

L02 Towards Open source Geospatial data services and Applications

- ❖ **Data Analytics** : Why geospatial Analytics ,Diverse Forms of geospatial data
- ❖ **Open Interoperable Access**: Services
- ❖ **Scalable User Oriented Application**: Spatial Decision Support System Applications, Open Source Architecture

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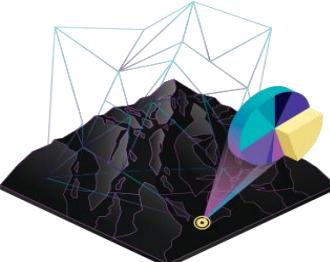
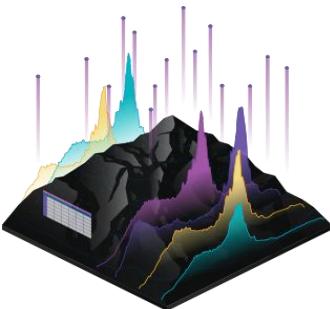
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Why GeoSpatial?

3 Key Benefits of effective geospatial *analytics*



- **Engaging & Actionable insights** — Seeing data in the context of a **visual map** to see **spatial patterns or relationship** > makes it easier to understand how events are unfolding and how to react to those events.
- **Predictive & Prescriptive Analytics** — **Using outputs of Prediction to forecast future outcomes** > **how spatial conditions are changing in real time** can help an organization better prepare for change and determine future action.
- **User oriented solutions** — **Understand the user's needs**-> collect the data->Define tools and techniques->Process and ->deliver the final data and applications for immediate decision making

GeoSpatial Data Types

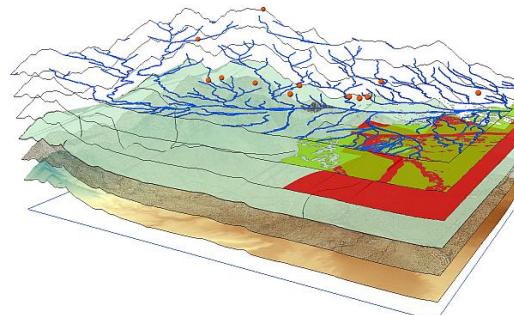
Huge Volume of Geospatial Data in diverse form

Vectors and Attributes

Points, lines, polygons, and other descriptive information about a location.

2D Data High Resolution Raster and Drone/Satellite Imagery and Orthomosaic.

3D Data 3D Point Clouds/Mesh, Elevation Models Collected by Drones Imaging / LiDAR systems / Satellite



Thematic Data



Gridded Raster



Image Raster



3D Dense Point Cloud



3D Mesh Model

Major Data Issues : Inaccessible & Unusable

Non-Standardize Database > Different Formats/Proj/Schemas ...



Lacks Common Platform for data sharing

- Limited GIS/Data Sharing Infrastructure at State Centres

No Mechanism for Data Search, Discovery and Access

No platform for on-demand processing of these data based on User Requirements n generate their own data products



"Difficulty in its usage for real time Decision Support System"

NeSDR – Ensuring Spatial Data Accessibility in NER

Ensuring Space Based Data Accessibility in NE Region for effective g-Governance/societal applications using Space Technology

What?

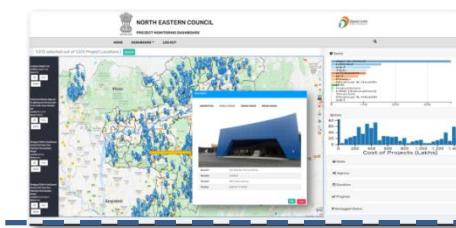
- **Interoperable Data Access:** Standardize Database and OGC
- **Robust Platform** for spatial data repository and sharing
- **Making Data > Discoverable, Searchable and Consumable**
- **Platform for on-demand processing** of these data based on User Requirements and generate their own data products
- **Establishment of De-centralized Spatial Data Sharing Infrastructure at State Centres**

Developed Using State-of-the-art Open Source Based Data Services and Applications

Why?

- **Provides Data on Demand** for real time and better Decision Support System
- **Support** for various planning and developmental activities via efficient and real time data sharing
- **Enables** design and development of user-specific custom applications for g-governance

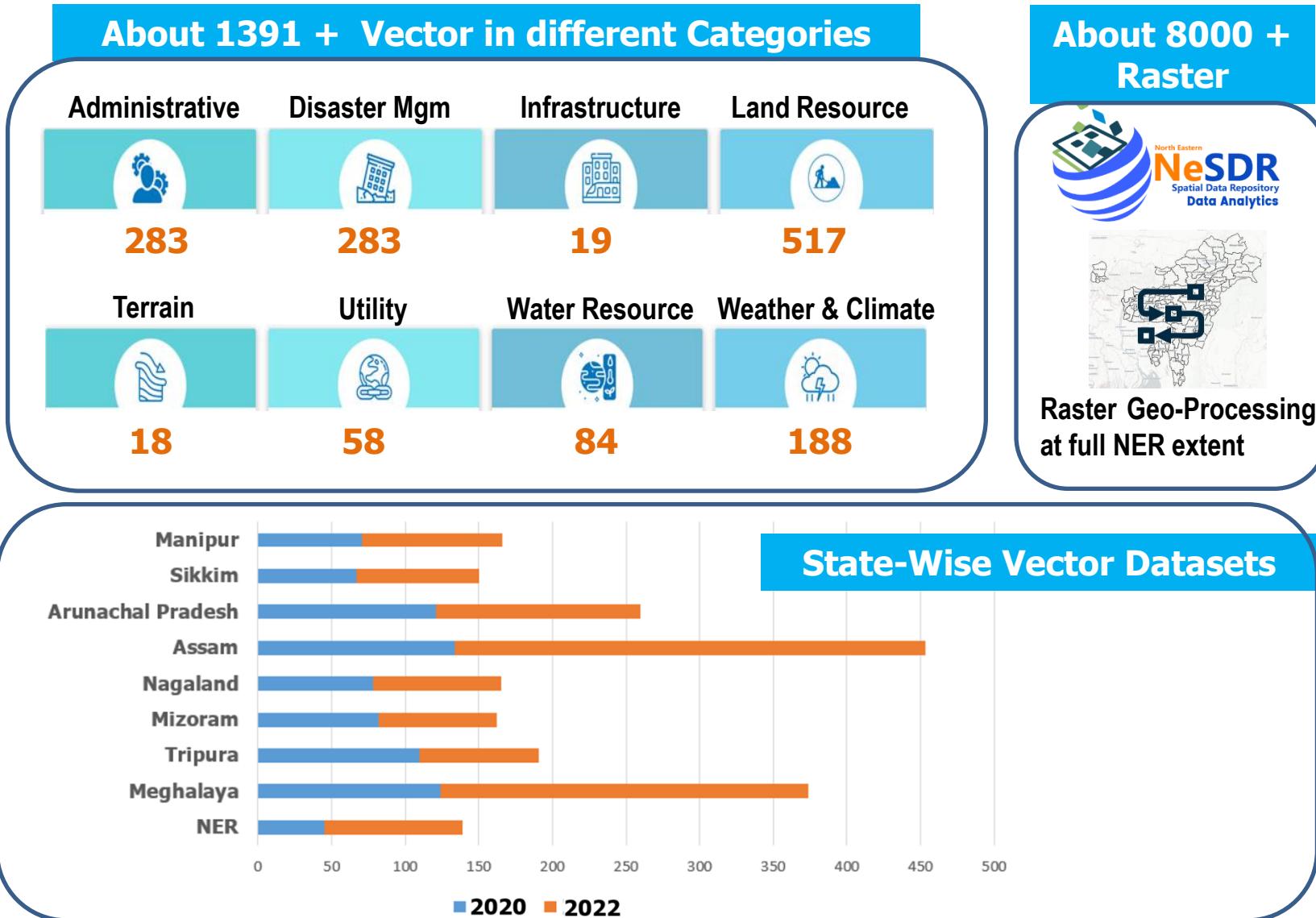
Users: +35 Government User Departments | Academia | Scientific Communities



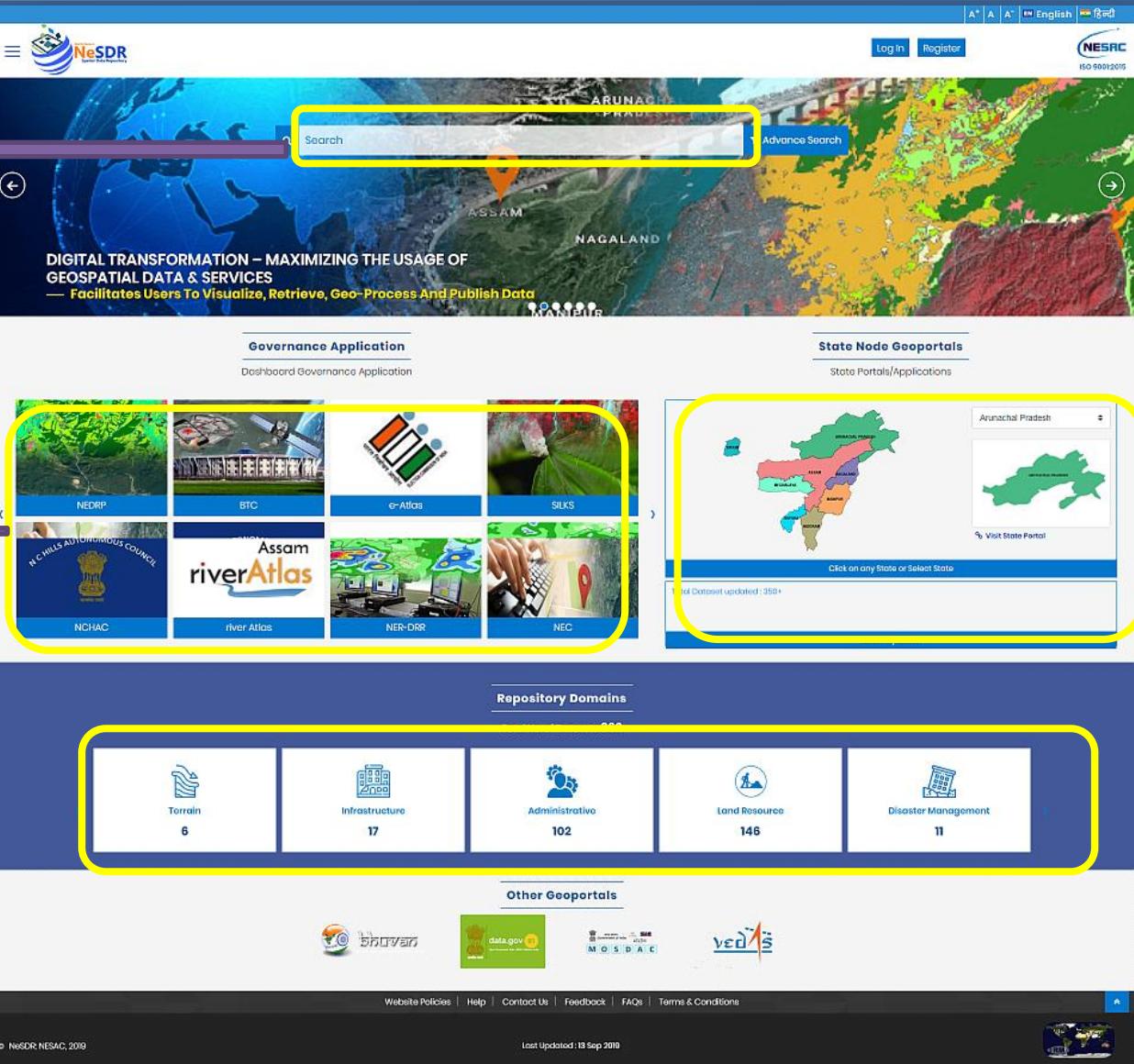
NeSDR Cataloguing at Centralized Node

**State-of-art
Infrastructure offering
Robust Platform**

- Secure Data **Storage**, Backup and Management
- Systematic Data Crawling and **Cataloguing**,
- **Publishing** of Data with Interoperable Services
- Secure and authorized Data **Sharing**



How do we discover this data?



The screenshot shows the NeSDR Geoportal homepage. A yellow box highlights the search bar at the top. Another yellow box highlights the 'eGov Applications' section, which includes links to NEDRP, BTC, e-Atlas, SILS, NCHAC, riverAtlas, NER-DRR, and NEO. A third yellow box highlights the 'Data Domains' section, which lists Terrain (6), Infrastructure (17), Administrativo (102), Land Resource (146), and Disaster Management (11). A fourth yellow box highlights the 'State Node Geoportals' section, showing a map of Arunachal Pradesh with various districts labeled.

Data Discovery /Searching

eGov Applications

Data Domains

State Portals

Geoportal for Data Exploratory
<https://www.nesdr.gov.in>

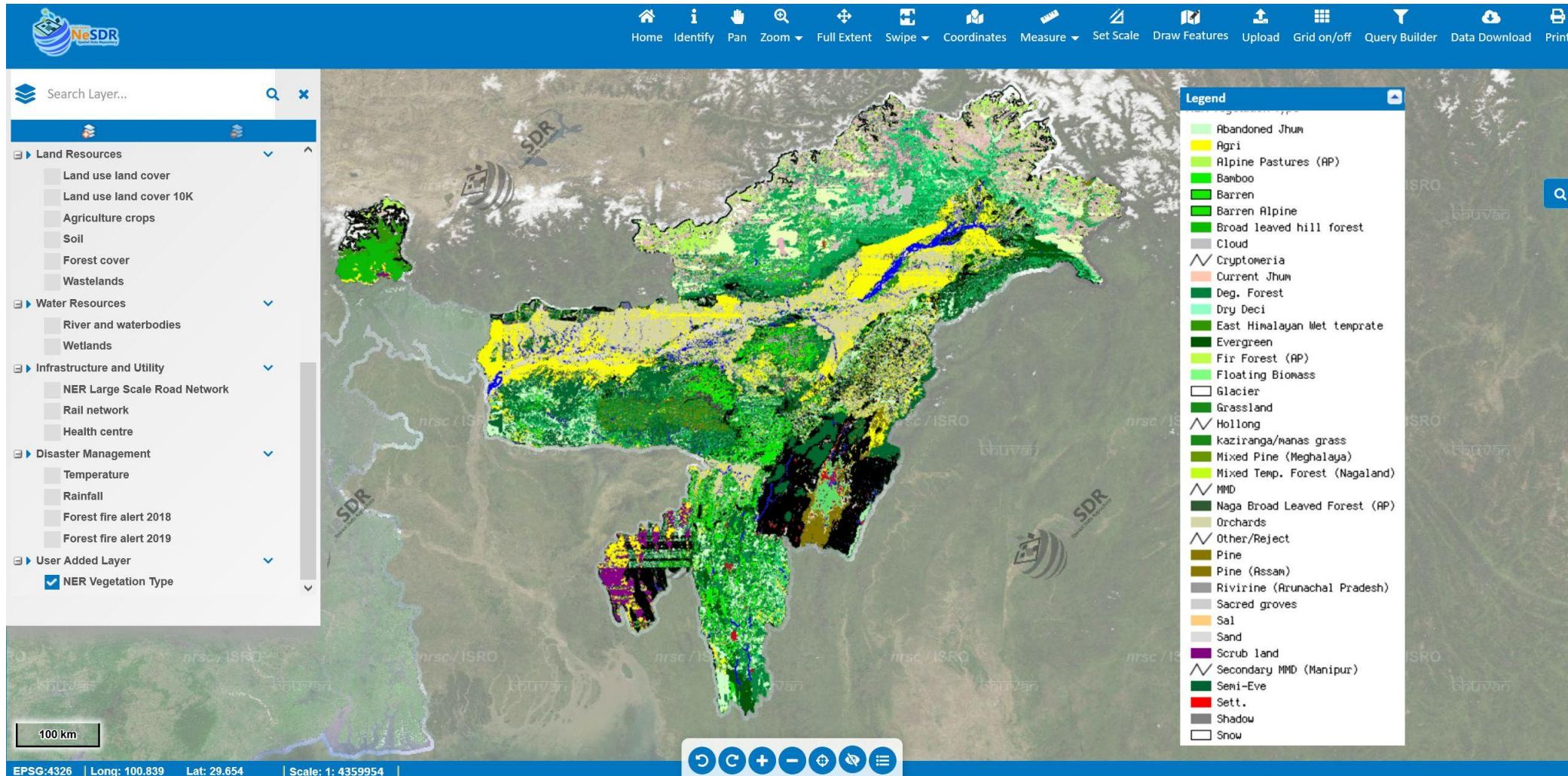
- **An Unified Single Window Platform**
- **Ideally spatial data is discovered via a geoportal.**

A Geoportal is a geospatial discovery tool that provides a **one stop gateway to access geospatial datasets** that can be used for mapping or analysis.

[Demo](#)

NeSDR In-Built Interactive Map Visualization

- Inbuilt GIS Tools
- Interactive Visualize | Analyze | Print



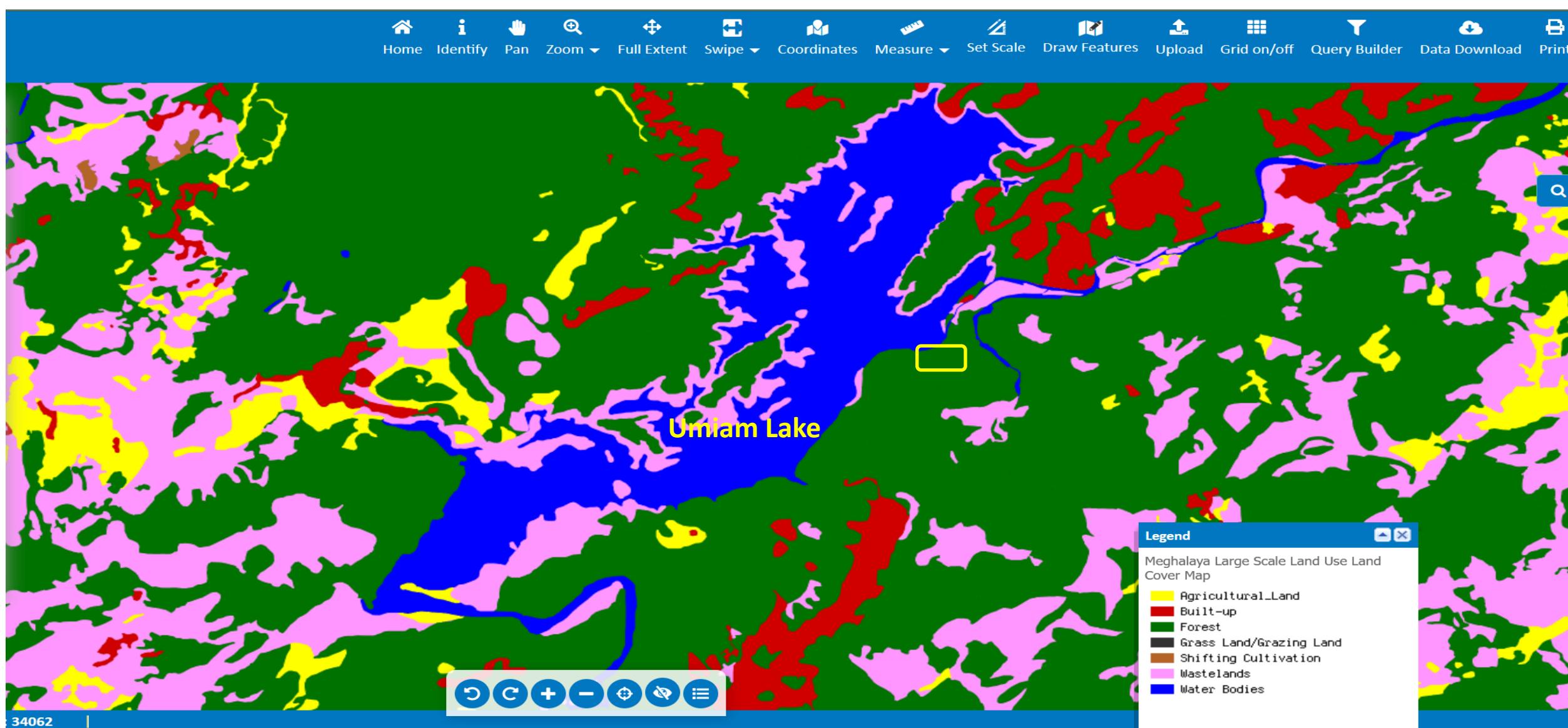
NeSDR Data : Road Network of NER

The screenshot displays a map of the Northeast Region (NER) of India, specifically the states of Arunachal Pradesh, Assam, Nagaland, Manipur, and parts of Meghalaya and Tripura. The map is a satellite view with a dense network of roads overlaid. A legend box in the bottom right corner identifies the road types:

NER Road Network	Symbol
National Highway	Red line
State Highway	Yellow line
District Road	Dark red line
City Road	Pink line
Village Road	Black line
Cart Track	Green line
Foot Path	Brown line

The map also features several labels: "SDR" is visible on the left side; "City Road" and "Village" are labeled on the right side; and "100 km" is indicated in the bottom left corner.

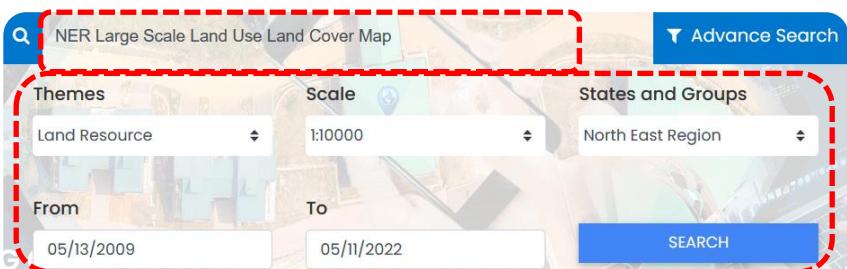
NeSDR Data : Land Use/Cover of Meghalaya



Data Catalogue: Discover>Search>Access

Data Discovery based on multiple-criteria

- Search on simple keywords
- Search on Data Themes / Scale / AOI / Temporal



Search Result

NER Large Scale Land Use Land Cover Map

NER Large Scale Land Use Land Cover Map

North East Region

Land Resource



wms

[VIEW IN GEOPORTAL \(1\)](#)



Visualize/Query/Access/Download



Metadata



Access Data in few Simple Steps

Register -> Search -> Explore | Visualize | Analyse -> Add to Cart -> Approval -> Download Data

NeSDR :Platform for Powerful Advance GeoAnalytics

On Demand Geo-Processing on Raster Datasets

- Ability to **ingest large/different Raster** dataset at NER Scale
- Call Processes and execute** different Raster Operations and Generate Useful Data Products

Step 1 Select Domain

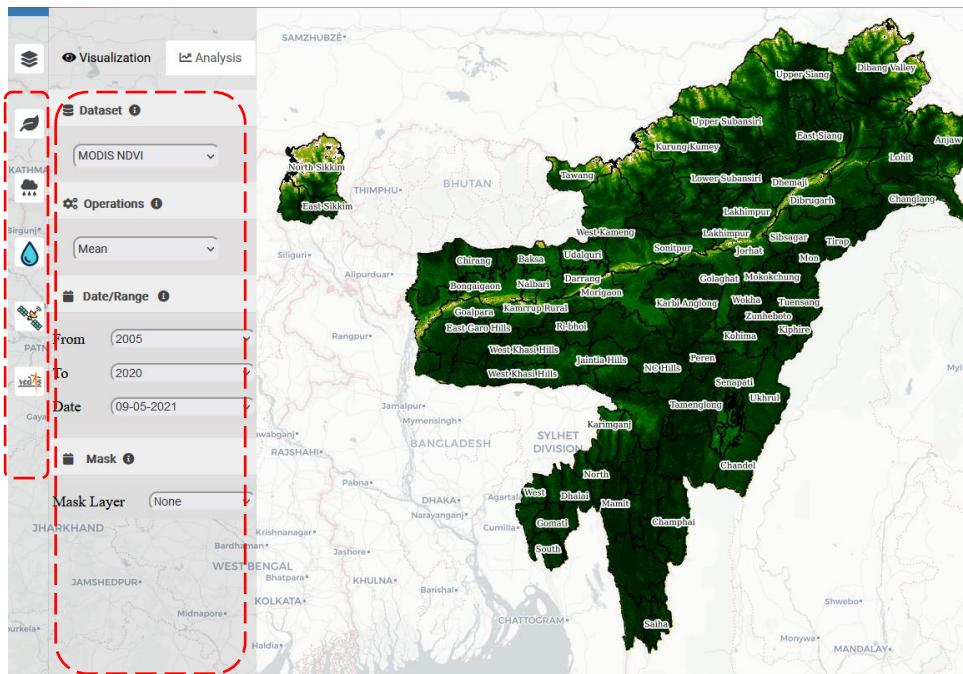
Vegetation

Weather

Water Resource

Satellite Imagery

VEDAS



Step 2
Data>Process List>Date Range



Operations (Raster/Vector)

Change and Trend Analysis



Raster Calculator

Raster Calculator

mean(soil:18-03-2019*,soil:11-10-2015*)

Help: Remove the dataset,date and select date & dataset from dropdown e.g. mean('modis:01-01-2020','modis:9-01-2020')

SOIL 11-10-2015 MEAN

0 100 default

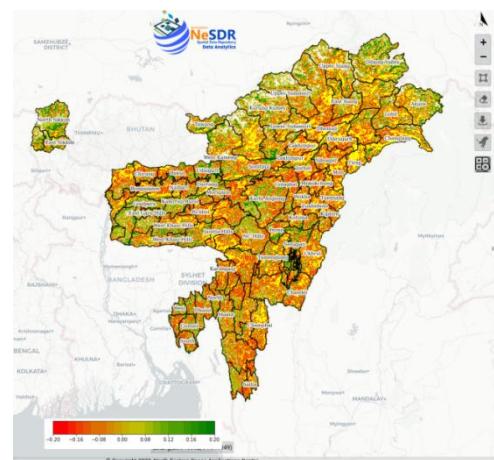
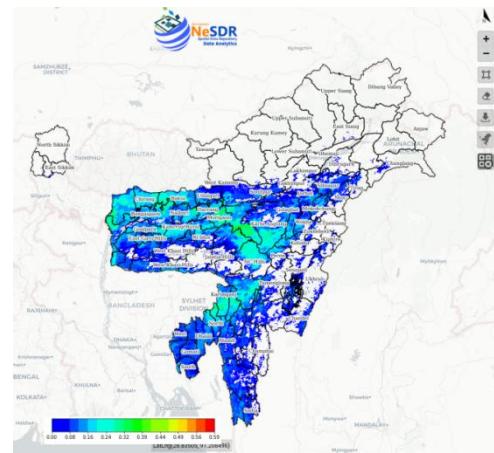
1	2	3	AC	<
4	5	6	-	cos
7	8	9	*	sin
.	0	(+	tan
acos	asin)	<	>
atan	log	log10	sqrt	=

Run Close

Raster Statistical/Vegetation/Range/Thresholding/Zonal Custom Indices/Time Series Visualization etc..



Generate new raster products



OGC > Improving access to geospatial data

Open GIS Consortium (OGC)

- Consortium of over 500 companies, agencies and universities
- “Develop encoding specifications that enable **interoperability** among diverse geospatial data stores, services, and applications”
- **To Consume** and not Store
- **Reduces need to duplicate** data, eases data updates
- **Maximizes use** of geospatial data
- **Enables usage across diverse formats, projections**



OGC Specifications

- Web Mapping Service (WMS)
- Web Feature Service (WFS, WFS-T)
- Web Coverage Service (WCS)
- Web Mapping Tiling Service (WMPS)
- Web Processing Service (WPS)
- Geography Markup Language (GML)
- Keyhole Markup Language (KML) etc...



Developing Interoperable Service

□ Web Map Service (WMS)

A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application.

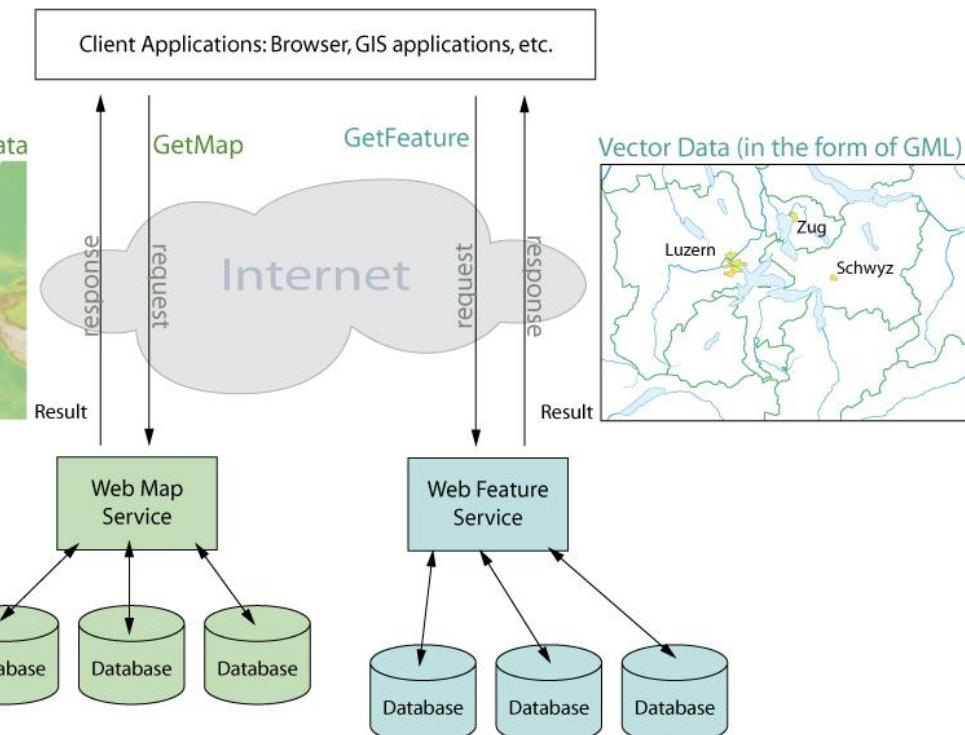
Raster Data



□ Web Feature Service (WFS)

The WFS operations provides an interface allowing requests for geographic features across the web using platform-independent calls.

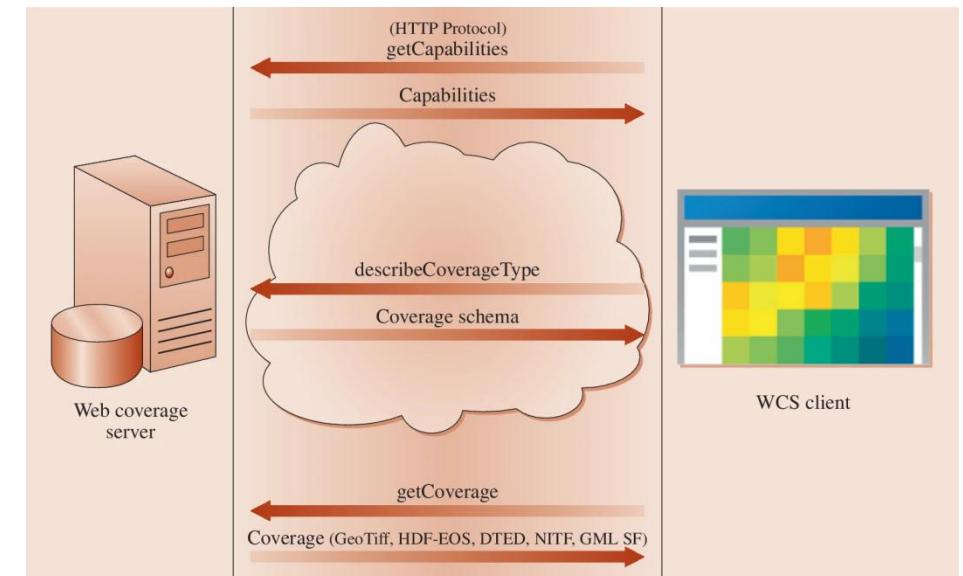
Response is geographic features as the “source code” behind a map, which end-users can **Query, Edit or spatially analyze**



Developing Interoperable Service

□ Web Coverage Service (WCS)

The WCS defines a standard interface and operations that enables interoperable access to geospatial "coverages". The term "grid coverage" typically refers to content such as satellite images, digital aerial photos, digital elevation data, and other phenomena represented by values at each measurement point.



□ Web Processing Service (WPS)

The WPS standard defines an interface that facilitates the publishing of geospatial processes and makes it easier to write software clients that can discover and bind to those processes. Processes include any algorithms, calculation or model that operates on spatially reference raster or vector data



Open Source Geospatial Foundation

- Supports collaborative development of key community-led open source GIS projects
- Provides infrastructure, funding, other support
- Promotes freely available data
- Eg. Openstreetmap
- Supports annual conferences
- Organizes FOSS4G Annual International Gathering



Example projects:

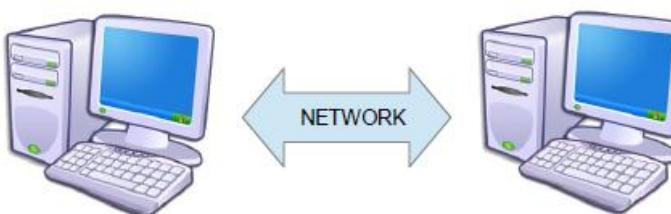
- MapServer/Geoserver
- OpenLayers
- GeoNetwork
- GDAL/OGR
- PostGIS
- Quantum GIS
- GRASS GIS



OGC Map Service Operation

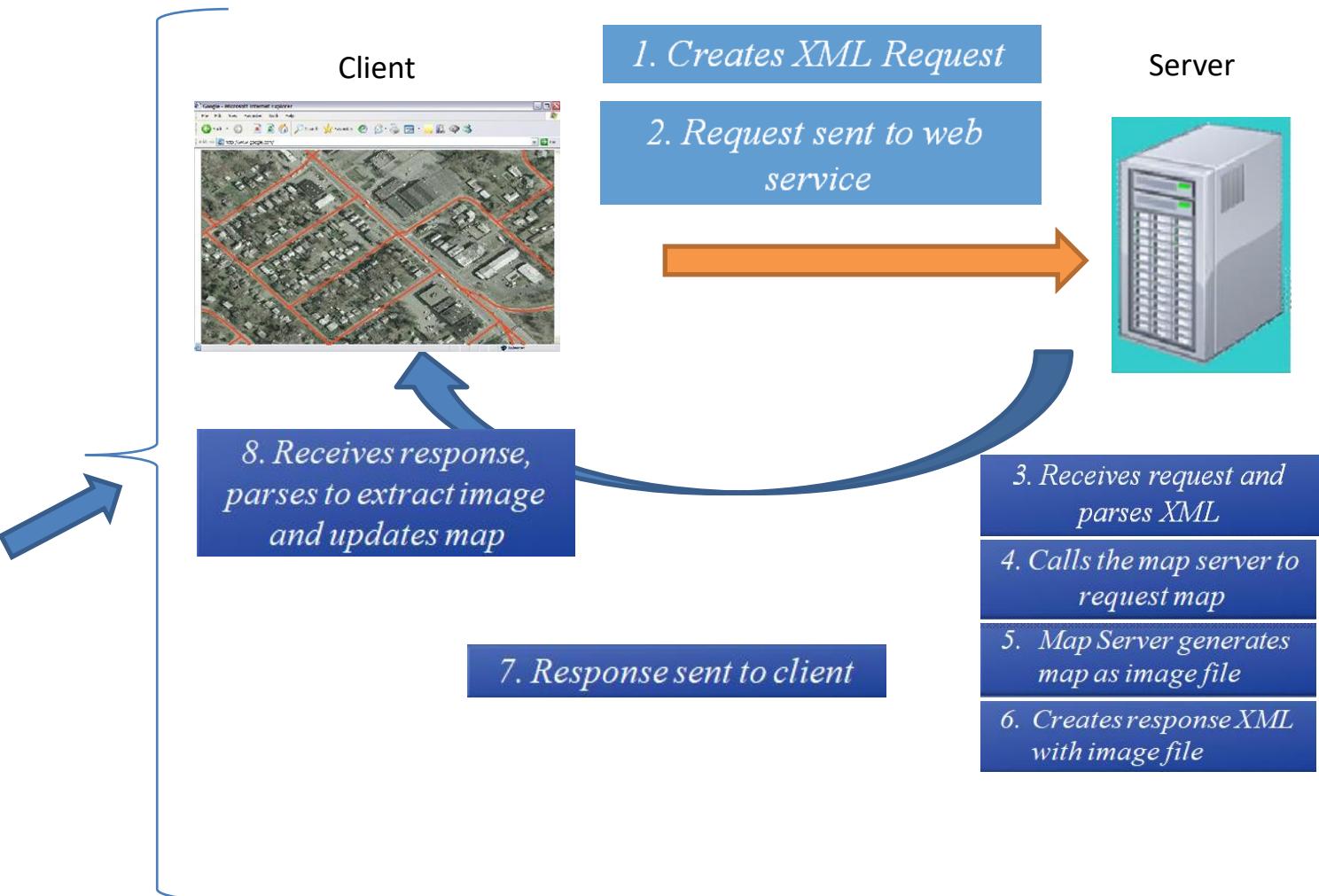
Web Service :

"... a software system designed to support the interoperability between network machines "



Web Geospatial Service

"...specific web services for geospatial data and information"



Web Map Service Specification

- WMS returns a map “pictures” rendered by map servers on the Internet.
- Easy to implement

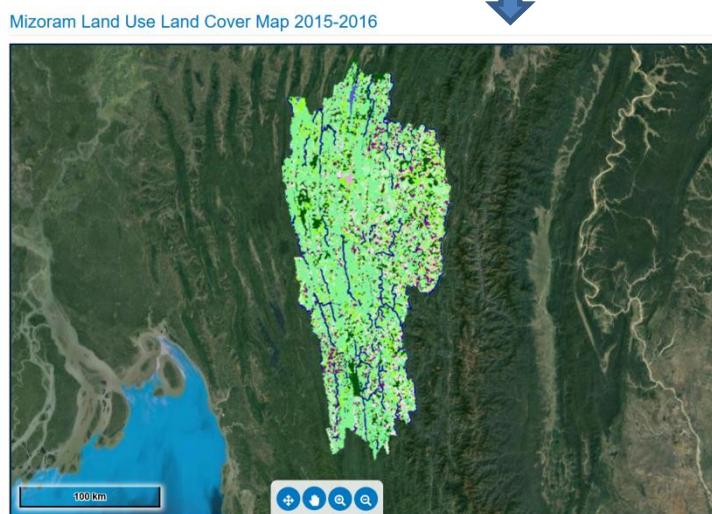
- WMS Server URL:

https://www.nesdr.gov.in/igistile/State_QC_passed_LULC_1516WS/wms

- **request=GetMap**

- Layername:- MZ_LULC_3RD_CYCLE

- Format:- "img/png"



https://www.nesdr.gov.in/geoportal/cgi-bin/IGiS_Ent_service.exe?IEG_PROJECT=State_QC_passed_LULC_1516WS&version=1.3.0&service=WMS&request=GetLegendGraphic&sid_version=1.1.0&layer=MZ_LULC_3RD_CYCLE&format=image/png&STYLE=default



Agricultural land Cropland Kharif
Agricultural land Cropland Rabi
Agricultural land Cropland Zaid
Agricultural land-Agriculture Plantation-Agriculture Plantation
Agricultural land-Aquaculture-Aquaculture
Agricultural land Cropland Cropped in 2 seasons
Agricultural land Cropland Cropped in more than 2 seasons
Agricultural land Cropland Fallow land
Built-Up Mining/Quarry Mining-Abandoned
Built Up-Urban-Built up - Compact
Built Up Industrial area
Built Up Industrial Ash / Cooling Pond / effluent and other waste
Built Up Mining / Quarry
Built Up-Mining / Quarry-Mining - Active
Built Up Rural
Built Up-Urban-Built up - Sparse
Built Up Urban Vegetated / Open Area
Forest Deciduous (Dry / Moist / Thorn) Dense / Closed
Forest Deciduous (Dry / Moist / Thorn) Open
Forest Evergreen / Semi evergreen Dense / Closed
Forest Evergreen / Semi evergreen Open
Forest-Swamp / Mangroves-Open
Forest Plantation
Forest Scrub Forest
Forest Tree Clad Area Dense / Closed
Forest Tree Clad Area Open
Grass/Grazing-Alpine / Sub - Alpine-Alpine / Sub - Alpine
Grass/Grazing-Temperate / Sub Tropical-Temperate / Sub Tropical
Grass/Grazing-Tropical / Desertic-Tropical / Desertic
Shifting cultivation Abandoned
Shifting cultivation Current
Snow, Shifting cultivation/Rann-Snow-Snow
Wastelands Scrub land Dense / closed
Wastelands Scrub land Open
Wastelands Scrub land Sandy area Riverine
Wastelands-Barren rocky-Barren rocky
Wastelands-Gullied / Ravinous land-Gullied
Wastelands-Gullied / Ravinous land-Ravinous
Water bodies-Canal / drain-Canal / drain
Water bodies Lake / Ponds Permanent
Water bodies Lake / Ponds Seasonal
Water bodies Reservoir / Tank Permanent
Water bodies Reservoir / Tank Seasonal
Water bodies River Non Perennial
Water bodies River Perennial
Wetlands-Inland-Manmade
Wetlands-Inland-Natural
Wetlands-Coastal-Lagoon,creeks,mud,flats,etc

WMS GetCapabilities

- HTTP based (GET or POST)
- Current Version 1.3.0

Operations

- GetCapabilities
- GetMap
- GetFeatureInfo
- GetLegendGraphic

Illustration link:

<https://bhuvan-vec1.nrsc.gov.in/bhuvan/nuis/ows?>

- Operation keywords are CaSe-InSeNsitiVe
- Operation values are case-sensitive

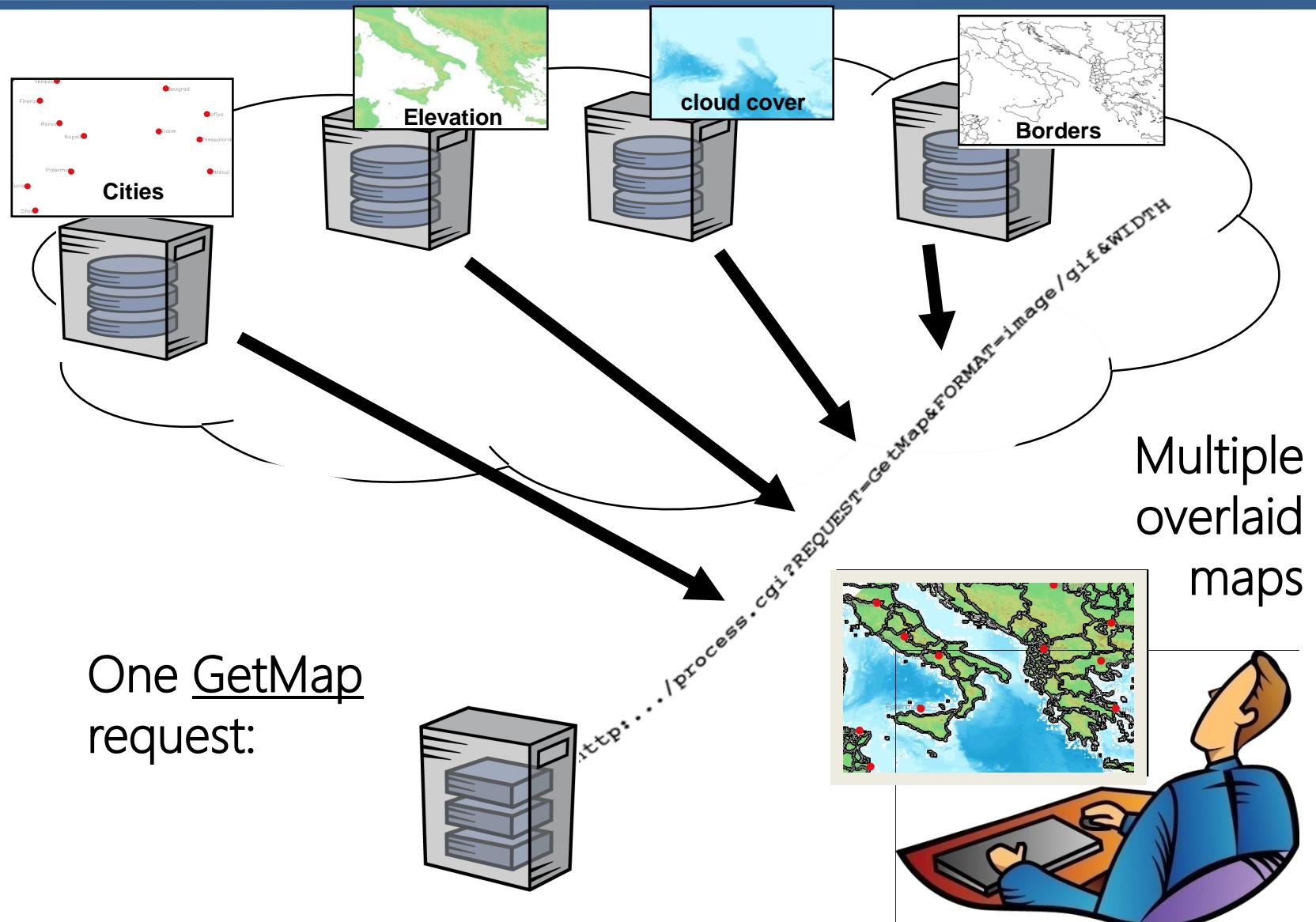
Layer Preview

<https://bhuvan-vec1.nrsc.gov.in/bhuvan>

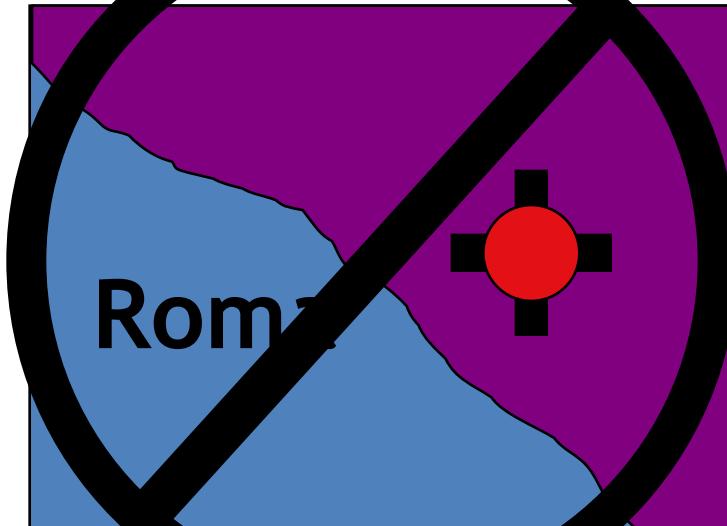
- Layer Preview in GeoServer
- Filtering via CQL

CQL (Common Query Language) is a query language created by the OGC for the Catalogue Web Services specification.

Accessing WMS Maps



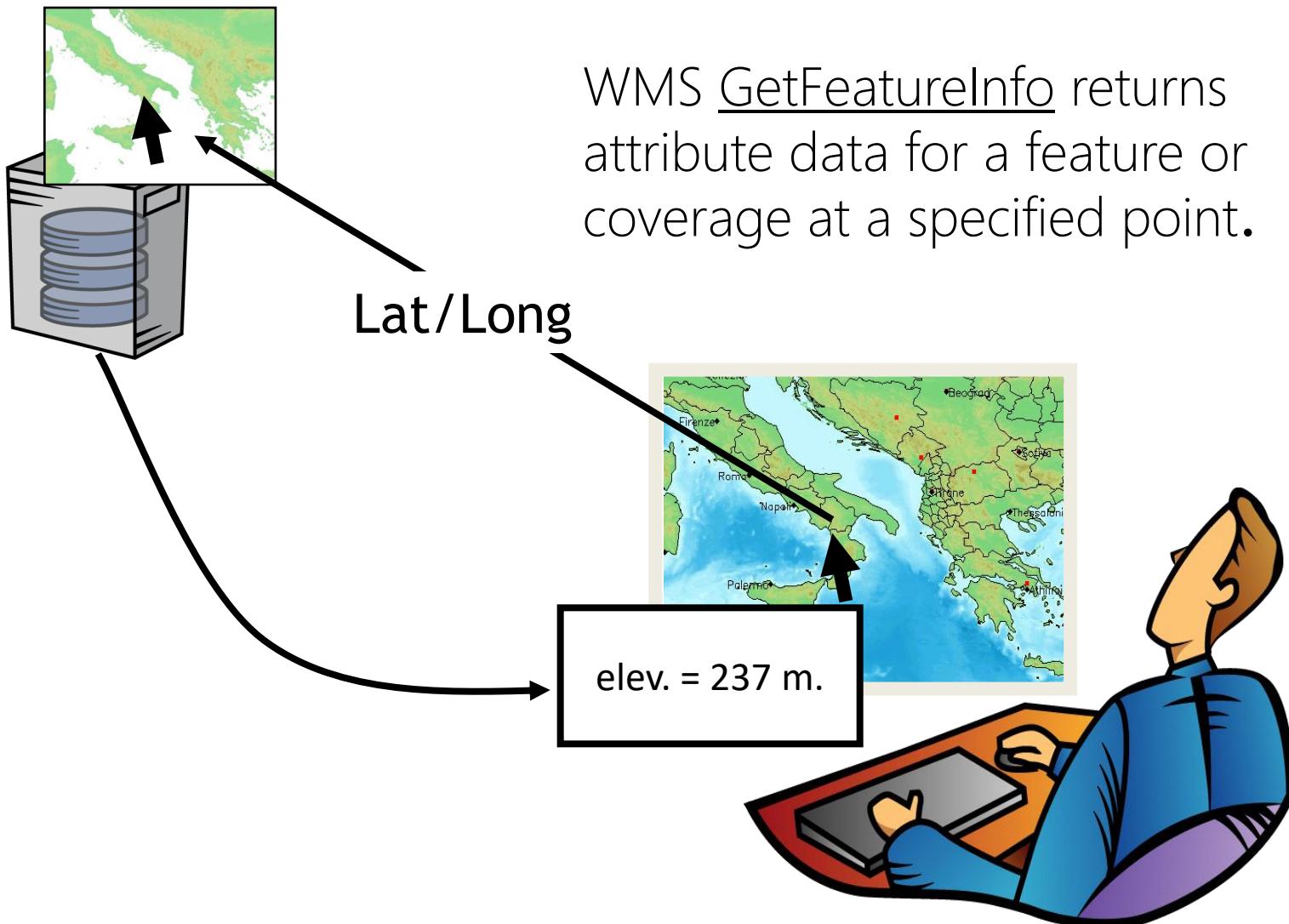
WMS can't "give data away"



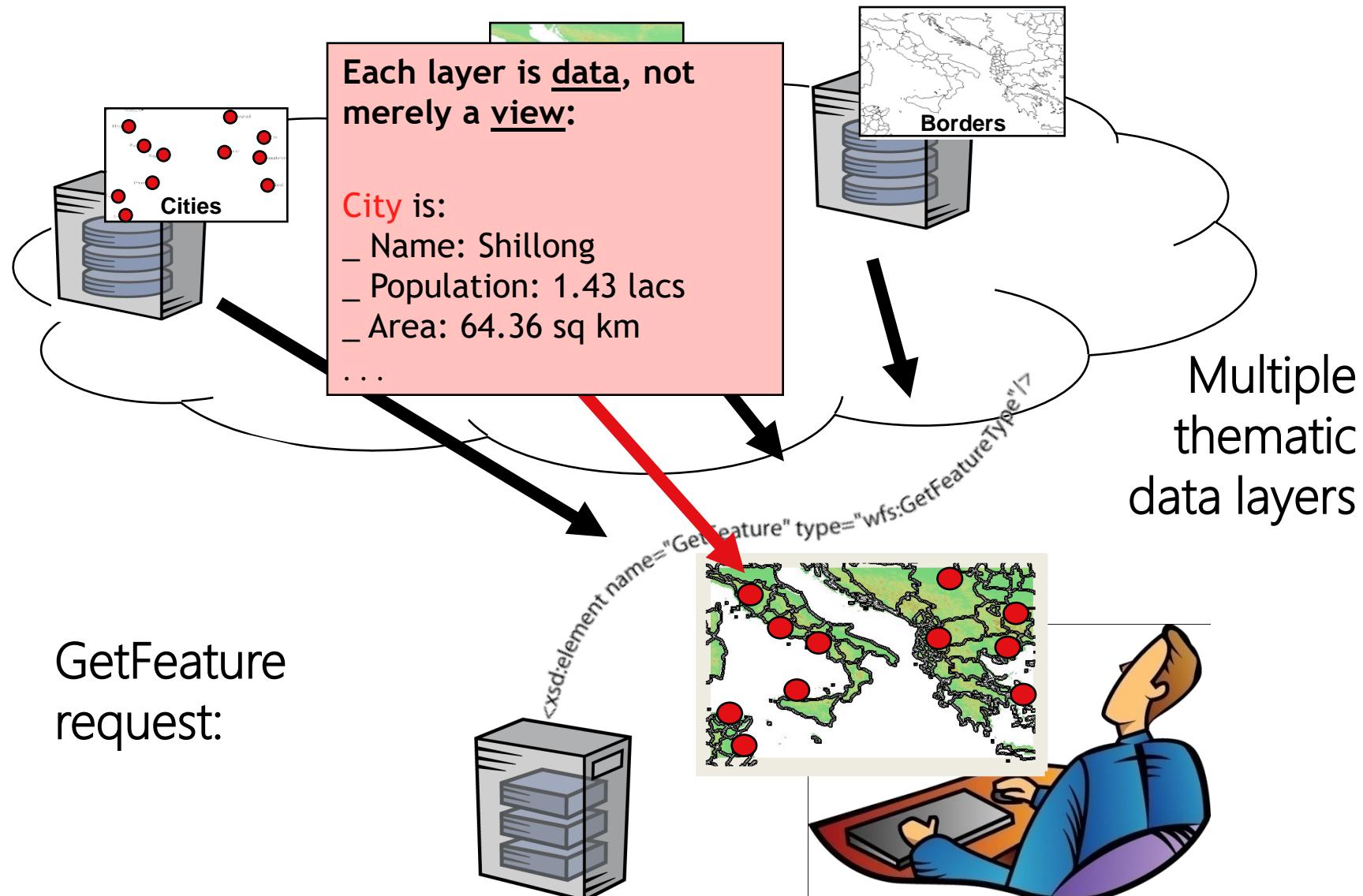
WMS GetMap returns a server's "dumb" JPEG, GIF or PNG representation of the data on the server. It does NOT return the actual data, only a bitmap of the data.

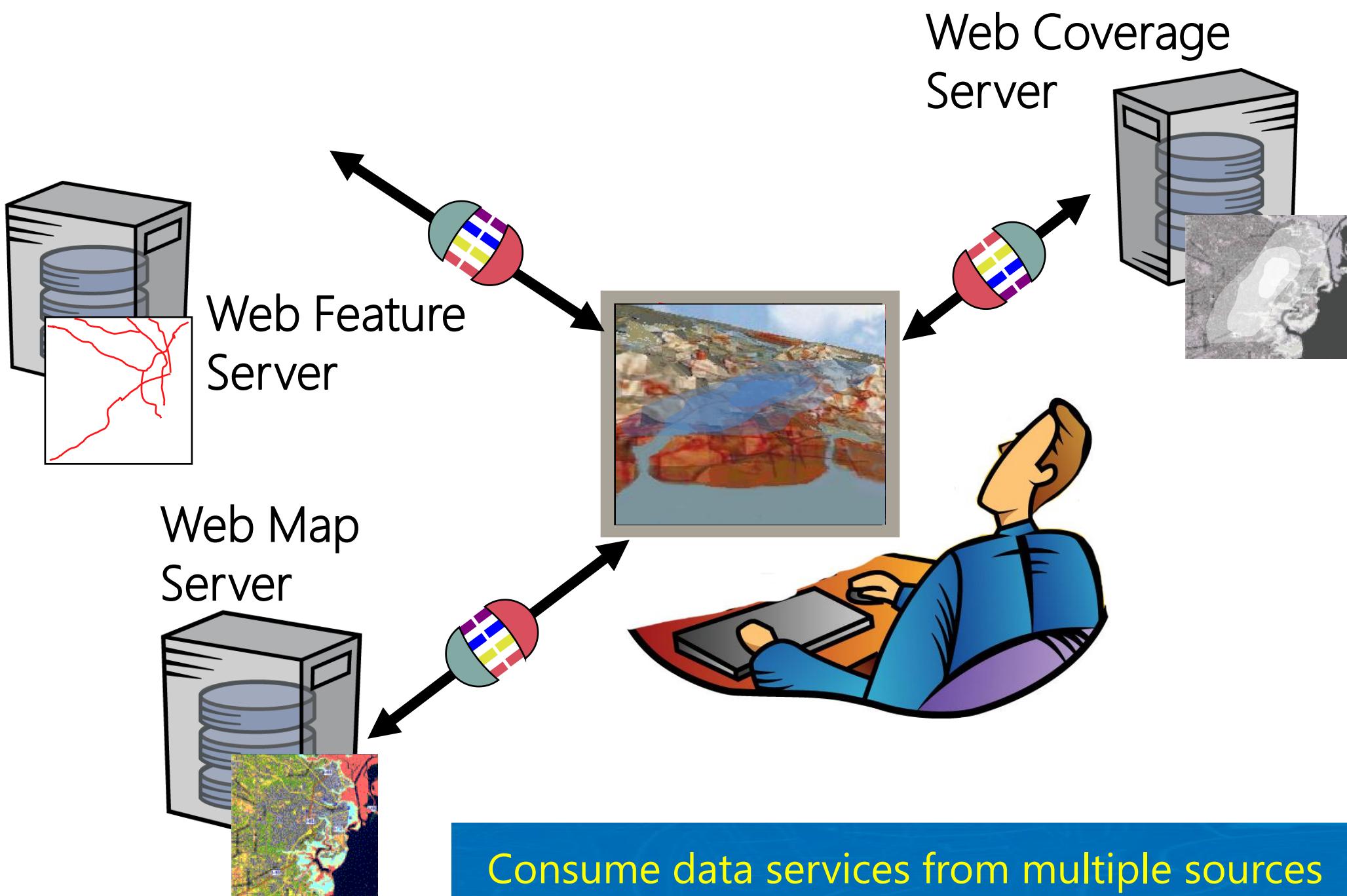


WMS can query by pointing

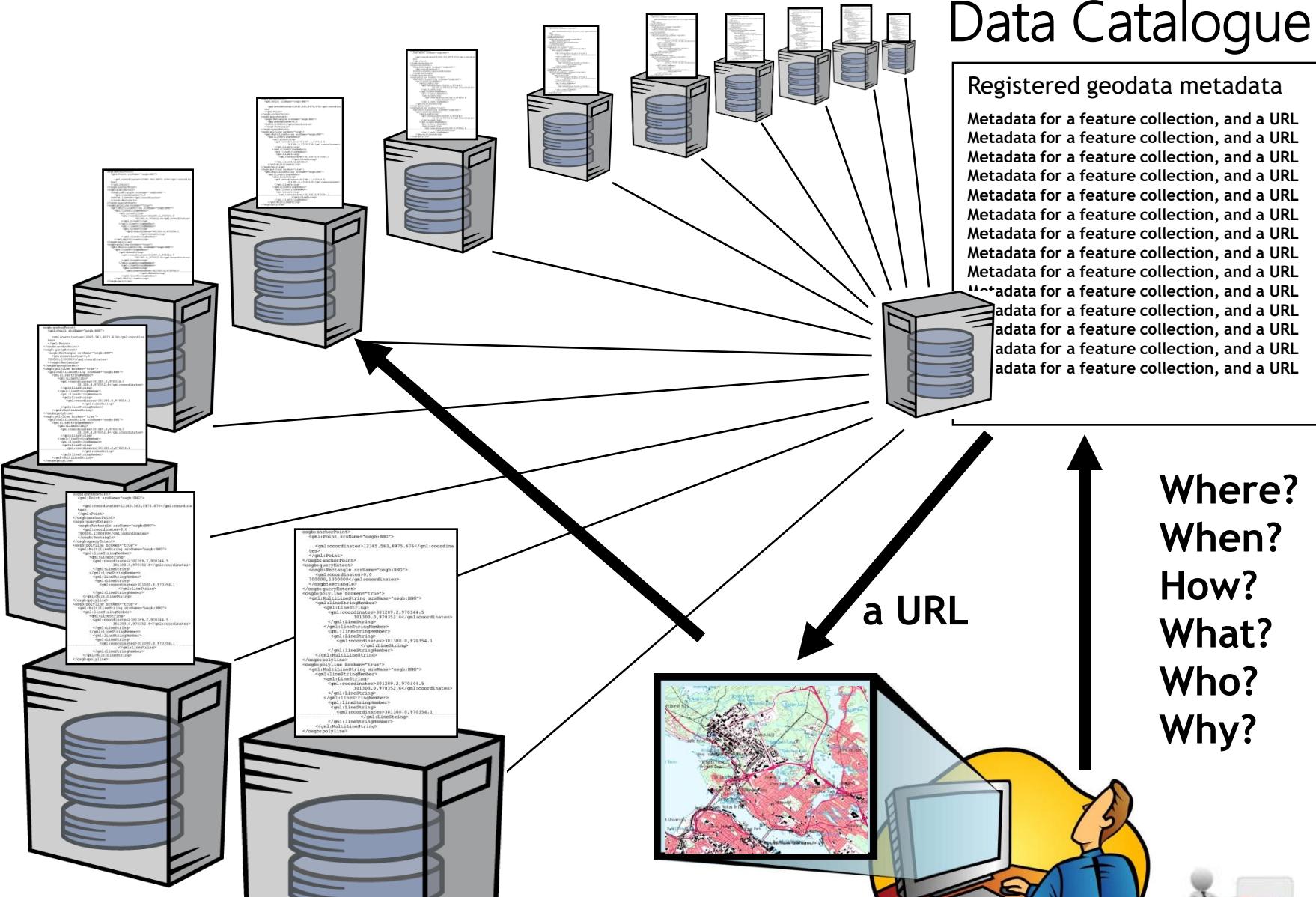


WFS gets feature data from multiple servers



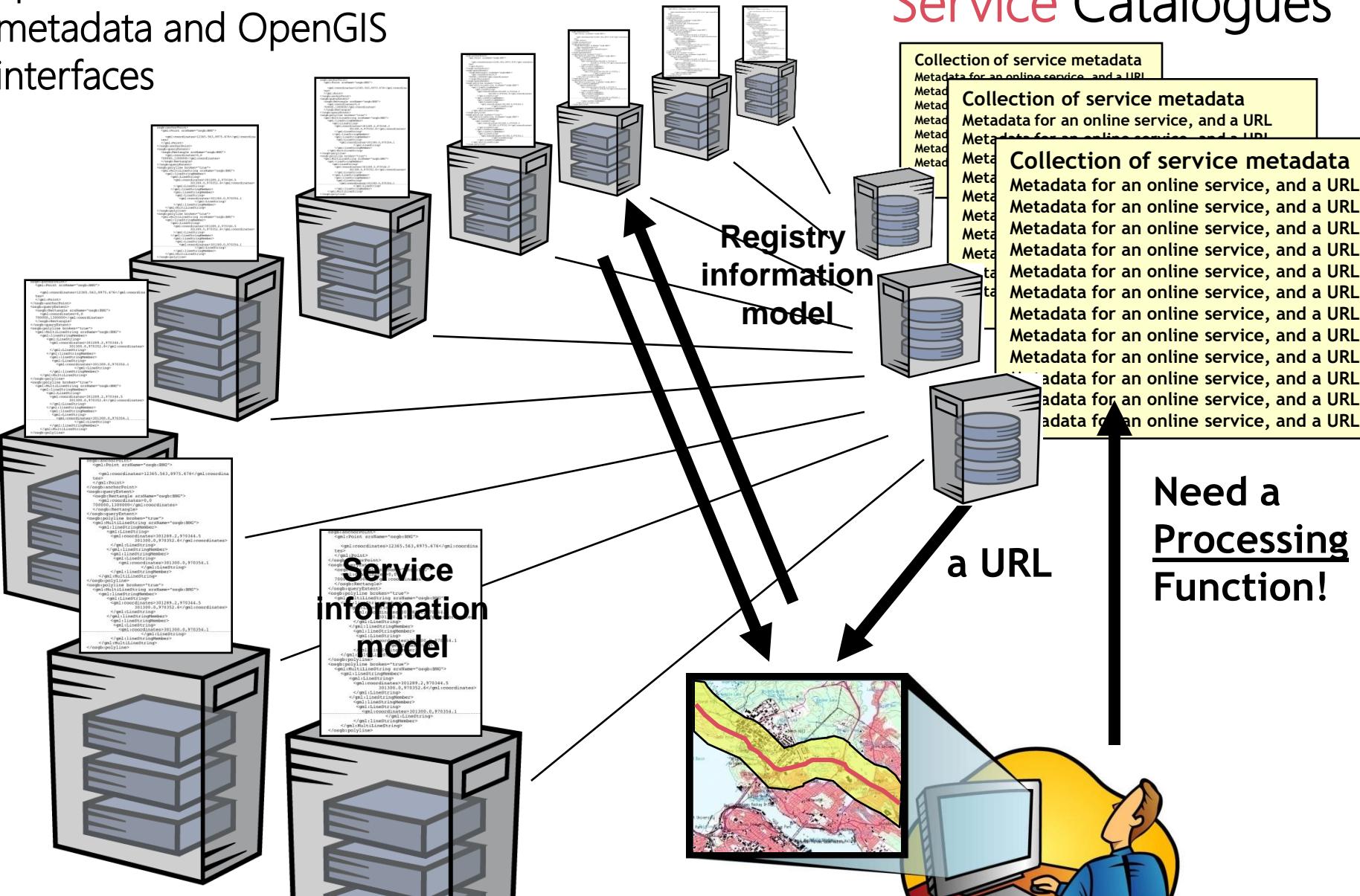


Data Catalogue



Search and Discover data as per requirement

Spatial services servers with metadata and OpenGIS interfaces



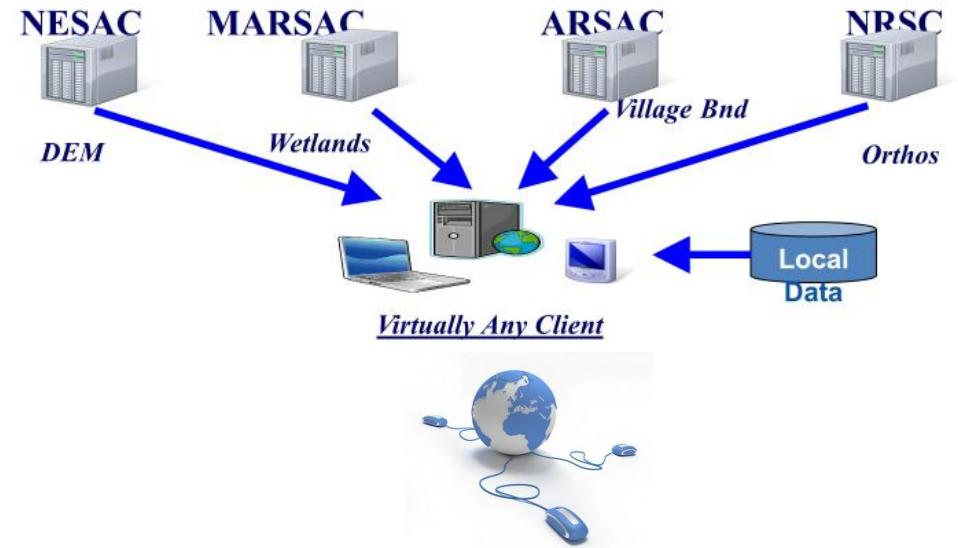
Execute Processing Function on the data services!

OGC Advantage

- Faster access to data
- Access Real time/updated data
- Reduce data redundancy /Maximize data usage
- Interoperability
- User Oriented/Focused Applications : Immediate decision making / planning process

Many More..

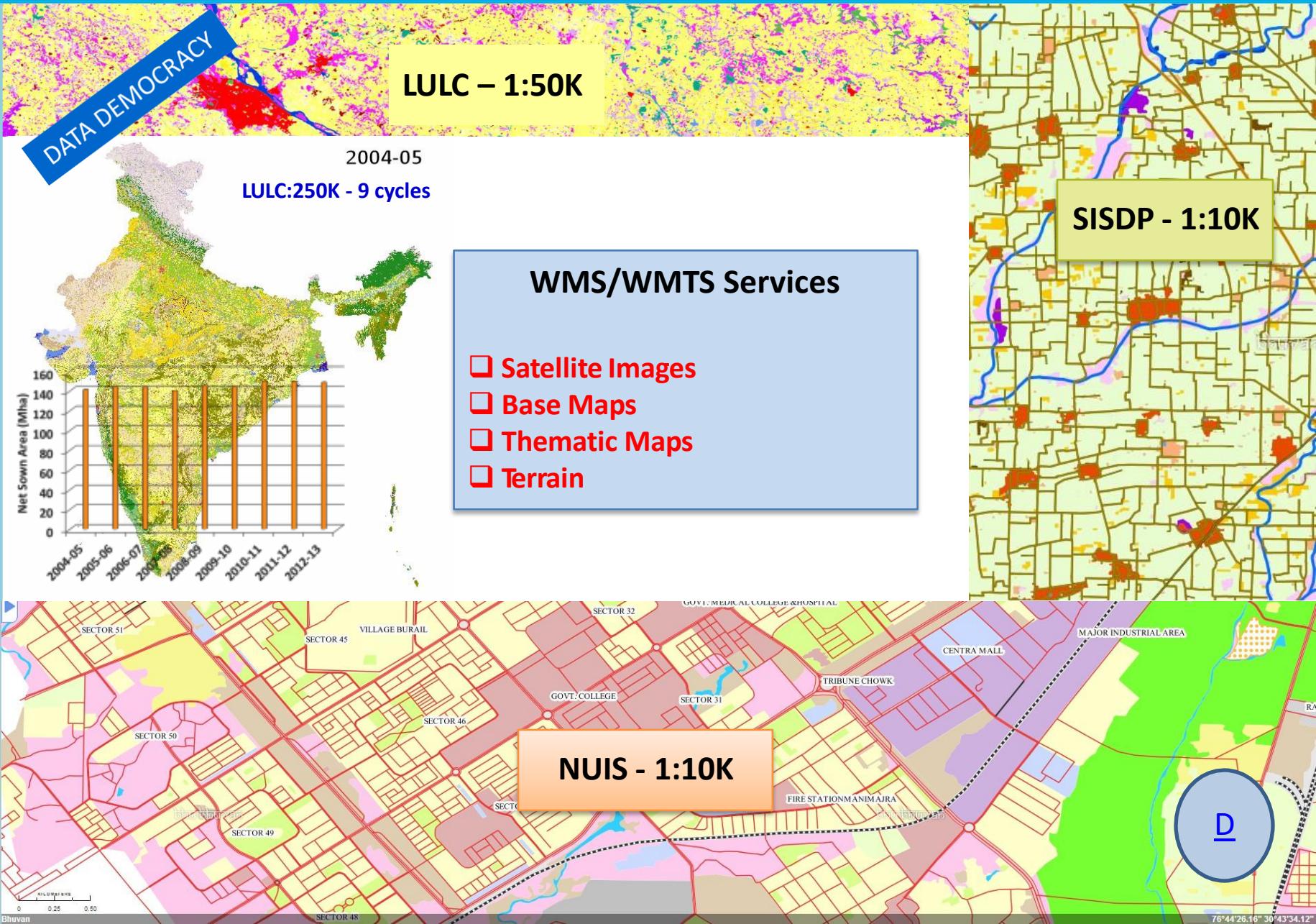
- Format is irrelevant
- No media involved
- Size is irrelevant (only requested data needed)
- Software independent
- Device independent (PC, phone)
- Saves Time!



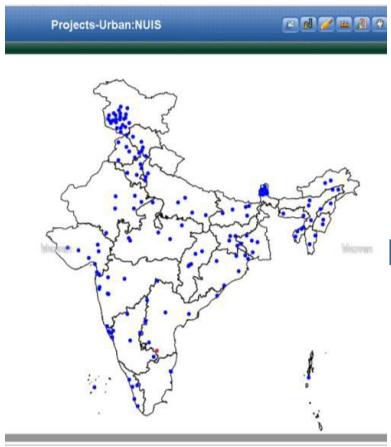
Real-time access to geographic data and services and interoperability.

Thousands of GIS data services waiting to be access and use!

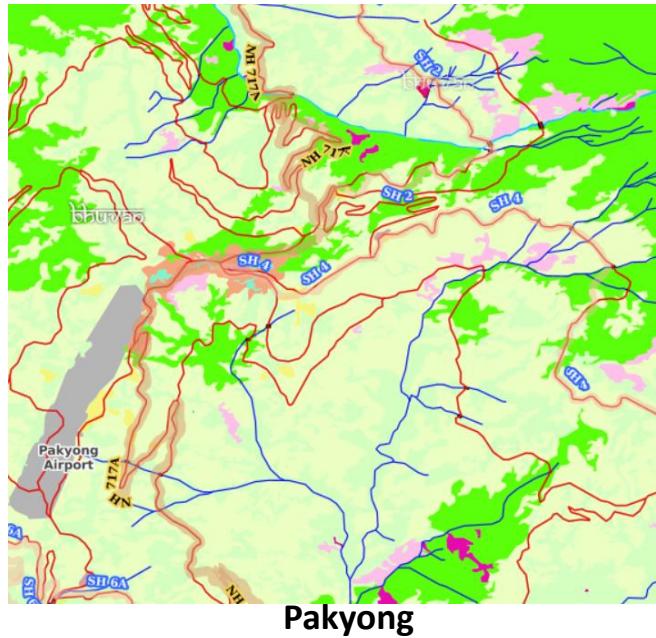
VISUALIZATION



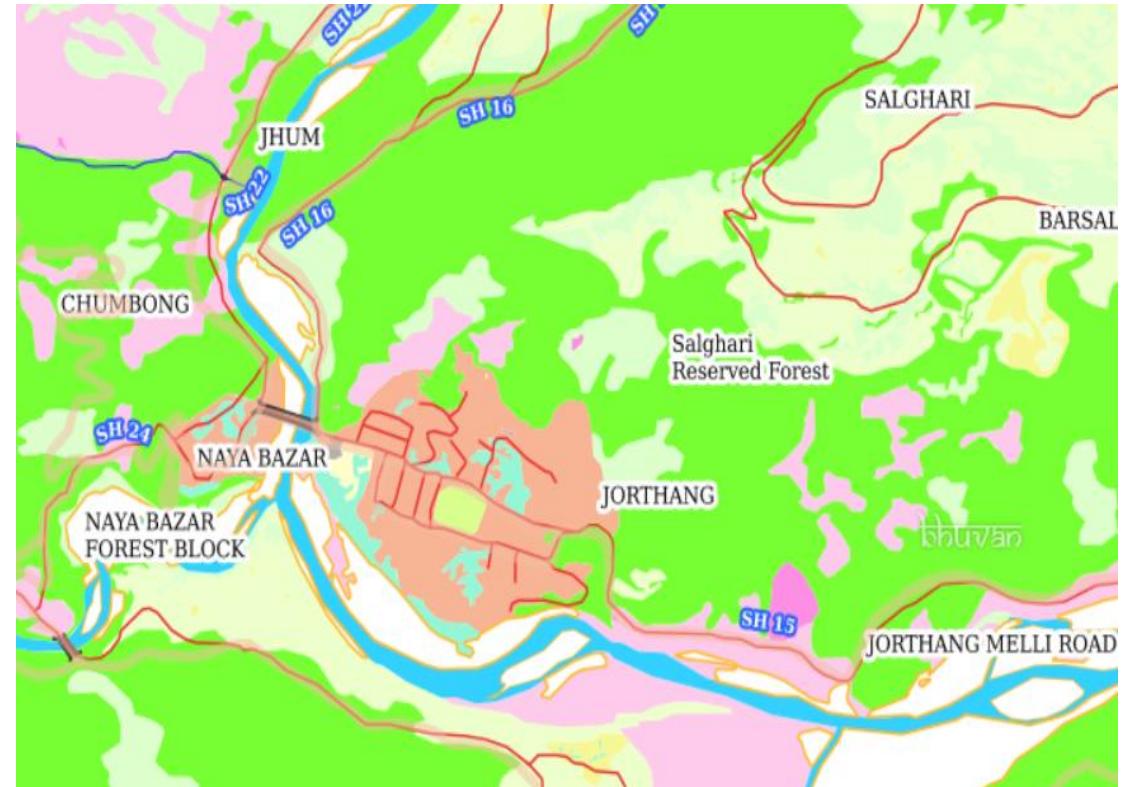
Urban Information System NUIS : 152 towns



Screenshot of the Bhuvan thematic services interface. The interface includes a search bar, dropdown menus for 'Select Name', 'Select State', and 'Select Town', and a legend for land use categories: Road, Rail, Drainage, Residential, Commercial, Crop Land, and Fallow Land. The map shows a town with various land use areas highlighted in different colors.



Road	Crop Land
Rail	Fallow Land
Drainage	Plantations/Orchards
Residential	Open Forest
Commercial	Forest Plantations
Industrial	Dense Forest
Mixed	Mangroves
Recreational	Scrub land
Public&Semi-public	Barren/Rocky
Public Utilities&Facility	Salt affected
Communications	Gullied/Ravinous
Vacant Land	Sandy area
Reclaimed Land	Waterlogged
Vegetation	Marshy/Swampy
Rural Settlement	Mudflats
Bus Terminus	Quarry/Brick kilns
Railway Station	Mining Area
Canal	Industrial Dump
River/Stream	
Lakes/Ponds/Tanks	
Waterbodies Dry	

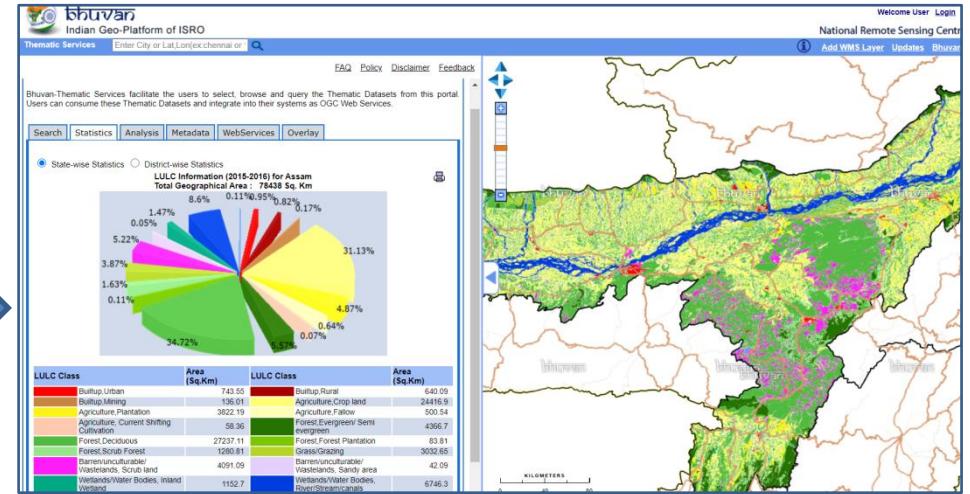
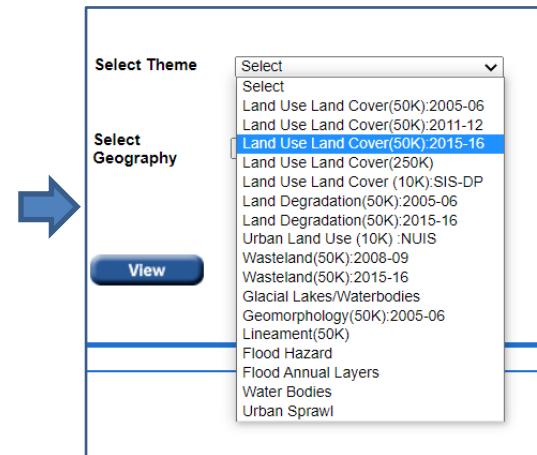
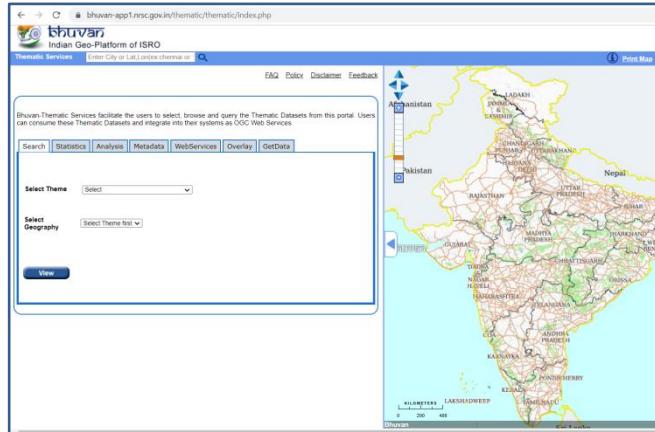


Jorethang Naya Bazar

Example on accessing Data as WMS Services

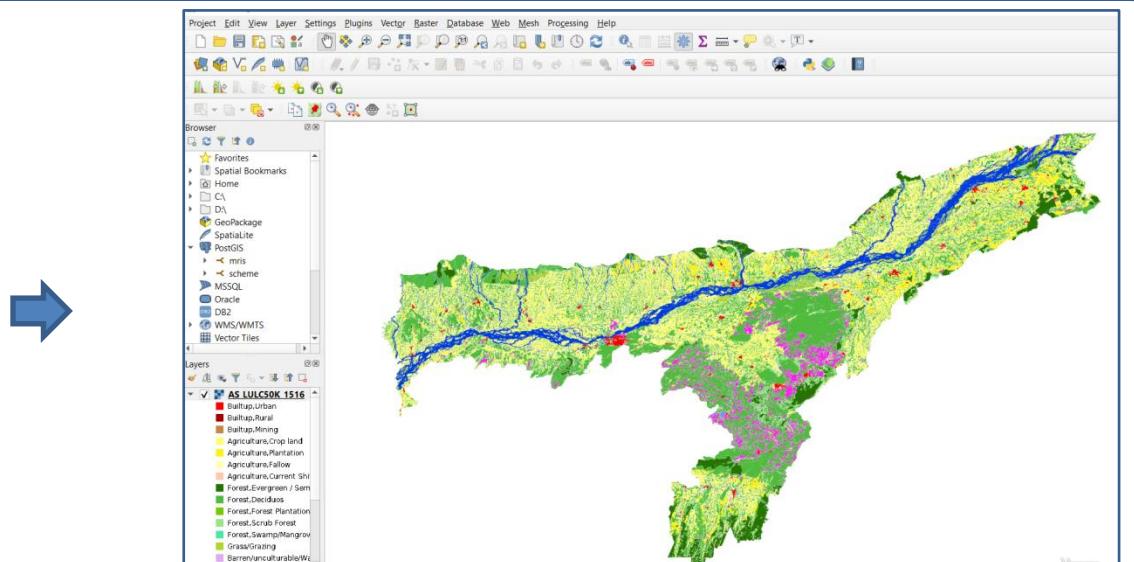
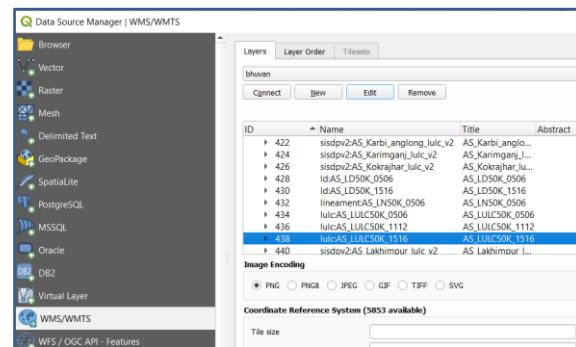
Option 1: Access the data service on inbuilt Web Map Viewer

<https://bhuvan-app1.nrsc.gov.in/thematic/thematic/index.php>



Option 2: Access the data service on Desktop GIS (QGIS)

<https://bhuvan-vec2.nrsc.gov.in/bhuvan/wms>



ISRO Bhuvan WMS Server URLs

Theme	Scale	OGC WMS Server URLs
Land Use Land Cover	1:50000	WMTS: "http://bhuvan5.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvan5.nrsc.gov.in/bhuvan/wms"
Land Use Land Cover	1:250000	WMS: "http://bhuvan3.nrsc.gov.in/cgi-bin/LULC250K.exe"
Urban Land Use: NUIS	1:10000	WMTS: "http://bhuvannuis.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvannuis.nrsc.gov.in/bhuvan/gwc/service/wms"
Wasteland	1:50000	WMTS: "http://bhuvan5.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvan5.nrsc.gov.in/bhuvan/wms"
Geomorphology	1:50000	WMTS: "http://bhuvan5.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvan5.nrsc.gov.in/bhuvan/wms"
Lineament	1:50000	WMTS: "http://bhuvan5.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvan5.nrsc.gov.in/bhuvan/wms"
Flood Hazard	1:250000	WMS: "http://bhuvan-noeda.nrsc.gov.in/cgi-bin/hazard.exe"
Flood Annual Layers	1:250000	WMS: "http://bhuvan-noeda.nrsc.gov.in/cgi-bin/flood.exe"
Erosion	1:50000	WMTS: "http://bhuvan5.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvan5.nrsc.gov.in/bhuvan/wms"
Salt Affected & Waterlogging	1:50000	WMTS: "http://bhuvan5.nrsc.gov.in/bhuvan/gwc/service/wmts/" WMS: "http://bhuvan5.nrsc.gov.in/bhuvan/wms"

Huge Geospatial Data
~ 3.6 lakh products, 800 GB transactions per day and ~10 million data points



OGC Ready Services for Applications

NeSDR OGC WMS Server List (1124 Data Services) > Interoperable Map Service

Access data services and built **custom** applications

Base and Administrative layers

https://www.nesdr.gov.in/geoportal/../?IEG_PROJECT=QC_Pass_Base_A
dmin_StatewiseWS (80)

Road Network

https://www.nesdr.gov.in/State_QC_passed_RoadWS/wms/ (8)

Land Use Land Cover 50k 1st Cycle

https://www.nesdr.gov.in/State_QC_passedLULC_0506WS/wms/ (8)

Land Use Land Cover 50k 2nd Cycle

https://www.nesdr.gov.in/State_QC_passedLULC_1112WS/wms/ (8)

Land Use Land Cover 50k 3rd Cycle

https://www.nesdr.gov.in/State_QC_passed_LULC_1516WS/wms/ (8)

Land Use Land Cover 10K layers

https://www.nesdr.gov.in/NER_LULC10KV2WS/wms/ (8)

Derived layers from Land Use Land Cover 1st cycle

https://www.nesdr.gov.in/AR_Derived_LULC_05_06WS/wms/ (6)

Derived layers from Land Use Land Cover 2nd cycle

https://www.nesdr.gov.in/AR_derived_LULC_11_12WS/wms/ (6)

Derived Maps from Land Use 2015-16 Meghalaya

https://www.nesdr.gov.in/ML_Derived_LULC_15_16WS/wms

Derived layers from Land Use Land Cover 3rd cycle

https://www.nesdr.gov.in/AR_Derived_LULC_15_16WS/wms/ (6)

Derived layers from Land Use Land Cover 3rd cycle

https://www.nesdr.gov.in/Arunachal_Water_ResourceWS/wms/ (6)

Soil Ressources Map

https://www.nesdr.gov.in/SOIL_250KWS/wms (8)

List of Arunachal Pradesh 10K layers

https://www.nesdr.gov.in/QC_Pass_AR_10K_DerivedWS/wms/ (7)

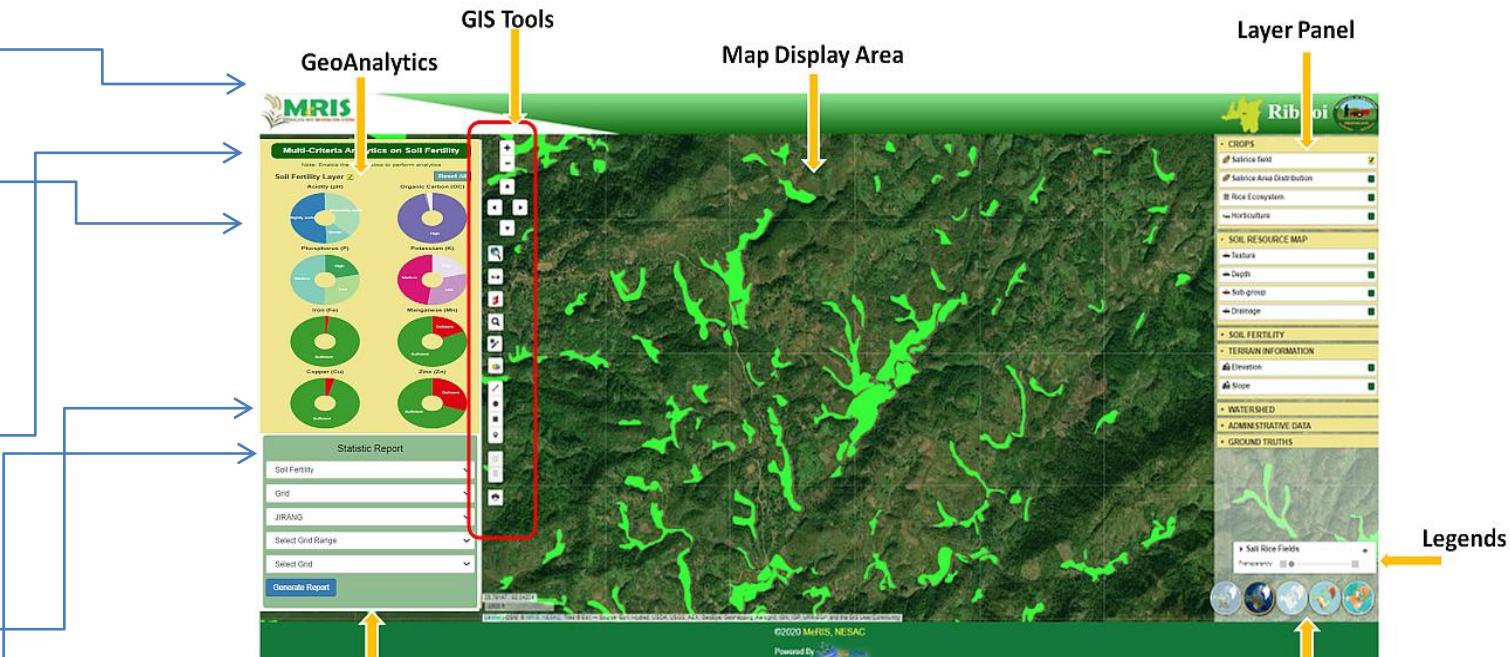
Water Resource Layers

https://www.nesdr.gov.in/Arunachal_Water_ResourceWS/wms/ (4)

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Meghalaya Rice Information System



Build more eGovernance
Applications using NeSDR
Data and Services



Developing User Oriented SDSS Applications

Basic Ingredients for Perfect DSS Platform

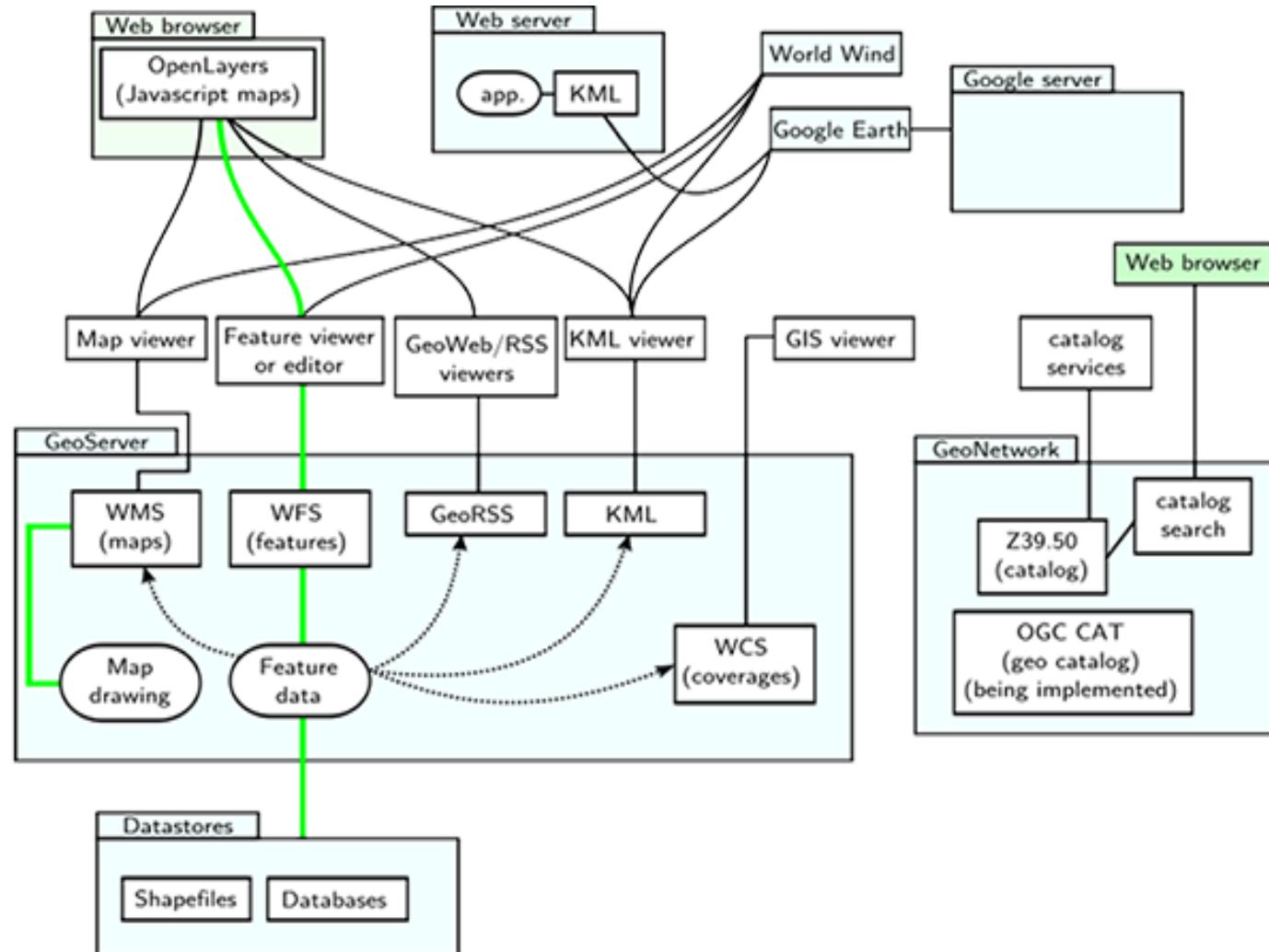
👉 **Collect and ingest all data** related to Specific domain's/Department's needs and other associated data in a single-window platform. Data Served as **Interoperable OGC data service**

👉 **Build Tools to Interact, Analyse, Report** : A geospatial based dashboard for **interactive visualisation, navigation , GeoAnalytics, and Multi level Reporting**

👉 **Adopts State-of-the-art Web/Geospatial technology**: Uses latest web mapping tools and technology for **store, manage, publish and analyse** the maps on the web



Open Source Application Stack



Open Source Software Ecosystem

Desktop GIS: General GIS Viewing, editing and **analysis on the desktop**



Data Store: Storing Spatial Data



Browsing Facing GIS: General GIS Viewing, editing and **analysis in the browser**



Web Services: **Publishing spatial** data to the internet



Specific Spatial Analysis Tools



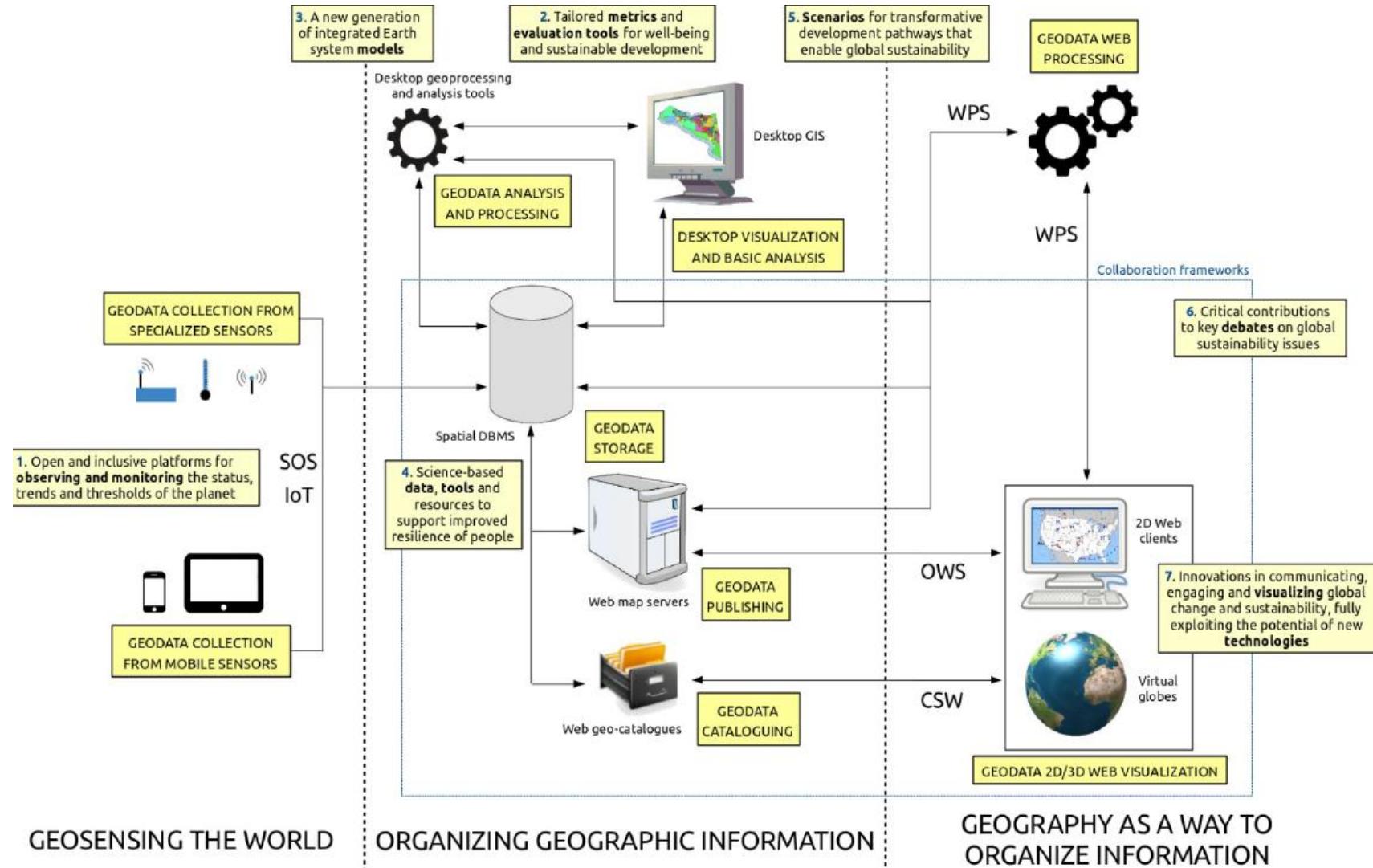
Geospatial Libraries



Collect > Analyze > Apply to Real world Problems

Combine **Open Source Tools** for solving real world problems

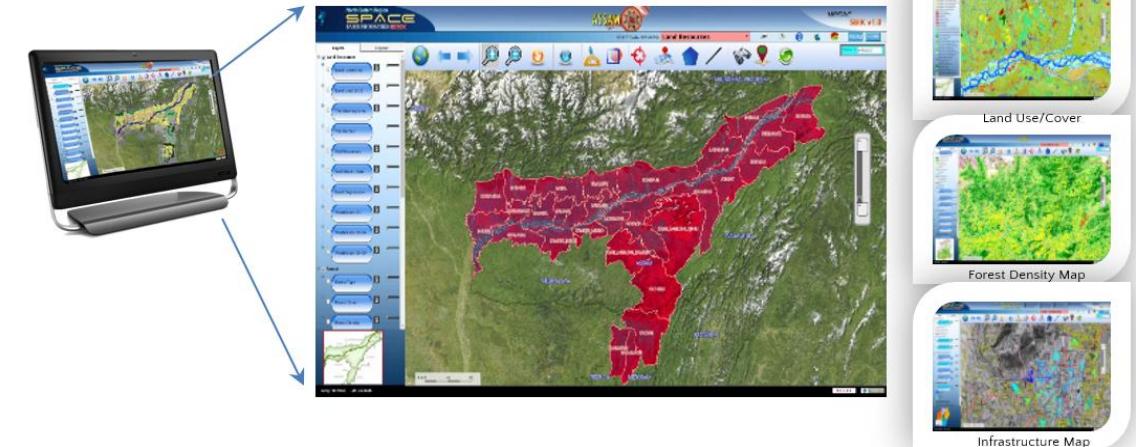
- Observing and Monitoring
- Organizing Information
- Analyzing
- Solve real world problems



Few Examples : Building Scalable User-Oriented Applications

Space Based Information Kiosk

User Requirement: Needed to make available all information pertaining to natural resources, infrastructure and all assets of Govt. / private etc. derived from space based data in a single window **standalone/portable platform** and to disseminate such data to all line department including educational institutions for their use in planning inputs.



Accomplishments: Installed, Launched and Operationalised in 8 States, Ministry of DoNER, New Delhi and 25 Line Departments in NER. Launched by Chief Secretaries/ CM of States

Design and Development of the application purely with Open Source Technology and Tools. Uses **Open Source MapServer** based on mapscript for handling, configuring and managing the geospatial layers, **PostgreSQL** for managing the spatial database, latest web tools for **touch-screen display and interaction** and optimization for smooth map display, interaction, navigation and analysis

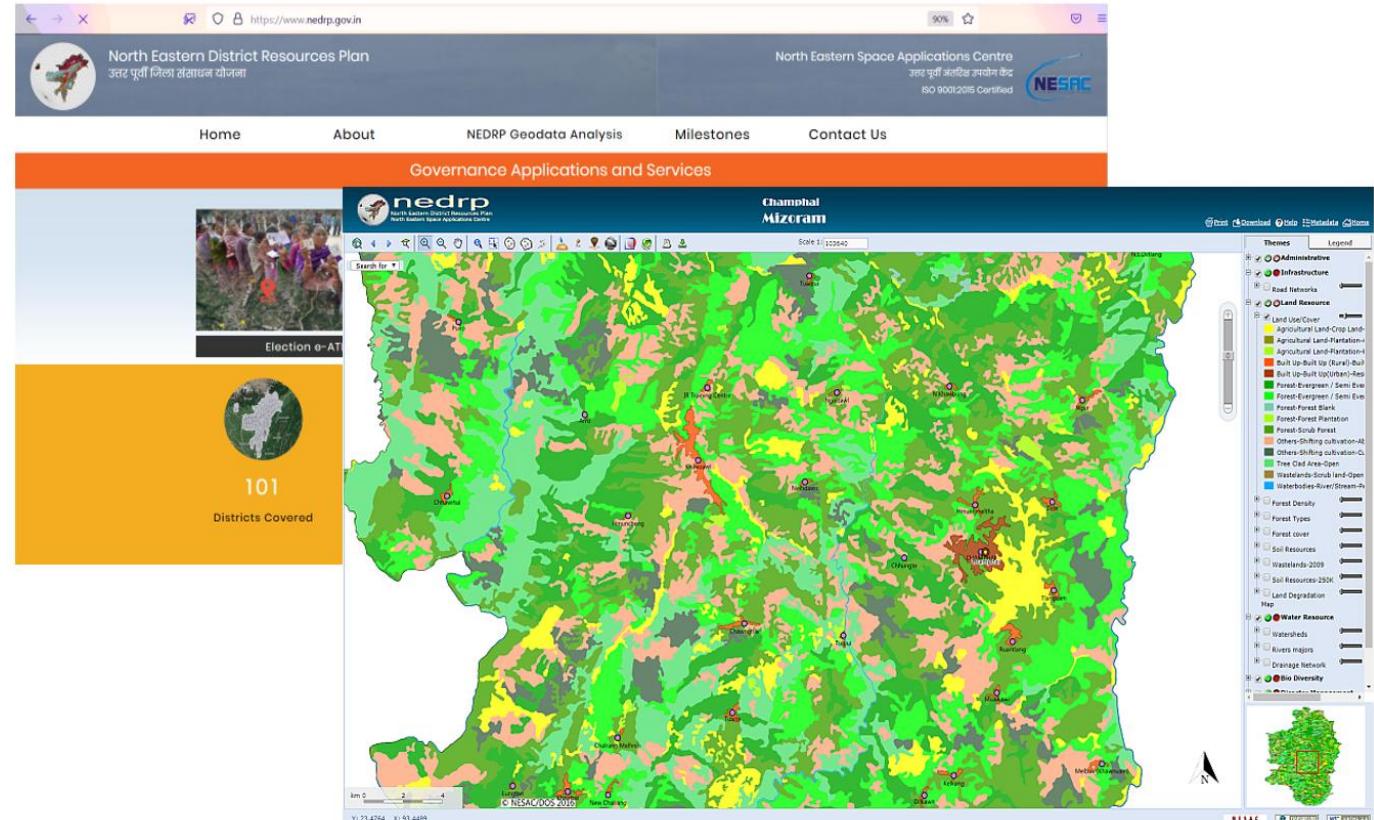


North Eastern District Resource Plan

User Requirement: To make district-wise standardized geospatial data of entire NER for its maximum utilization in the region for various developmental planning activities. Used for DPRs preparation and Action Plan inputs.

Design and developed with Open Source Tools, Completed for entire 101 districts of North Eastern States. 753+ datasets shared to Line Departments. Used by Students and Researchers across NER.

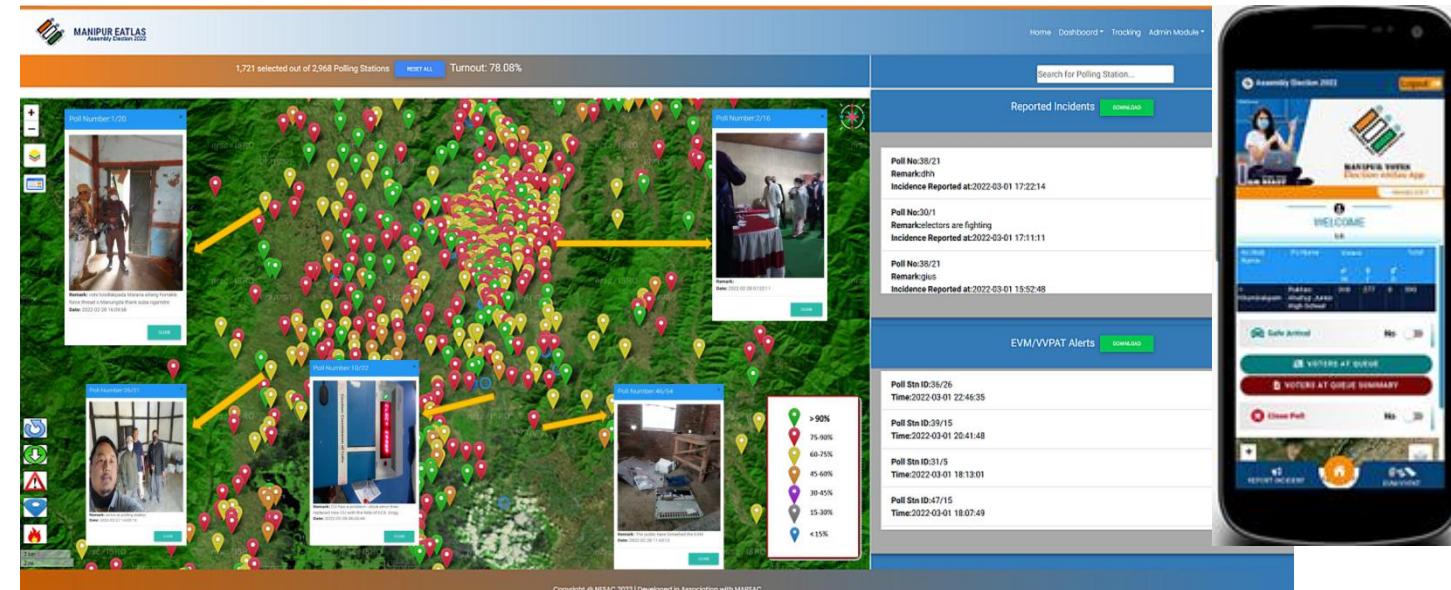
Awarded Silver, National eGovernance Award 2017-18. Launched by the Hon'ble Union Minister for Electronics & Information Technology on 11 August, 2018.



Election eAtlas system for NER

User Requirement: Dashboard for Election management, planning, tracking and reporting of Events/Incidents

- **Mapping** of precise geolocations of entire Polling Stations of the state linked with detail information on Voters and Polling Station facilities
- **Multi-Criteria Tools** for Polling Station Planning and management
- Live Dashboard for **reporting real time events/Incidents** during election with precise geolocation
- **Live Tracking** of Election Officials during election
- Being used by Office of Chief Electoral Office, Manipur *since 2019 LS Election*



eAtlas Control and Monitoring Station at Office of Chief Electoral Officer, Manipur

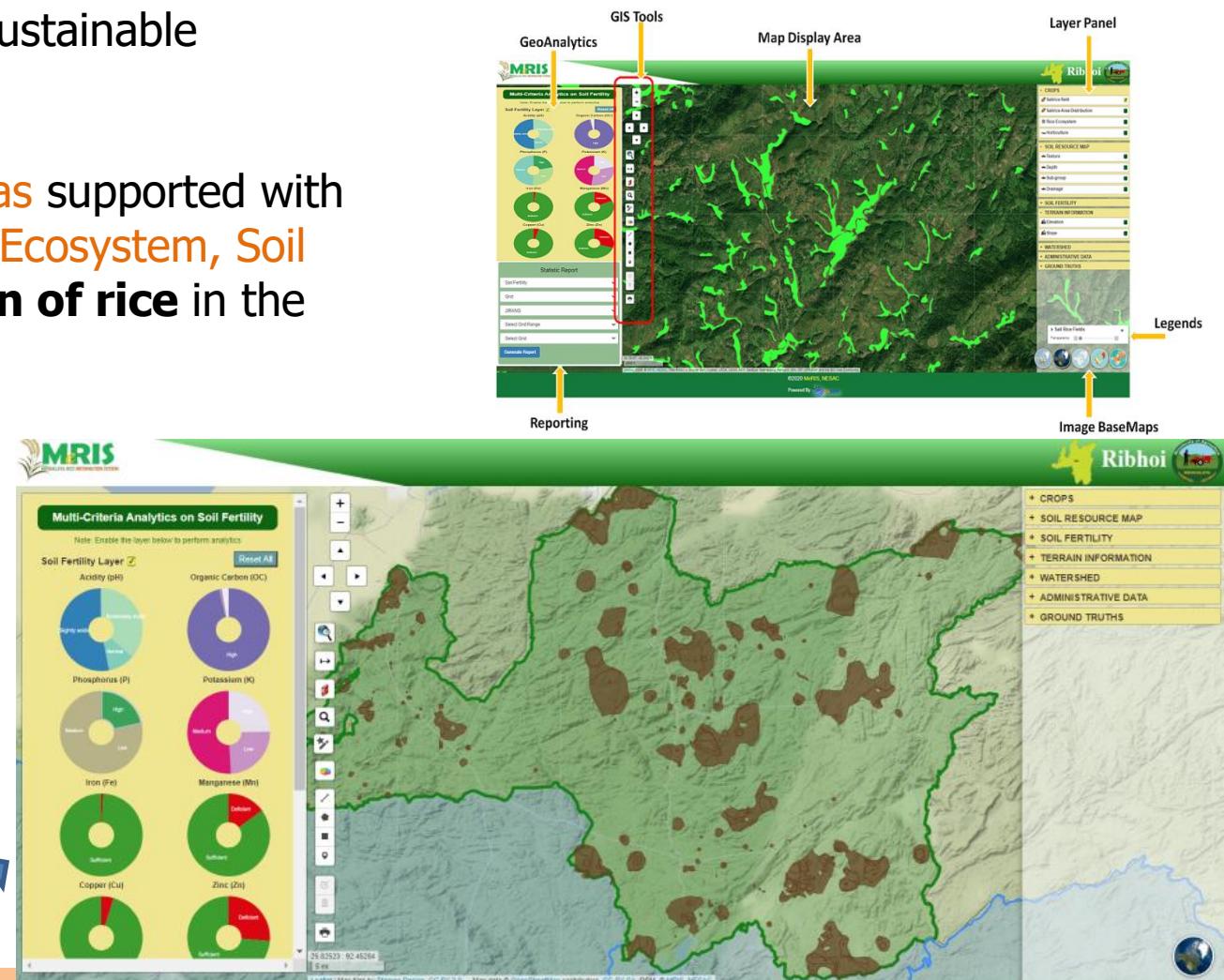
Awarded Winner 7th eNabling North East Award 2019-2020 under category 'access to public schemes, entitlements, citizen & e-governance services'

Rice Information System, Meghalaya

User Requirement: A decision support system for sustainable development of rice in the state of Meghalaya

- It has all relevant information on **Rice growing areas** supported with **Soil Fertility map** with details on its nutrients, **Rice Ecosystem**, **Soil information**, **Slope**, **Horticulture** etc, **for expansion of rice** in the state.
- Customize reports** on grid, village, district will help planner for systematic development and planning.
- Multi-criteria based statistical map** visualization based on soil nutrients should help focusing on specific variety of rice crops in the state.
- Design and built using **Open Source technology and standards** for cost-effectiveness and scalability.

Q. Show Soil Area Rich in
High Phosphorus



Multi Criteria Analytics on Soil Fertility on a Click!

Enable finding specific area that meets single/multiple soil nutrients requirements

Sericulture Development

SILKS Sericulture Information Linkages & Knowledge System
Central Silk Board, Ministry of Textiles, Government of India, Bangalore

SIRMOUR, HIMACHAL PRADESH

GAYA, BIHAR

Gwalior, Madhya Pradesh

Alzawl District, Mizoram

SILKS Showcases
More than 930 Spatial Layers of Information On Potential Areas for Sericulture, Soil Slope, Road, Villages etc.

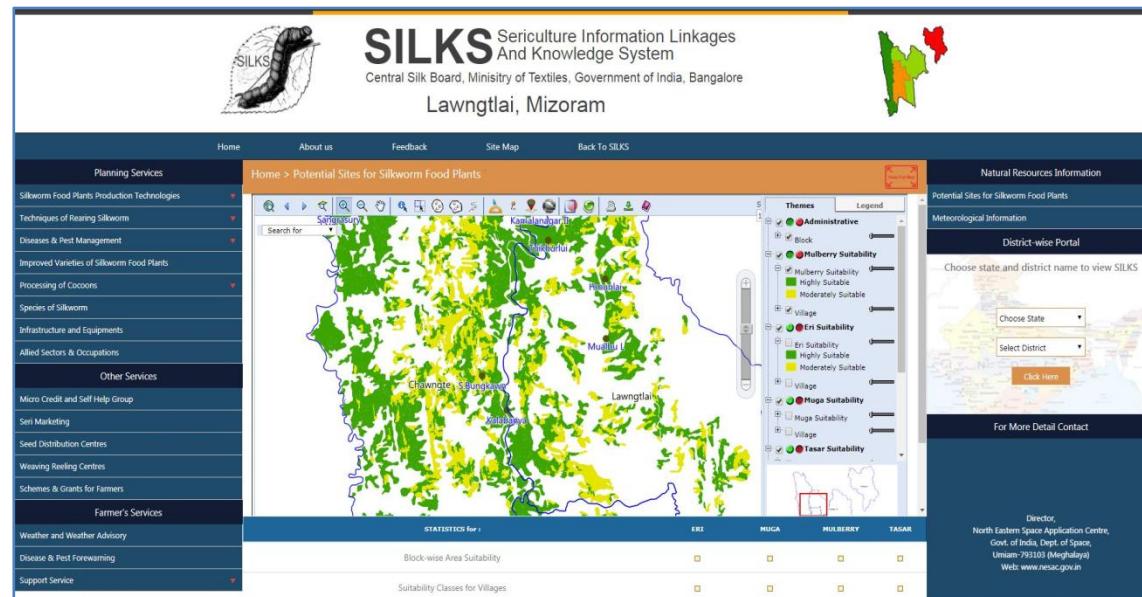
About CSB
The Central Silk Board (CSB) is a Statutory Body, established during 1945, by an Act of Parliament. It functions under the administrative control of the Ministry of Textiles, Government of India.

About NESAC
The North Eastern Space Application Centre (NESAC) established in the year 2000 as a joint initiative of Department of Space (DOS), North Eastern Council (NEC) to provide developmental assistance to the north eastern states of India through space science and technology.

National eGovernance Award 2015-16

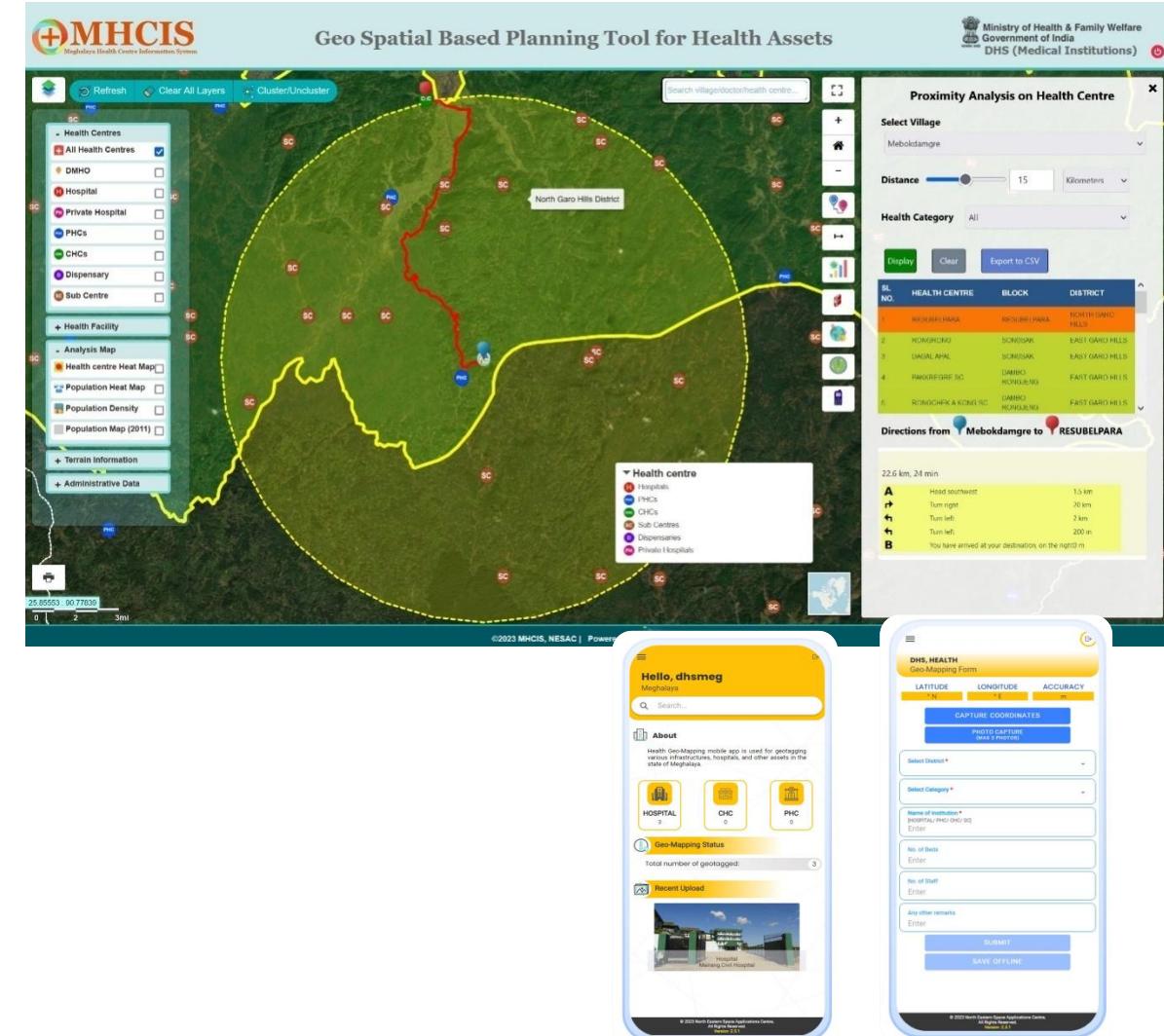
User Requirement: District-wise portals on Potential Sites for Sericulture Plantation (Eri/Muga/Tasar/Mulberry)

- Developed Using **Open Source Tools**
- For Ministry of Textiles, GOI
- Total **178** SILKS Portals for 178 selected districts in India)
- **17 Modules** in each District Geoportal
- Available in **12 Major Local languages** of India



GeoHealth Analytics for Meghalaya

- ✓ Enabling **accurate geo-location mapping of Infrastructure** to support better public health planning and decision-making
- ✓ Strengthening Health Information System in the State **by connecting maps, apps, data and people**
- ✓ Facilitating Optimize use of Health Resource – Finding **Accessibility and proximity of health assets** across the state.
- ✓ **Gap Analysis** that aims at bridging health service inequalities within and across districts / blocks.
- ✓ Geospatial data and techniques are also an **effective tool to monitor progress and provide a strong basis for policy making** to achieve the SDGs



Multi Sectoral Project Monitoring

1

Precise Geotagging of Project sites

Geotagging using Mobile Application

Integrated with GAGAN/NaVIC Technology

2

Quarterly Monitoring of Project sites

1. **Mobile App-** to cover all sites
2. **Satellite Imagery-** to cover **larger Infrastructure** related projects)
3. **Drone Survey-** to cover **Small-Medium** Infrastructure projects)



2- 4m positional accuracy

3

Management & Monitoring Dashboard

Built Using State-of-the-art **Open Source** Geospatial Web/Mobile Technology



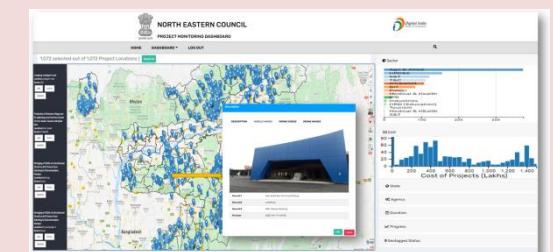
Live Project status



Interactive Maps

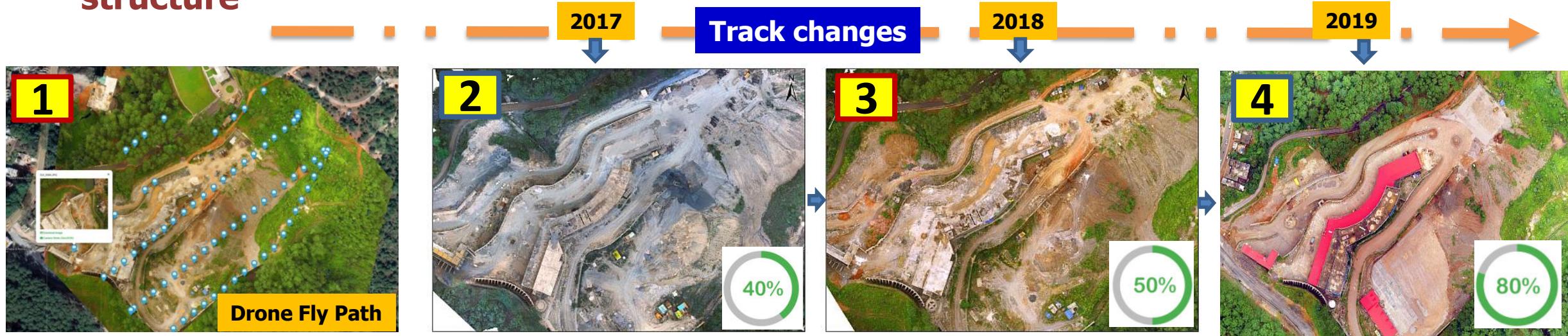


Reporting with Charts



Project Monitoring : Drone Imaging

- ❖ High Resolution aerial 2D/3D View of Large Construction area : **Measure size and shape of structure**



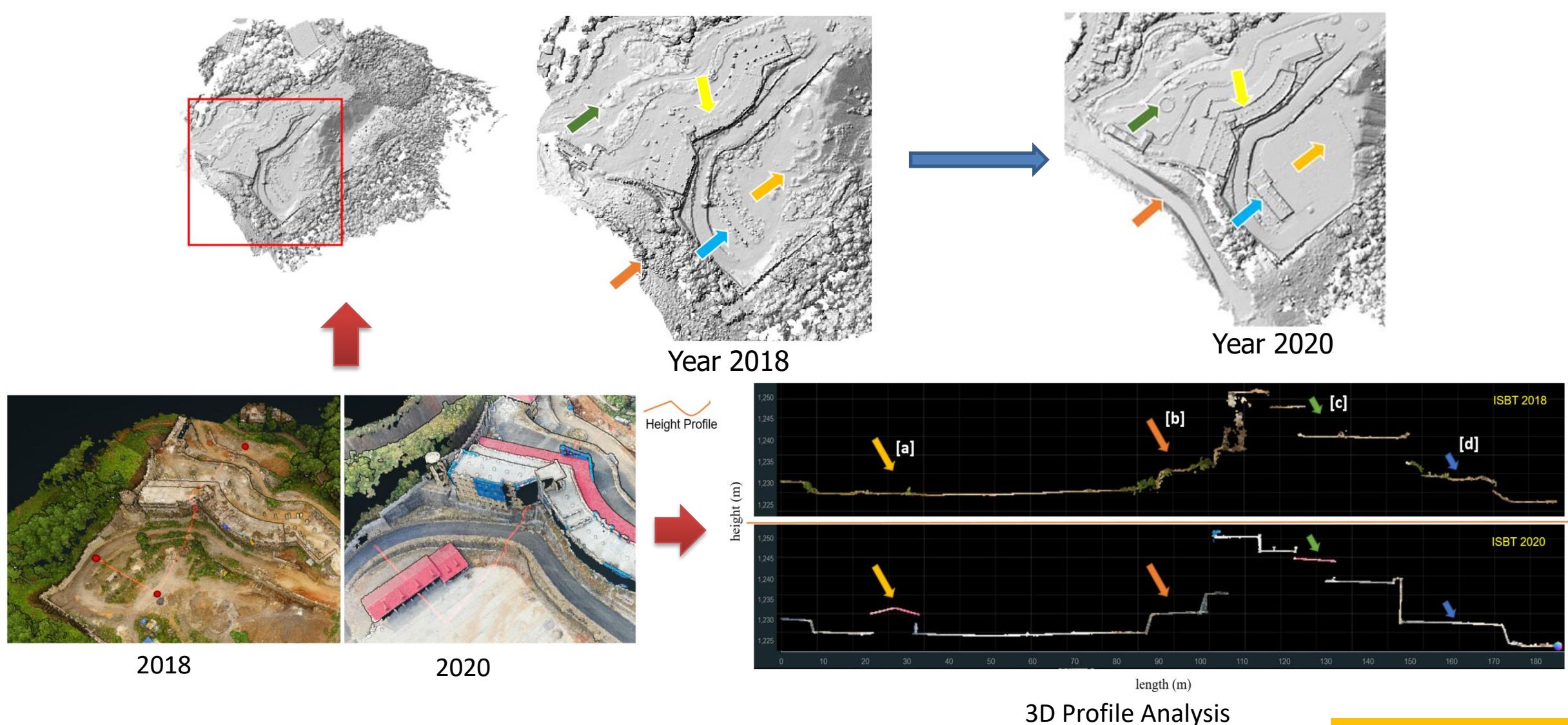
Track quantifiable change in 3D



Advantages :

- Large Scale Aerial View of Large Construction area
- Measure size and shape of structure – Track progress on each sections of construction area
- (Optional) 3D Visualization of Structure

Project Monitoring : Tracking Changes in 3D



Monitoring of Health Projects during COVID lockdown

Close Monitoring of 34 Project sites under COVID Care Establishment

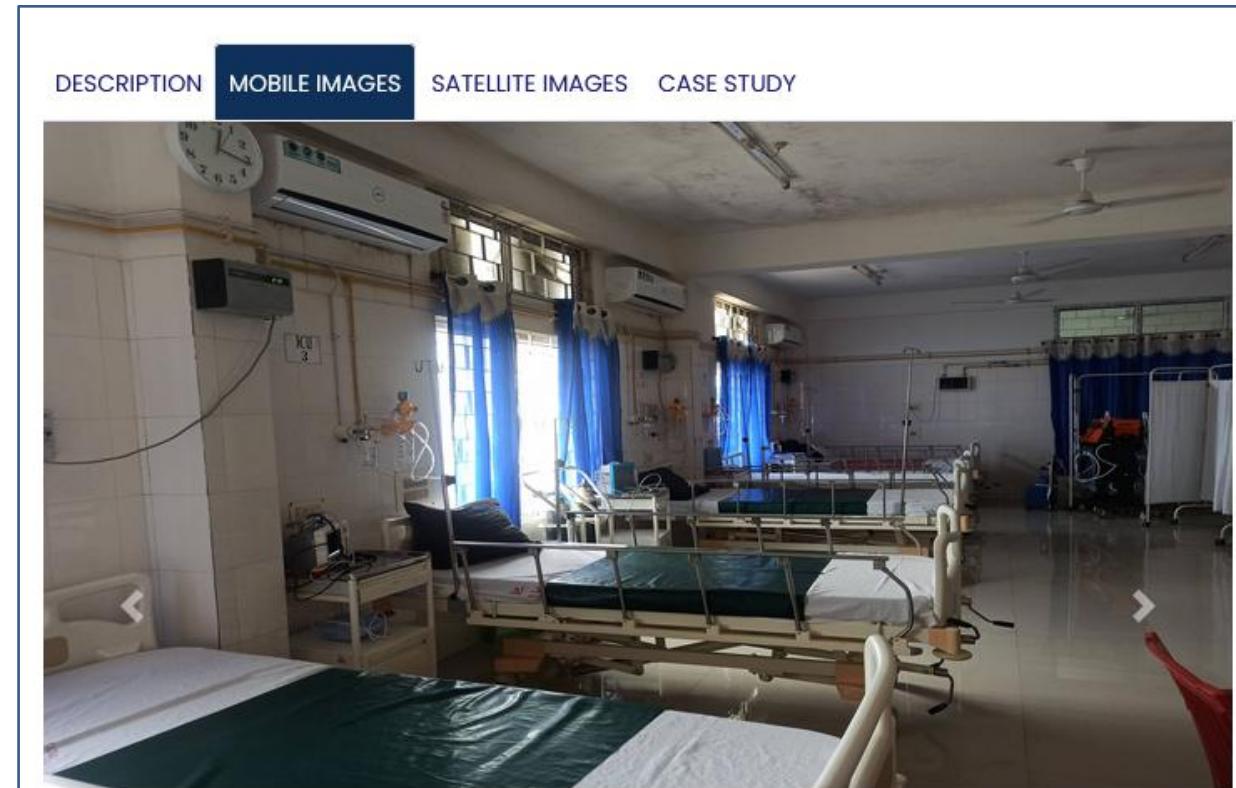
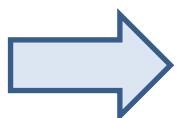
PROJECT MONITORING DASHBOARD ANALYTICS
NEC/MDONER PROJECTS

HOME DASHBOARD ADMIN ▾ LOG OUT

Upgradation of existing District Hospitals for setting up of ICUs for treatment of COVID-19 patients

Bhutan, ASSAM, MEGHALAYA, NAGALAND, MANIPUR, Arunachal Pradesh, Assam, Meghalaya, Nagaland, Manipur, Arunachal Pradesh

Image date : 5 May, 2020



Status showing receiving of 20 nos. of ICU machine –
Goalpara District Hospital, Assam

Secure Hosting and operationalization of 22 Major User Oriented eGovernance Dashboard Applications

SNo	Title of the Projects	Sponsored by	Current status
1	Development of Geo-tagging and Geo-indexing of infrastructure projects	BTC	Operational
2	GeoTagging and Monitoring	NEC	Operational
3	Mobile Apps for surveillance of malaria	RMRC, ICMR	Operational
4	Sericulture Geotagging Apps and NERTPS	CSB	Operational
5	Assam River Atlas	ASDMA	Operational
6	E-Atlas for North East	CEOs of NER	Operational
7	NeSDR Analytics platform	InHouse	Operational
8	African Swine Fever Outbreak Management(ASMAN)	SITA	Prototype Developed
9	CCE	Ministry of Statistics Govt of India	Done
10	CHAMAN	MNCFC	Done
11	IOT	TDP	Done
12	COVID Dashboard	State govt Heath Dept	Done
13	MRIS		Done
14	Etatlas(Traccar)	CEO Election Depts	Done
15	MDEWS		Done
16	NESRIS		Done
17	ROFR-Tripura	Govt of Tripura	Under Development
18	Village Resource Mapping	MBDA	Under Development
19	Malaria Dashboard	RMRC, Dibrugarh	Under Development
20	ASDMA Alert Dessemination Apps	ASDMA	Under Development

Thank You

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