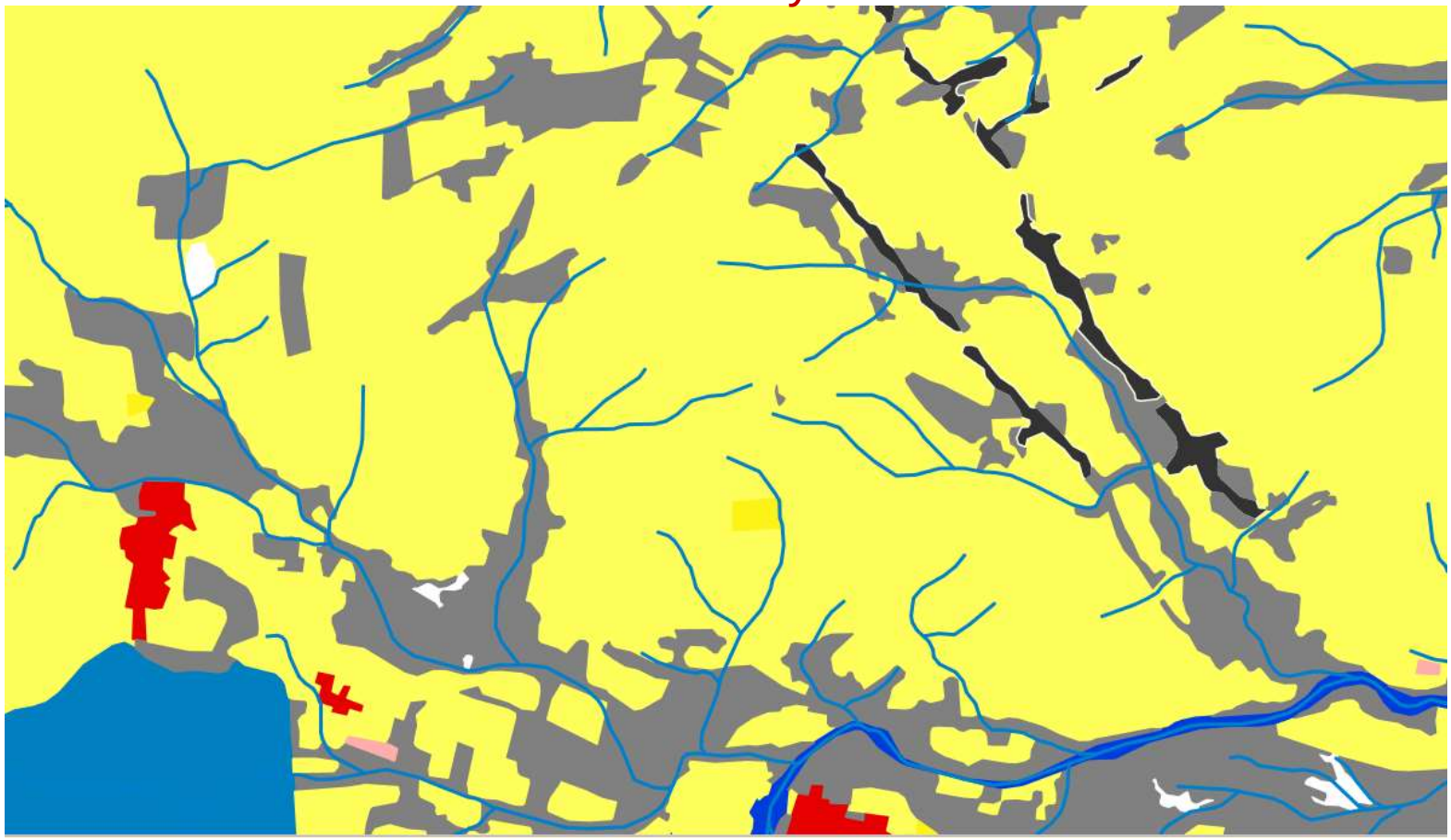
Centre/State Level	**3,600**
District Level	27,500
Block Level	2,70,000
GP Level	15,98,900
Total	**1900000**

Utilization of spatial data layers for activity planning

1. MGNREGA- Water harvesting-Check Dam construction

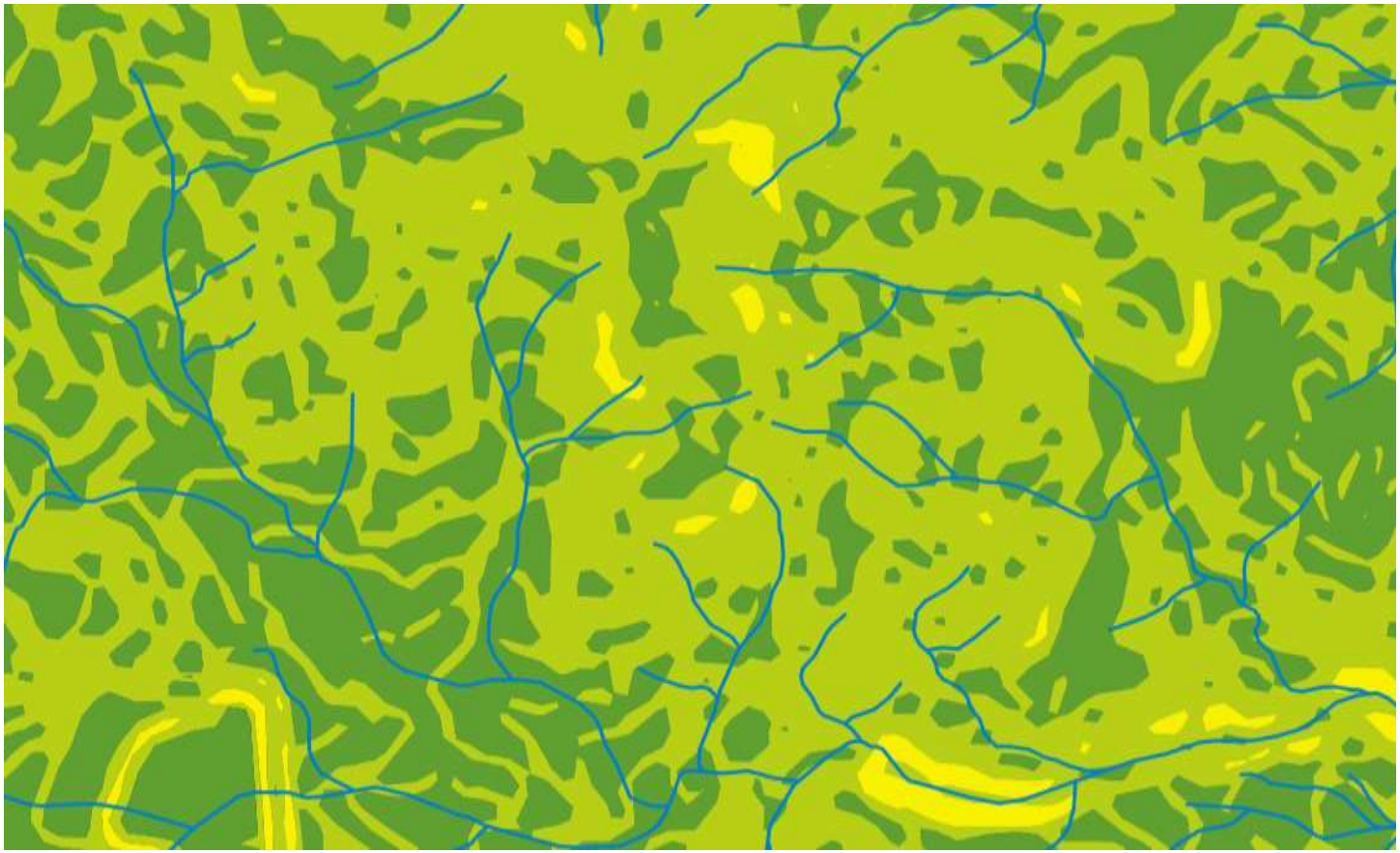
A.P – Anantpur – Dharmavaram - Pothkunta

LULC – Agriculture/cropland area with high drainage density



MGNREGA- Water harvesting-Check Dam construction

SLOPE: Very Gentle to Moderate



MGNREGA- Water harvesting-Check Dam construction

DRAINAGE

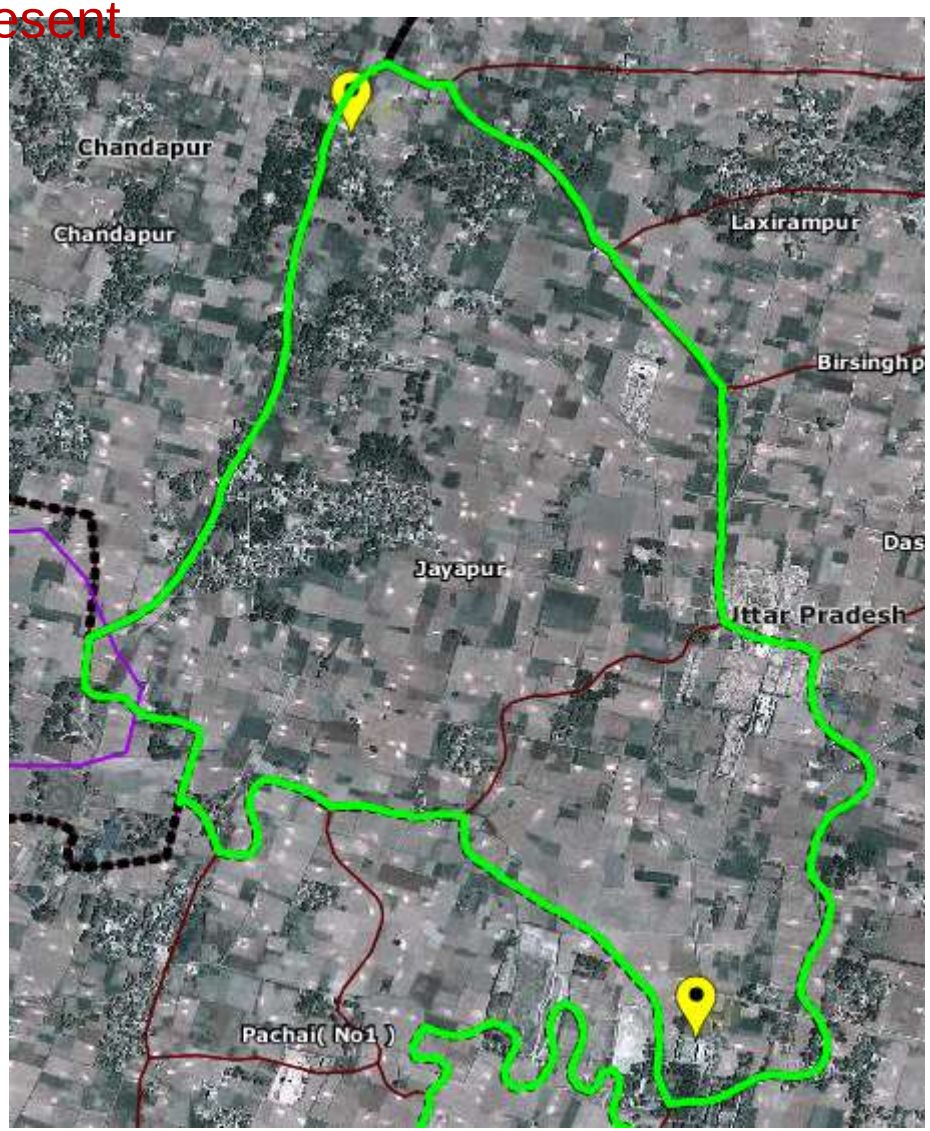
Check Dams could be constructed at these locations as these have:

1. High Drainage density
2. Agriculture cropland in vicinity
3. Gentle to moderate slope

2. Sarva Siksha Abhiyan – Construction of School buildings

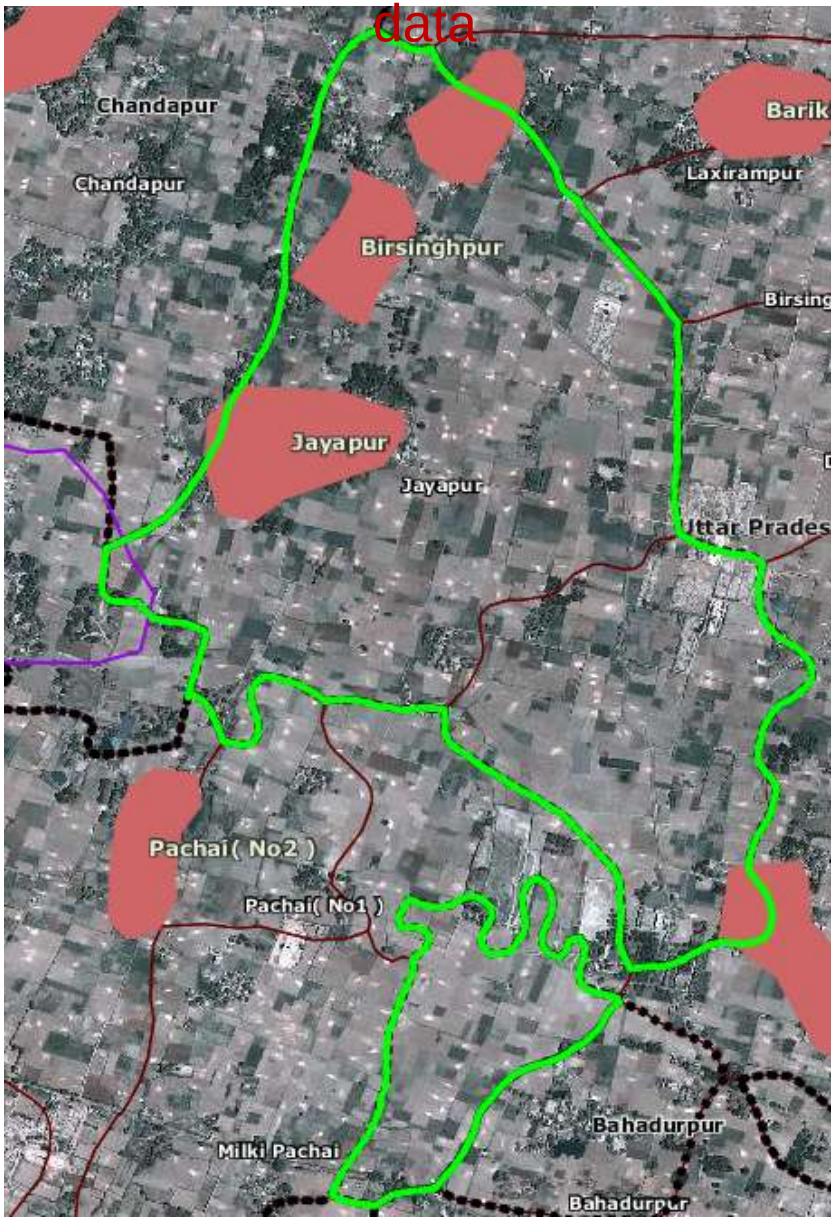
U.P - Varanasi – Arajiline - Jayapur

Asset data to identify existing school and their types : No higher School present

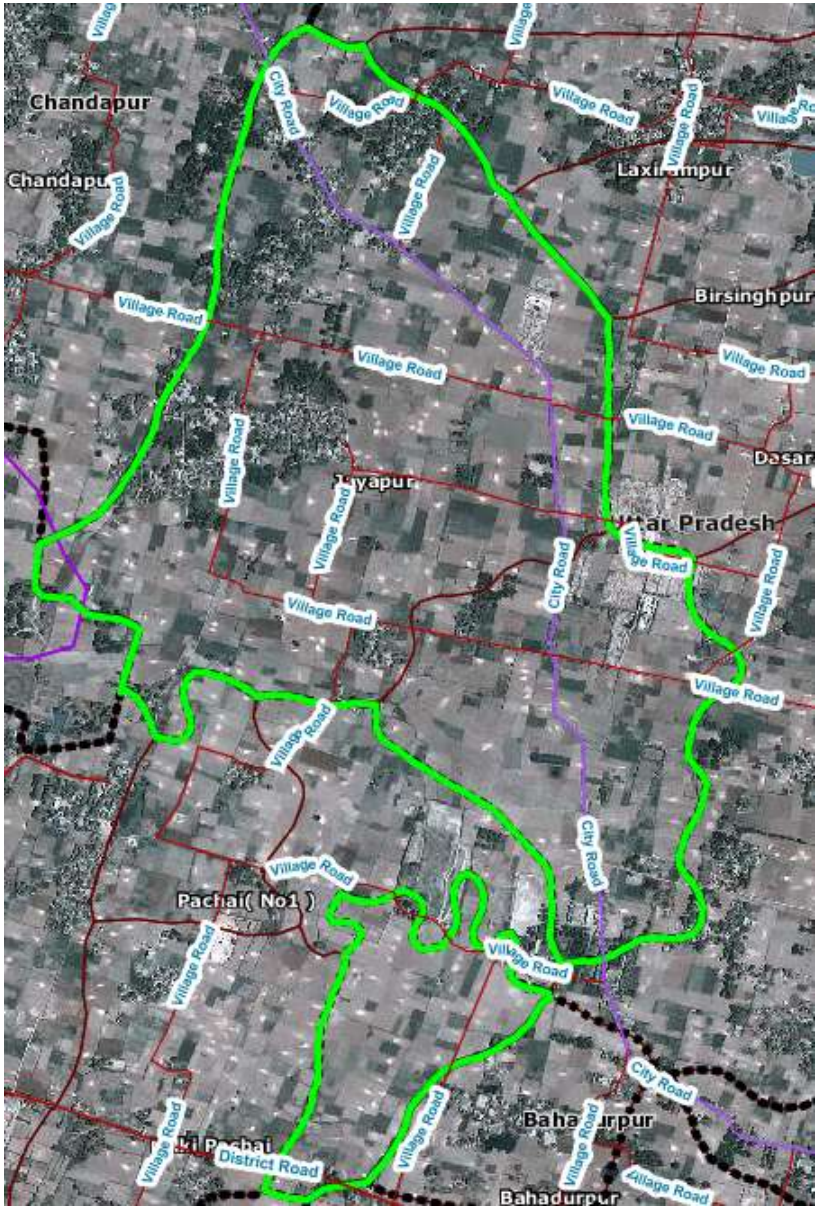


Sarva Siksha Abhiyan – Construction of School buildings

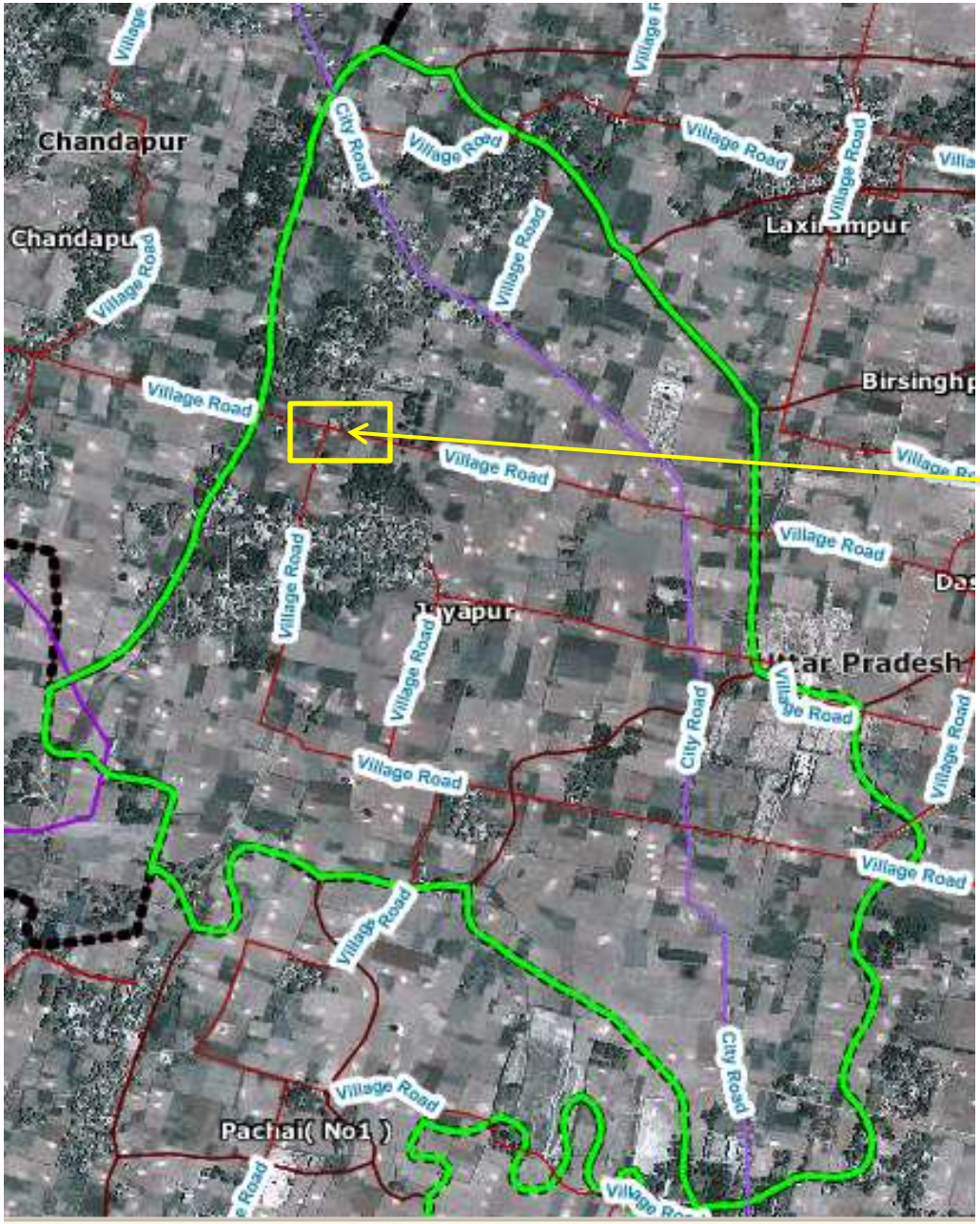
Settlement with demography data



Road network for connectivity



Sarva Siksha Abhiyan – Construction of School buildings



School can be constructed at this location due to

1. No school other than primary school exist in panchayat
2. Good connectivity by road
3. Near to settlements

4. Nirmal Bharat Abhiyan – Construction of School Toilets

Rajasthan - Jodhpur - Luni- Luni

Asset attributes to identify schools where toilets not present: Female teachers but no toilet for females

Category: School

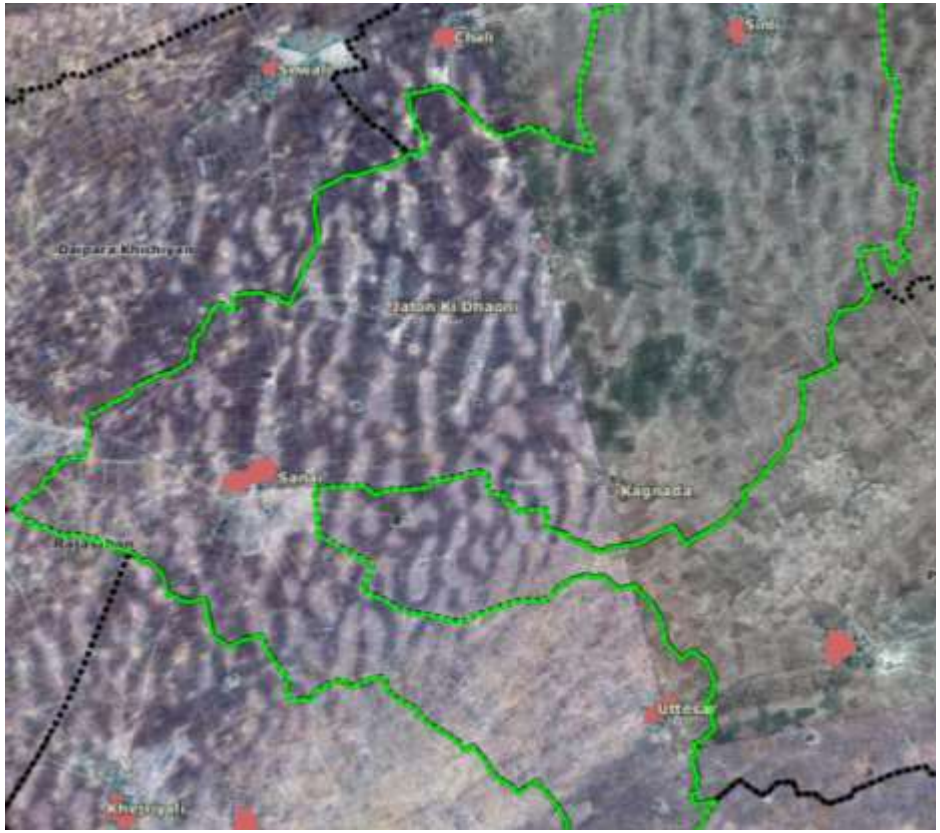
Attribute	Value
Name	
Type	Boys
Run by	Government
Building Ownership	
No. of students - Boys	111
No. of students - Girls	
No. of teachers - Male	2
No. of teachers - Female	5
Medium of teaching	Hindi
No. of rooms	11
Toilet Facilities	Male
Classroom furniture	true
Drinking water	true
Midday meal	true
Electricity	true
Internet	false
Telephone	false
Lab Facility	false
Playground	true
Other Facilities	
Other Information	

Asset Picture

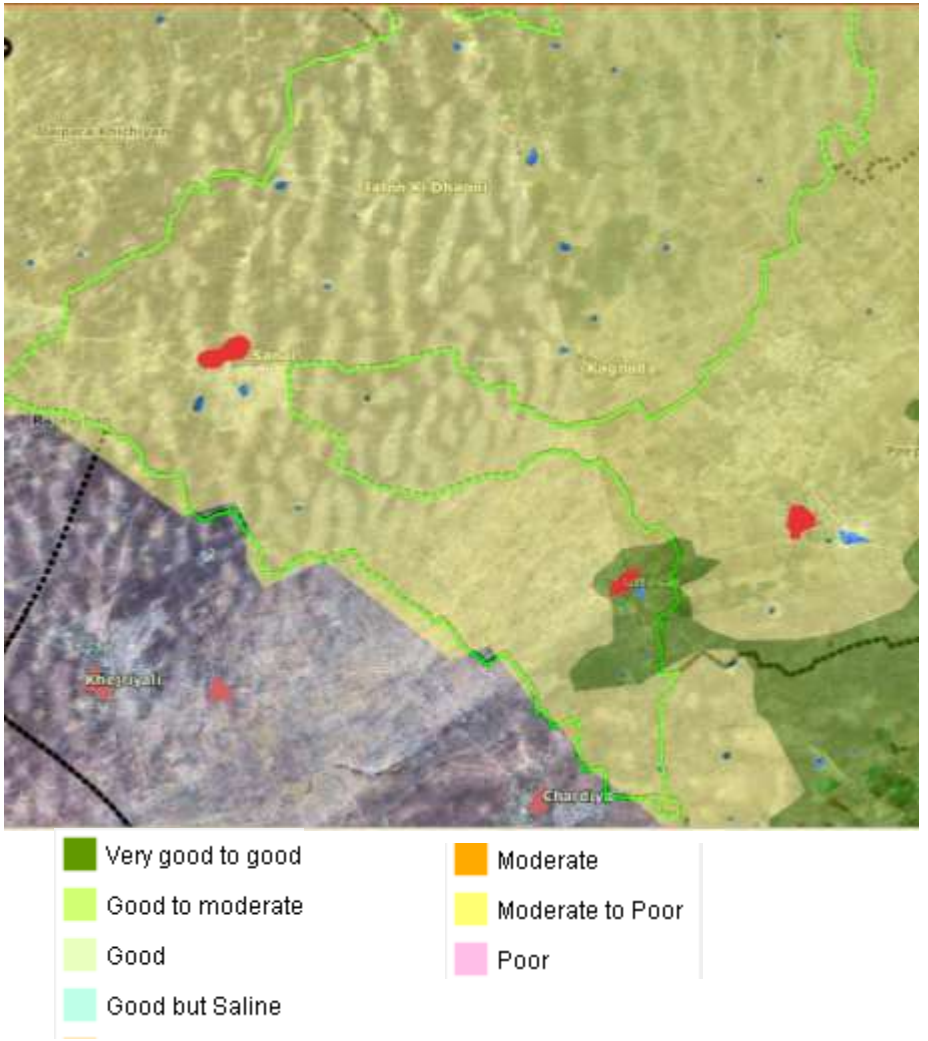
5.National Rural Drinking Water Mission – Public Facilities for Drinking Water

Rajasthan - Jodhpur - Luni- Subdand

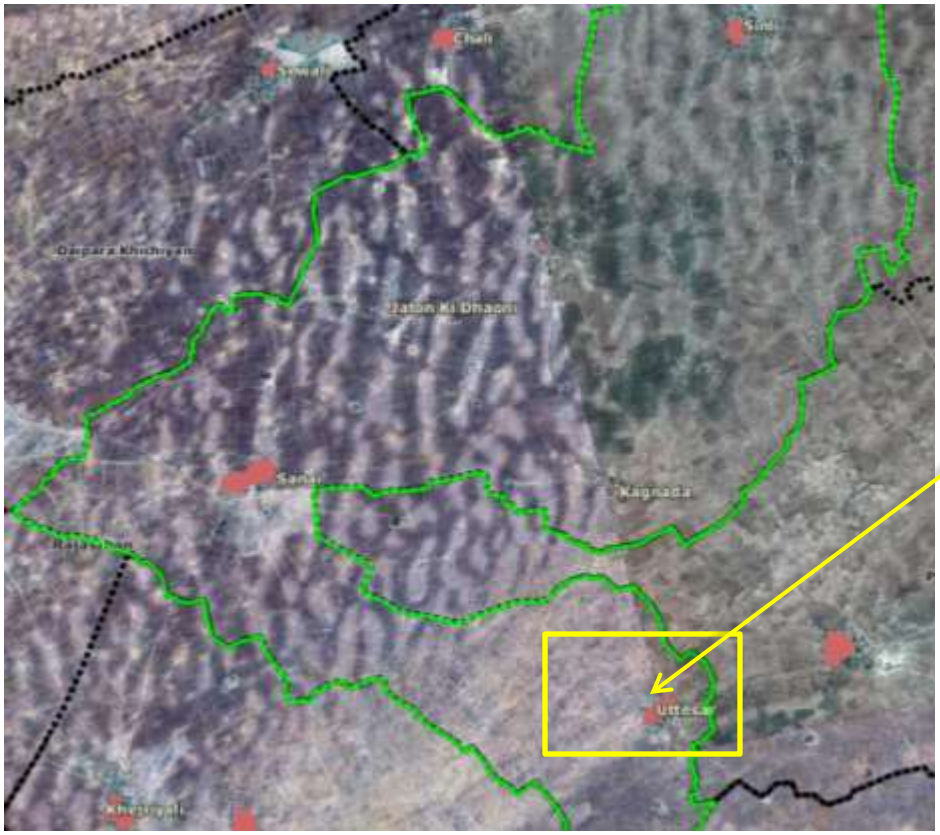
Settlement locations & demography



Legacy data – Ground water potential



National Rural Drinking Water Mission – Public Facilities for Drinking Water



Public facility for drinking water can be proposed here due to

1. Very good to good ground water prospects
2. Near to settlements

6. Pradhan Mantri Gram Sadak Yojana – Upgradtion of Roads

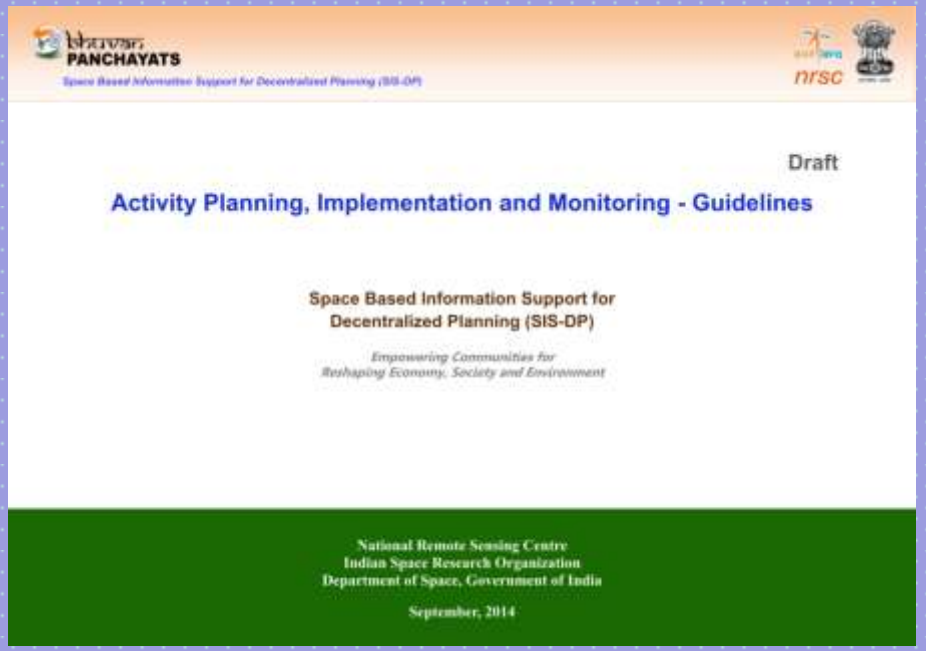
Rajasthan - Jodhpur - Luni- Subdand

Road Network – For identification of roads that are frequently used and are to be upgraded

1.Cart track to be metalled/ made as pucca road
2. Not many metalled roads in the vicinity

Space Inputs, Spatial Enablement and G - Governance

Thank you



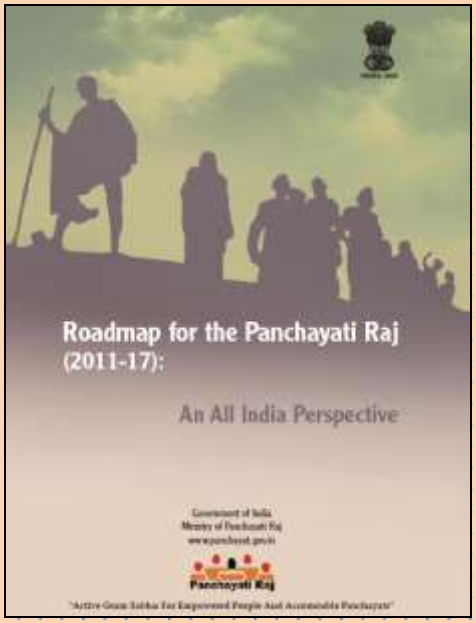
OPPORTUNITIES FOR SPATIAL, PARTICIPATORY, INTEGRATED DECENTRALIZED PLANNING IN THE COUNTRY

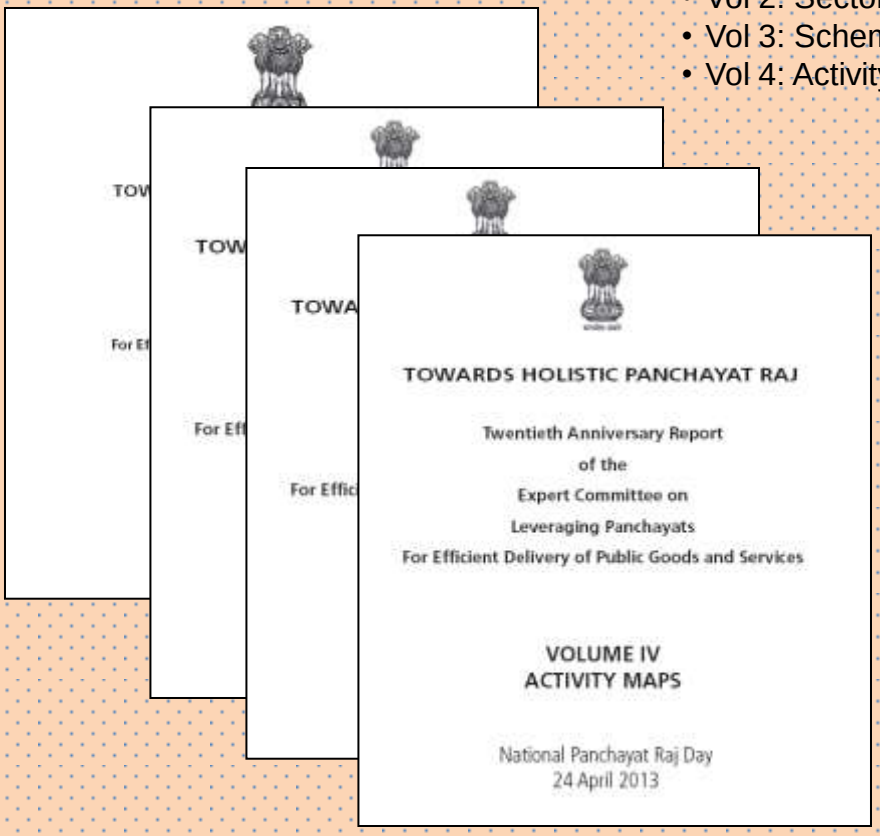
Panchayats Raj, 2013

Towards Holistic Panchayati Raj : Twentieth Anniversary Report of the expert Committee on leveraging Panchayats for efficient delivery of public good and services, Volume I-IV, April, 2013

- Vol 1: Policy Issue
- Vol 2: Sectoral
- Vol 3: Schemes Annexes
- Vol 4: Activity Maps

Roadmap for the Panchayati Raj (2011-17):An All India Perspective





Bharat Broadband – Broadband Connectivity to Panchayat

Geo-Information Technologies & Spatial Planning

Geo-Information Technologies (Earth observation and GIS technology) undoubtedly have great Potential in Reshaping the Environment, Economy & Society.

SPATIAL, PARTICIPATORY, INTEGRATED & DECENTRALISED PLANNING

- Earth observation plays a key role in community driven management and acquires special importance in the context of decentralized planning. Observations of the Earth system constitute critical input for advance understanding towards local planning by providing information, measurements and quantifications of natural or artificial phenomena.
- The synoptic view provided by satellite imagery offers technologically the most appropriate method for quick and reliable mapping and monitoring of various natural resources both in space and time domain. Further, Remote Sensing and GIS technologies are capable of creating various resource information layers in the shortest possible time along with regular updates.
- The illustration through GIS is an innovative approach for planning process and strategy for economic development, disaster management and human welfare as the same datasets could be used for all tiers of integrated decentralised planning by data aggregation at different scales.
- The capabilities provided by satellite imagery, digital maps, and associated information have transformed our ability for understanding the forces that shape the geographical space.
- The Earth observation inputs today are being recognized for making the difference in the information economy for the development, deployment and integration of science and technology into policy and decision making by the stakeholders for sustainable development.