Compendium of Use Cases

छत्तीसगढ़ शासन

सत्यमेव जयते

A ROADMAP FOR FUTURE

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Use Case 1- Identification of Particularly Vulnerable Tribal Groups (PVTGs) hamlets with gap of Road Connectivity and Health Center

Project Brief:

Enables targeted identification of PVTGs hamlets lacking adequate health facilities and road infrastructure by overlaying data on tribal settlements, existing healthcare locations, terrain, and accessibility. The aim is to plan and develop social and basic amenities for tribal settlements.

Problem Statement:

Region of Interest: Orchha Tehsil, in Narayanpur district of Chhattisgarh,

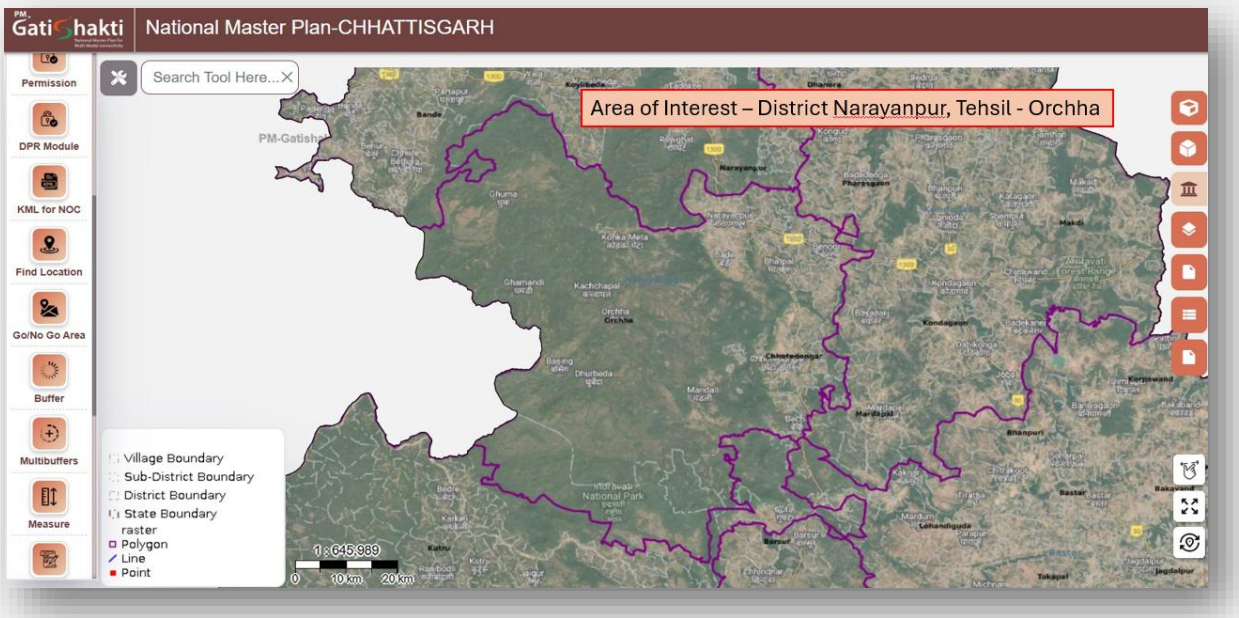
Orchha Tehsil is a remote and forested area, one of India's least surveyed and most inaccessible zones. This area is predominantly inhabited by PVTGs, including the **Abujhmaria and Hill Maria tribes**, who face significant challenges **related to road connectivity and basic health facilities.**

Usage of PMGS SMP Plan:

- Integration of tribal habitation data with road and health infrastructure layers.
- Identification of spatial gaps using terrain analysis and accessibility modeling.
- Prioritization of road and health center development based on settlement density and criticality.

Expected Benefit:

- Improves road connectivity and healthcare access and emergency response.
- Enhances connectivity and market access, hence augmenting the employment and economy of State.
- Supports local businesses and increases income.
- Reduction in time of planning of health care facilities, access to roads, and allocation of resources



- *Fig 1: Region of Interest – Orchha Tehsil, Narayanpur District*

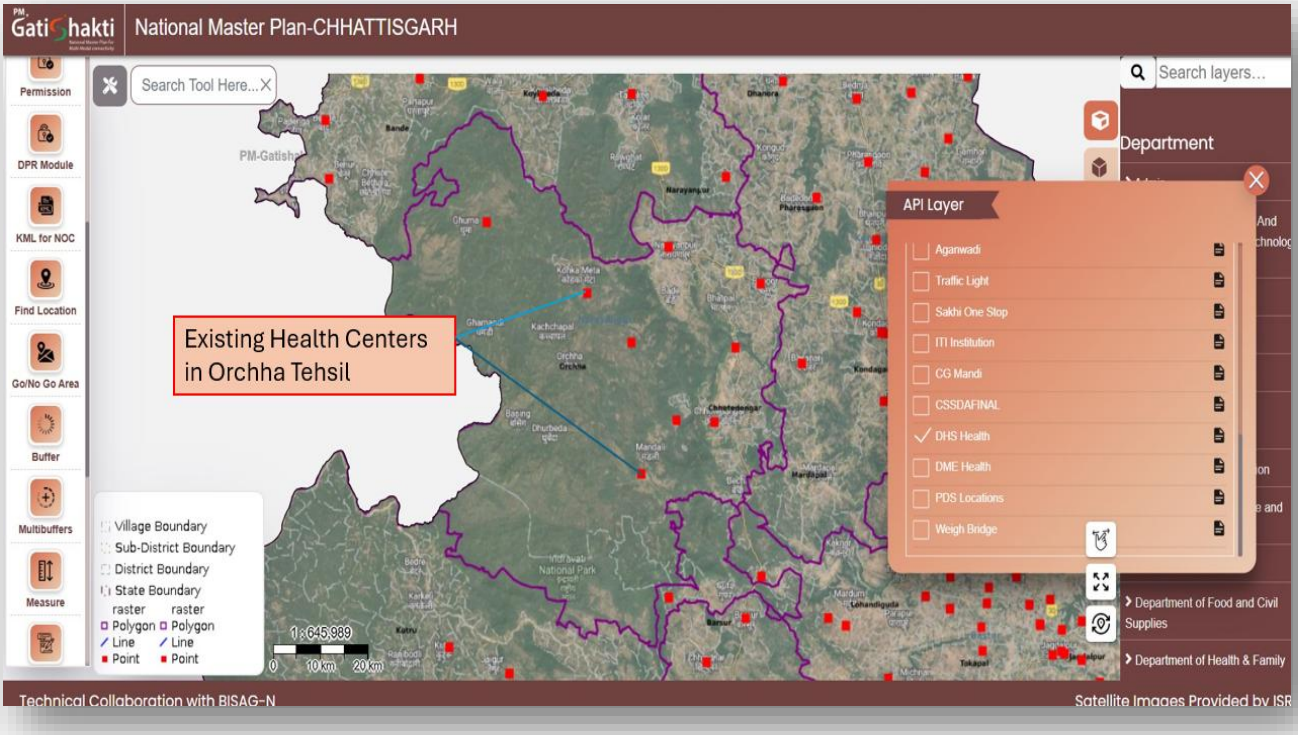


Fig 2: Existing Health Centre

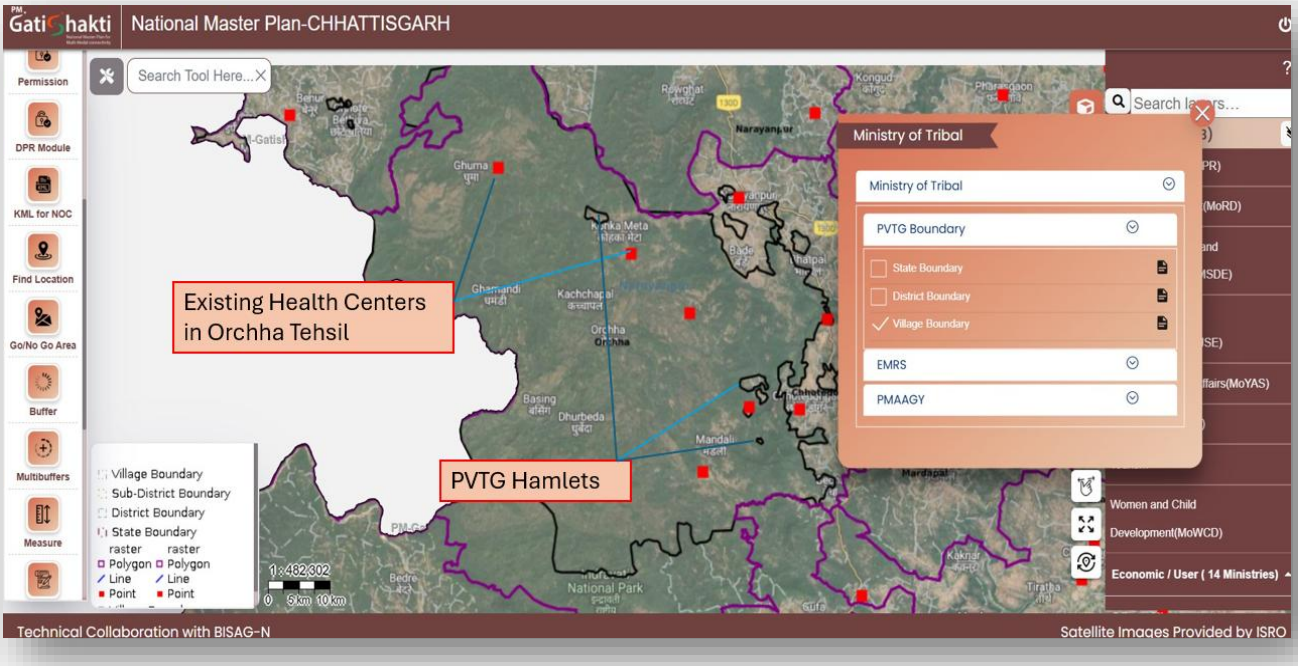


Fig 3: PVTG Hamlets and Existing Centres

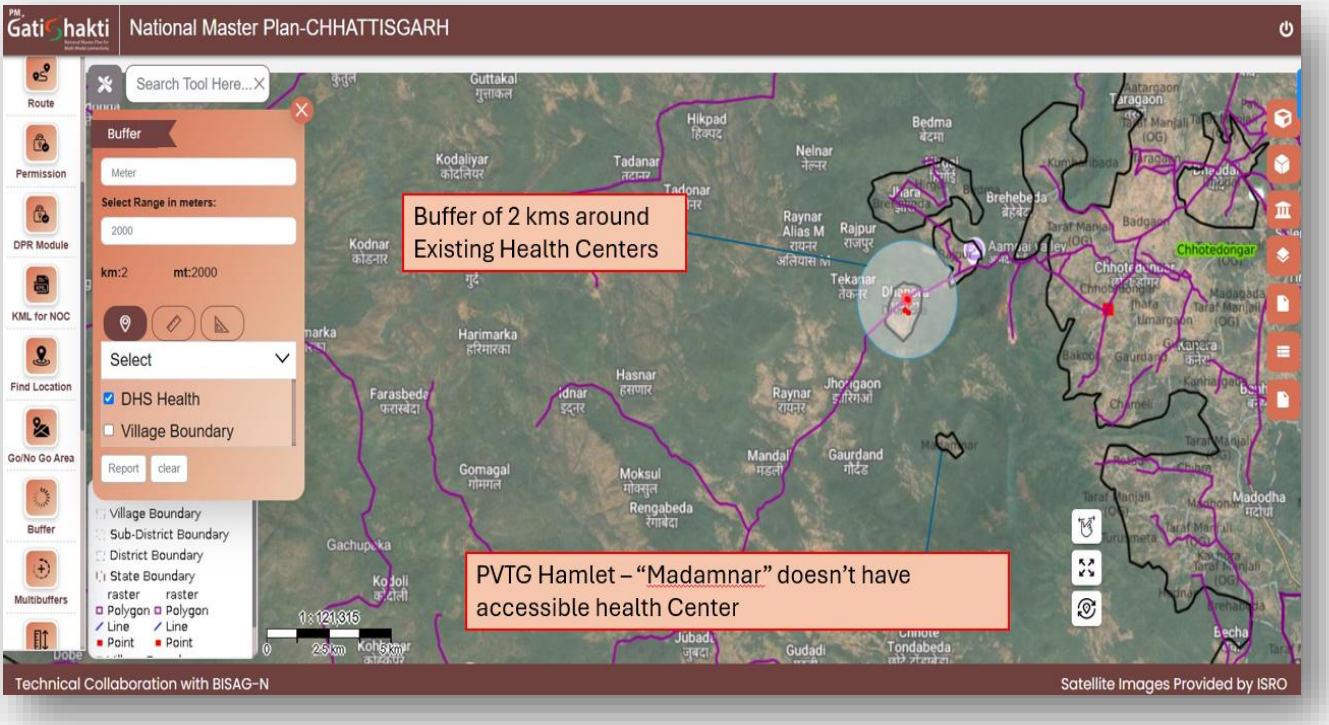


Fig 4: PVTG of Interest – Madamnar with no accessible Health Centre - 2 Km Buffer using Buffer tool.

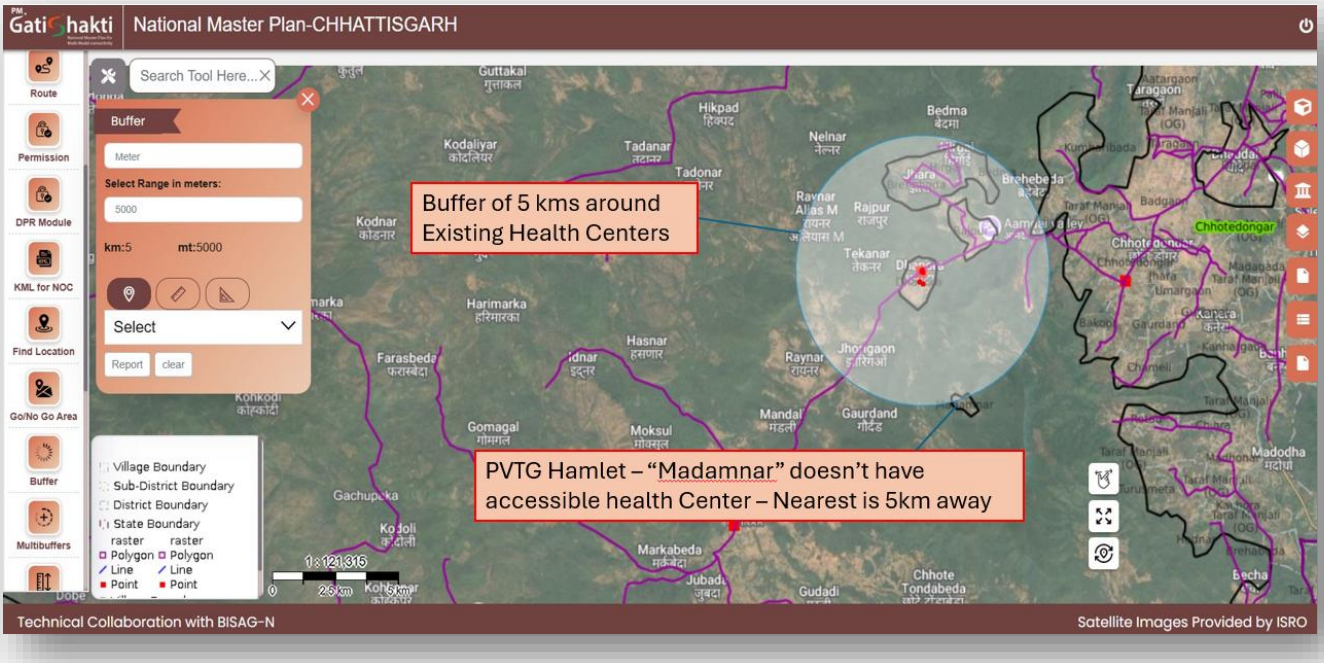


Fig 5: Madamnar PVTG is 5km away from nearest Health Centre -- 5 Km Buffer using Buffer tool.

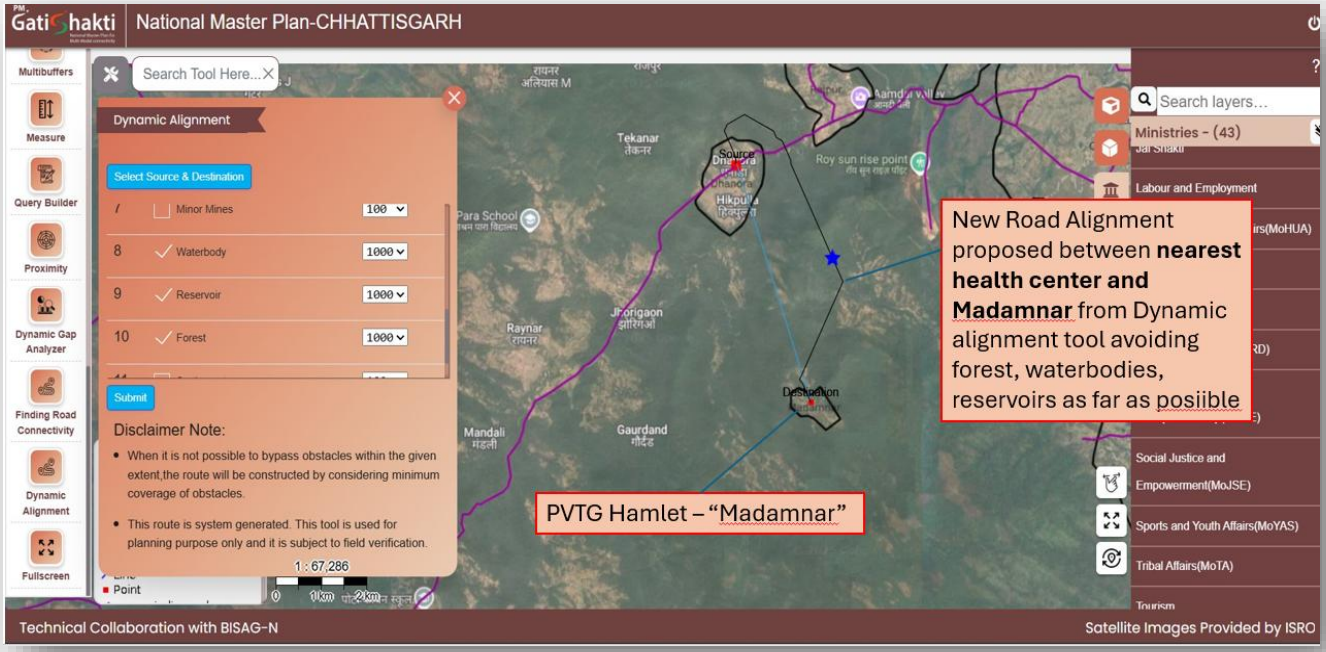


Fig 6: Using Dynamic alignment tool, Green field Road alignment is suggested between PVTG Madamnar and nearest health centre avoiding Forest, Water Bodies, Reservoirs and sanctuaries.

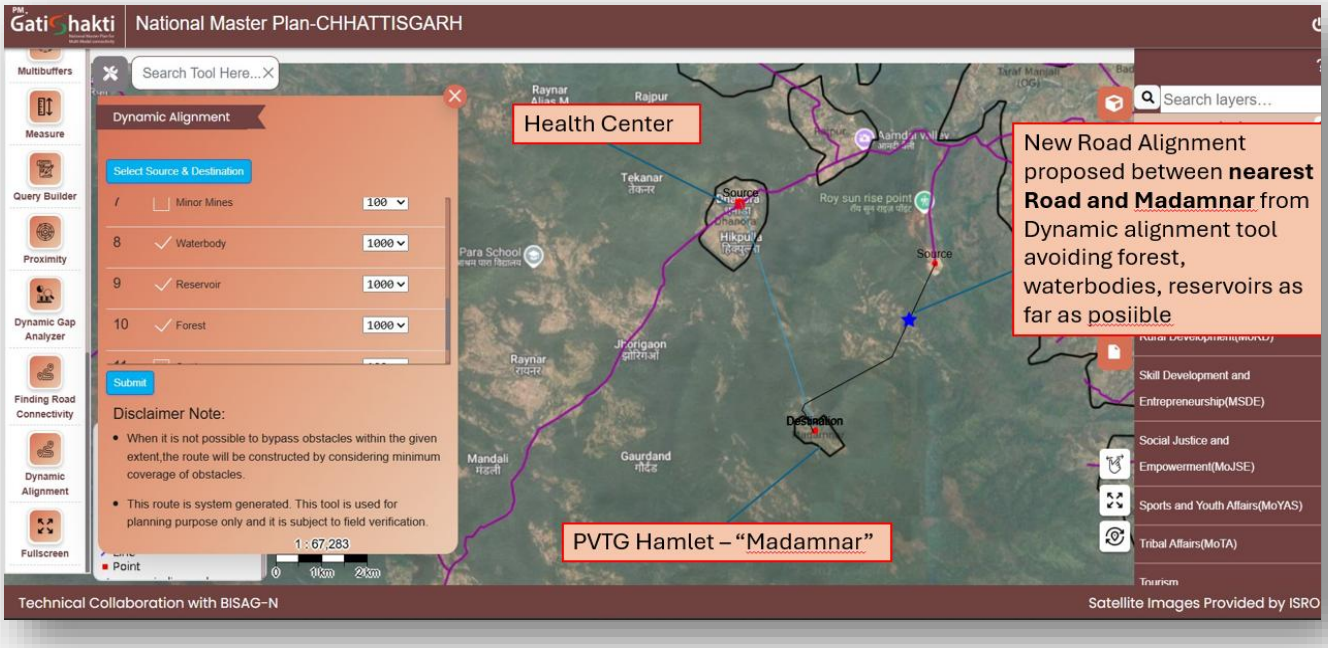


Fig 7: Using Dynamic alignment tool, green field Road alignment is suggested between PVTG Madamnar and nearest PMGSY Road avoiding Forest, Water Bodies, Reservoirs and sanctuaries

Use Case 2- Identification of potential area for planning for new Park/Gardens locations

Project Brief:

Raigarh district, situated in the easternmost part of Chhattisgarh, features a diverse landscape ranging from forested plateaus in the north to open plains in the south. Leveraging this natural diversity, a targeted approach was adopted to identify potential areas for developing new parks and gardens. The aim is to enhance social infrastructure, promote urban liveability, and create green spaces that contribute to ecological balance and community well-being.

Problem Statement:

Raigarh district, with its evolving urban centres and expanding rural settlements, has significant scope for improving basic amenities such as parks and gardens. Despite the rich natural backdrop, there exists a gap in planned recreational spaces, especially in rapidly growing urban residential clusters. Strategically planning for parks and gardens will foster a healthier environment and improve the overall quality of life for residents.

Usage of PMGS SMP Plan:

The PM GatiShakti platform's *Dynamic Gap Analyser* tool was utilized to identify priority areas for park development:

- A buffer range of 5000 meters was applied to analyze settlement clusters.
- Villages with a population of over 2000 were selected based on demographic data.
- The tool automatically identified villages exceeding the population criteria but lacking existing park or garden infrastructure.
- Further, downloadable tabular reports were generated to facilitate micro-level planning and decision-making by local authorities.

Through this analytical approach, targeted interventions for green infrastructure development were effectively planned to address existing gaps.

Expected Benefit:

- Enables data-driven planning for new parks and gardens aligned with population needs.
- Improves urban livability and ecological balance through the strategic development of green spaces.
- Promotes community well-being by ensuring equitable access to recreational amenities.
- Facilitates comprehensive social infrastructure development by addressing spatial gaps.
- Reduces planning time significantly by automating site identification using GIS-based tools.

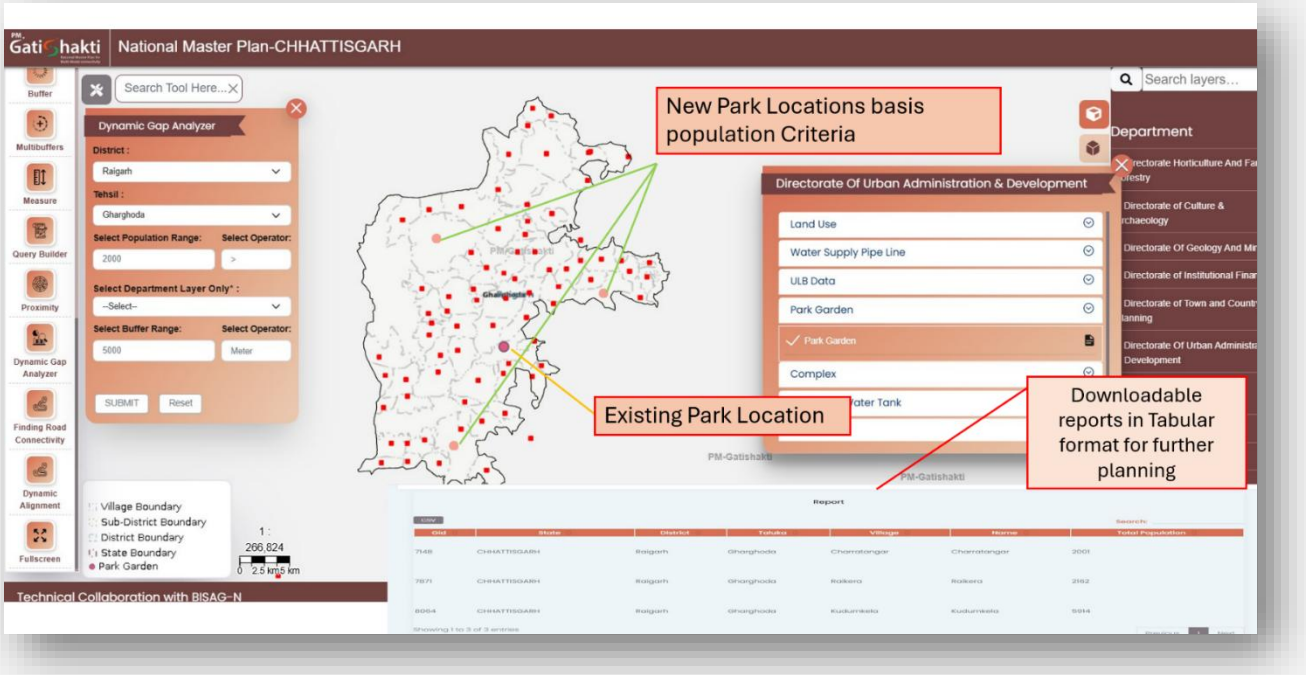


Fig 1: Identification of new park locations based on population criteria using Dynamic Gap Analyser tool for Raigarh District.

Use Case 3- Identification of Unserved Villages for New District Health Centres (DHS) in Bastar District, Chhattisgarh

Project Brief:

Bastar district, located in the southern region of Chhattisgarh, is characterized by a scattered settlement pattern and challenging terrain. Ensuring equitable access to healthcare services is critical for this tribal-dominated district. A focused initiative was undertaken to identify unserved villages that require the establishment of new District Health Centres (DHS) to strengthen healthcare accessibility in remote areas.

Problem Statement:

The vast geographical spread and dispersed population clusters in Bastar district create significant challenges in healthcare service delivery. Many villages remain underserved, located far from existing DHS facilities. Addressing this gap by scientifically identifying and planning new health centres is essential for promoting inclusive healthcare access and improving health outcomes in the district.

Usage of PMGS SMP Plan:

- The *Dynamic Gap Analyser* tool under the PM GatiShakti National Master Plan (NMP) was utilized to identify priority villages for healthcare interventions:
- **District:** Bastar; **Block:** Lohandiguda.
- A **population threshold of >1500 people** was applied to select villages with significant service demand.

- A **buffer range of 5 kilometers** was set around existing District Health Centers to detect villages located beyond this coverage radius.
- Villages fulfilling both criteria—population above 1500 and situated more than 5 km away from an existing DHS—were flagged as **unserved villages**.
- This approach enabled focused identification of healthcare infrastructure gaps using demographic and spatial data analytics.

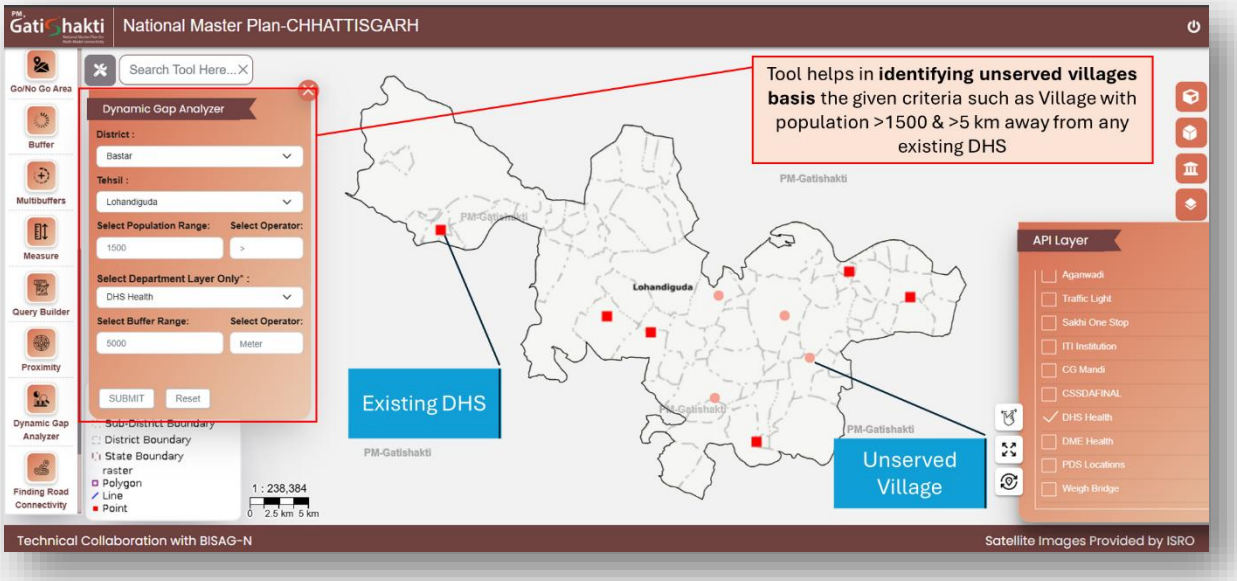


Fig 1: Identification of unserved villages for planning new District Health Centres (DHS) using Dynamic Gap Analyser tool for Lohandiguda Block, Bastar District.

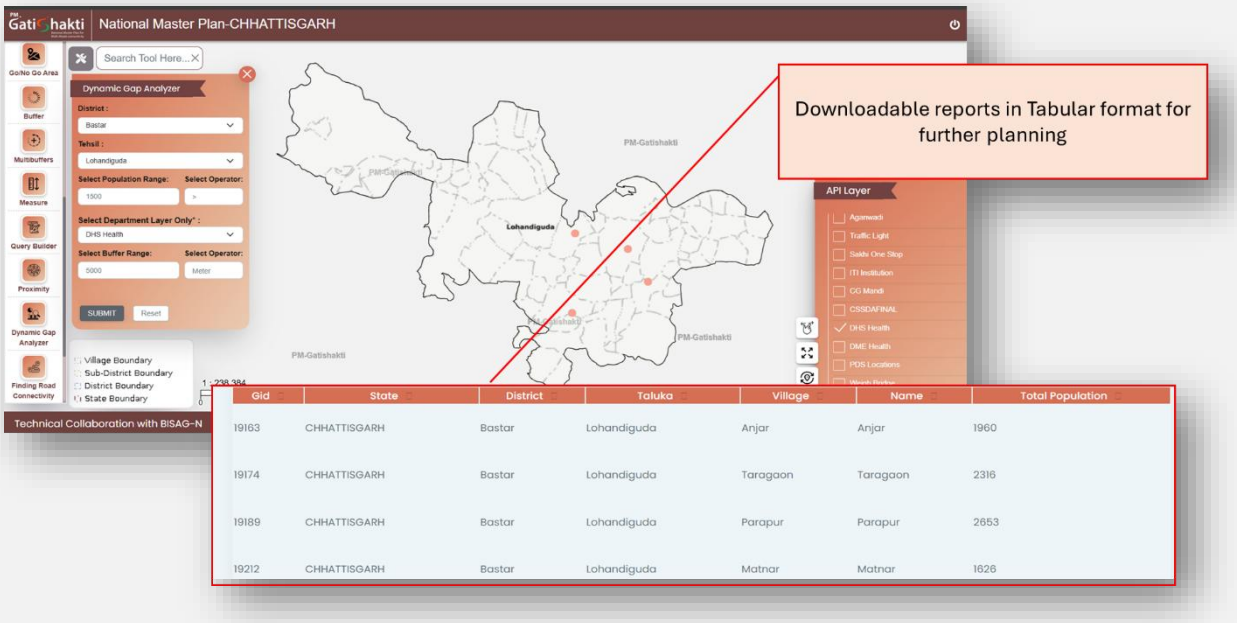


Fig 2: Functionality of downloading the report in tabular format.

Expected Benefit:

- Facilitates targeted healthcare infrastructure planning in underserved regions.
- Improves healthcare accessibility for rural and tribal populations.
- Supports data-driven decision-making using GIS-based dynamic gap analysis.
- Reduces service delivery inequities by bridging physical access gaps to healthcare facilities.
- Promotes comprehensive and inclusive health development in backward regions like Bastar.

Use Case 4- Identification of Habitations Without Last Mile Road Connectivity in Bijapur District, Chhattisgarh

Project Brief:

Bijapur district, located in the southern tip of Chhattisgarh, faces significant challenges in providing robust infrastructure due to its difficult terrain and dispersed settlements. Strengthening road connectivity to remote habitations is crucial for improving accessibility, enabling social service delivery, and fostering inclusive development. A focused initiative was undertaken to identify habitations lacking adequate road connectivity.

Problem Statement:

The scattered habitation pattern across Bijapur district has resulted in several villages being disconnected from the main road network, limiting access to essential services. Addressing these last-mile connectivity gaps is critical for social, economic, and infrastructure development. Prioritizing road connectivity interventions will enhance mobility, accessibility to health and education services, and promote economic activities in remote areas.

Usage of PM GatiShakti NMP (GIS Operation):

The *Finding Road Connectivity* tool on the PM GatiShakti platform was used to systematically identify habitations needing road connectivity:

- **District:** Bijapur; **Block:** Bhairamgarh.
- Focused on **Habitation** as the area of interest.
- Selected **Road Network (DRRP)** as the existing road layer for analysis.
- A **buffer range of 1000 meters** was set to identify habitations located beyond 1 km from the nearest road.
- The tool generated **tabular reports** listing unconnected habitations for further targeted planning.

This GIS-based approach enabled data-driven prioritization of habitations requiring new road linkages.

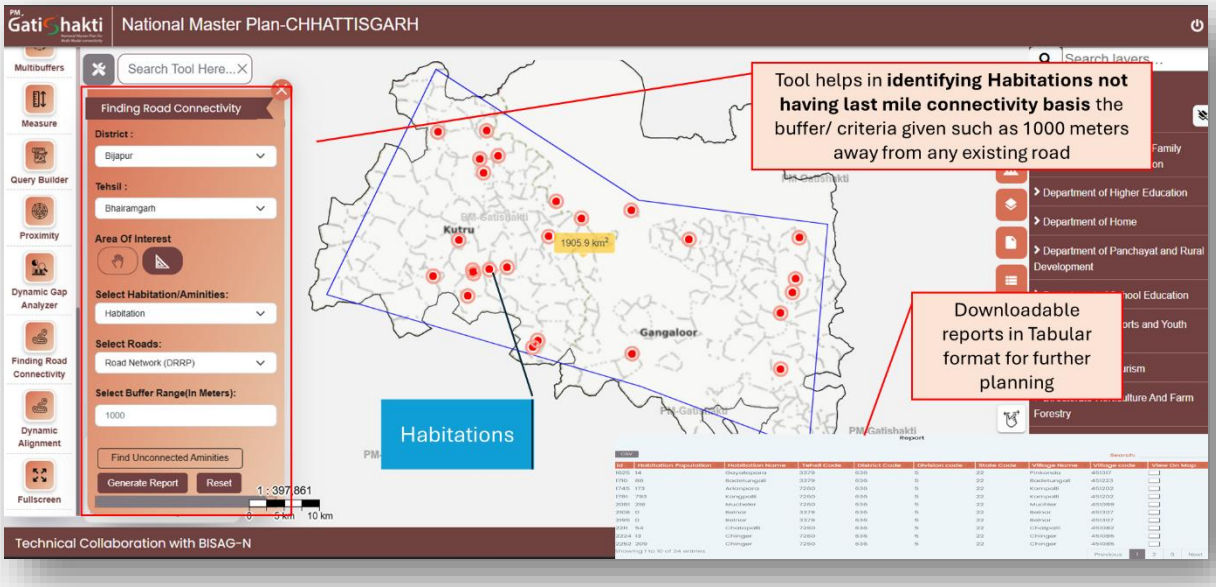


Fig 1: Identification of habitations without last-mile road connectivity using Finding Road Connectivity tool for Bhairamgarh Block, Bijapur District

Expected Benefit:

- Enables **targeted infrastructure planning** to address critical road connectivity gaps.
- Promotes **inclusive development** by linking remote habitations to essential services.
- Supports **efficient project planning** through GIS-enabled automated analysis and reporting.
- Improves **economic integration** of remote villages by enhancing market access and mobility.
- Facilitates **accelerated rural development** through strategic investments in road infrastructure.

Use Case 5- Identification of Anganwadis Without Last mile Road Connectivity in Bijapur District, Chhattisgarh

Project Brief:

Bijapur district in southern Chhattisgarh is marked by remote settlements and sparse road networks, posing challenges for service delivery, particularly to children and mothers through Anganwadi centers. Enhancing road connectivity to Anganwadi centers is crucial to ensure access to nutrition, education, and healthcare services for rural communities. A focused GIS-based study was carried out to identify Anganwadis lacking last-mile connectivity.

Problem Statement:

Anganwadi centers serve as critical community institutions for child development and maternal health in rural India. However, in Bijapur district, many Anganwadis are located far from existing road networks, hindering effective service delivery. Planning and executing targeted connectivity

improvements are vital to strengthen the Anganwadi network and promote inclusive growth in rural areas.

Usage of PM GatiShakti NMP (GIS Operation):

The *Finding Road Connectivity* tool on the PM GatiShakti platform was deployed for this analysis:

- **District:** Bijapur; **Block:** Bhairamgarh.
- Selected **Anganwadi** as the area of interest under habitation/amenities.
- Used the **Road Network (DRRP)** layer as the baseline road infrastructure.
- Applied a **buffer distance of 500 meters** to detect Anganwadi centers located beyond 500 meters from any existing road.
- Generated **downloadable reports in tabular format** for further micro-level intervention planning.

This GIS-based assessment provided a data-driven foundation for improving Anganwadi accessibility in the district.

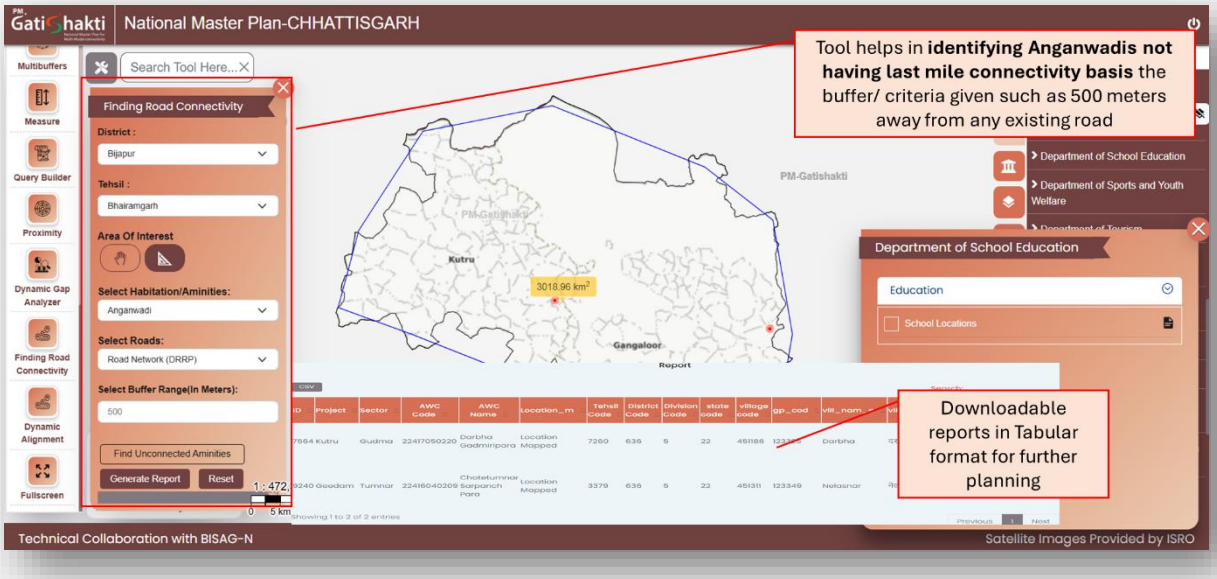


Fig 1: Identification of Anganwadis without last-mile road connectivity using Finding Road Connectivity tool for Bhairamgarh Block, Bijapur District.

Expected Benefits:

- Enables **targeted infrastructure development** to connect Anganwadi centers efficiently.
- Strengthens **childcare and maternal health service delivery** through improved accessibility.
- Facilitates **data-driven decision making** and project prioritization.
- Enhances **social inclusion** by bridging infrastructure gaps in rural and tribal areas.
- Supports **early childhood development initiatives** by ensuring easy access to Anganwadi services.

Use Case 6- Identification of Gaps in Godown Infrastructure Around Premnagar, Chhattisgarh

Project Brief:

Premnagar, located in Surajpur District in northern Chhattisgarh, holds strategic importance for agricultural and food supply chain logistics. Ensuring optimal storage capacity within accessible distances is vital for minimizing post-harvest losses and improving distribution efficiency. A spatial analysis was carried out to identify gaps in godown infrastructure around Premnagar to support informed decision-making for new godown planning.

Problem Statement:

Efficient warehousing and godown facilities are critical for food security, especially in agriculture-dependent regions like Premnagar. However, preliminary observations revealed that certain key areas may lack adequate storage infrastructure within reasonable proximity. Systematic identification of such gaps is necessary to strengthen the supply chain, reduce logistical costs, and support farmers and traders in the region.

Usage of PM GatiShakti NMP (GIS Operation):

The *Dynamic Multi Buffer* tool on the PM GatiShakti platform was employed to perform gap analysis for godown locations:

- **Point of Interest:** Premnagar, Surajpur Dist.
- **Existing Layer:** Godown locations mapped under Chhattisgarh Warehousing Corporation Ltd.
- **Buffer Ranges:** 5 km, 10 km, and 15 km were drawn around Premnagar.
- The analysis showed that **no existing godowns** were present within the specified buffer distances from Premnagar.
- A **Multi Buffer Count Report** was generated for quick reference and planning.

This GIS-based analysis provided a clear identification of the gap in storage infrastructure around Premnagar.

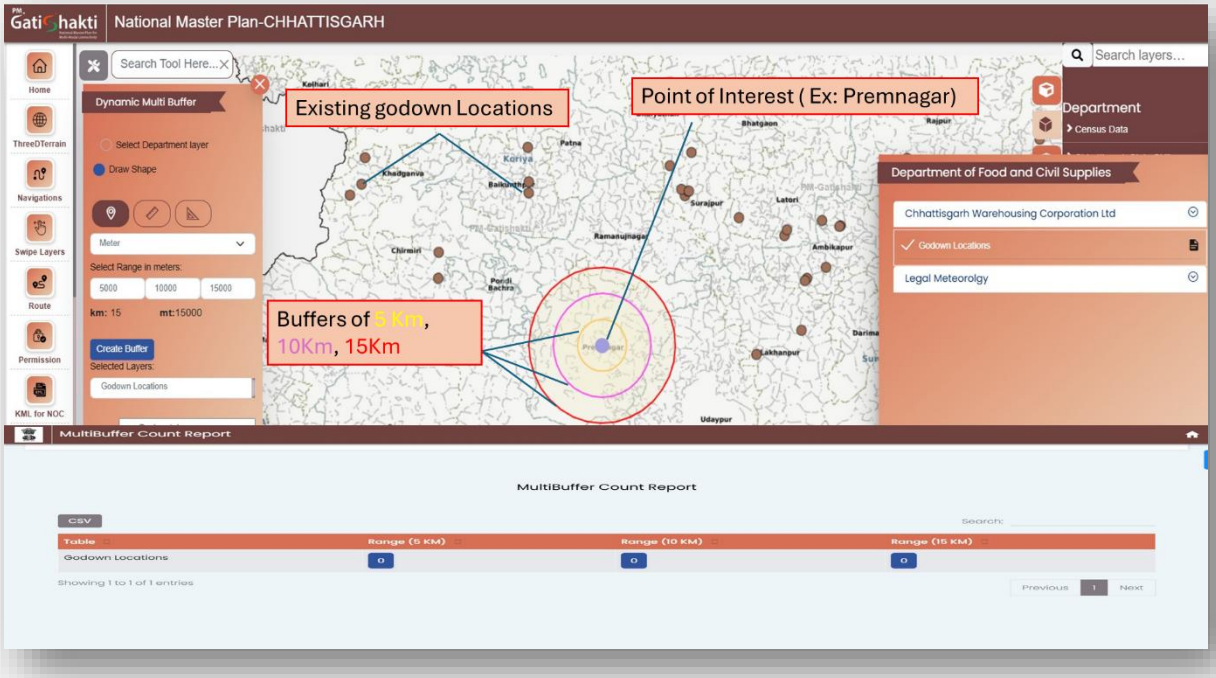


Fig 1: Gap analysis for godown infrastructure around Premnagar using Dynamic Multi Buffer tool.xxxxxq

Expected Benefit:

- Enables **evidence-based planning** for establishing new godown facilities.
- Improves **supply chain efficiency** by reducing transportation time and costs.
- Strengthens **post-harvest management** and reduces storage-related crop losses.
- Supports **farmers and traders** through better access to warehousing infrastructure.
- Facilitates **infrastructure development planning** through spatial data-backed decision-making.

Use Case 7: Identification of Unsuitable Liquor Shop Locations in Raipur, Chhattisgarh

Project Brief:

In urban areas like Raipur, the location of liquor shops in close proximity to sensitive public institutions such as schools, hospitals, and police stations can pose social and legal challenges. A digital intervention was designed to support regulatory compliance and planning by mapping and analyzing the spatial placement of liquor shops relative to key public amenities.

Problem Statement:

Despite existing norms, liquor shops are sometimes located within close range of schools, hospitals, and other sensitive facilities, creating public nuisance or violating zoning laws. Manual monitoring is inefficient and reactive. There is a need for a spatial planning tool that helps authorities proactively identify and regulate unsuitable liquor shop locations based on proximity thresholds.

Usage of PM GatiShakti / CGCOG Geo-Portal (GIS Operation):

The *Proximity Analysis Tool* in the Chhattisgarh Geo-Portal was used to identify liquor shop locations that violate minimum distance regulations:

- **District:** Raipur; **Tehsil:** Raipur.
- **Category Selected:** Liquor.
- A **buffer radius of 200 meters** was applied around liquor shops.
- Layers of **schools, hospitals, health centers, and police stations** were selected to assess nearby sensitive infrastructure.
- The map analysis clearly highlighted liquor shop locations falling within restricted buffer zones.
- This enables **evidence-based zoning enforcement** by local authorities.

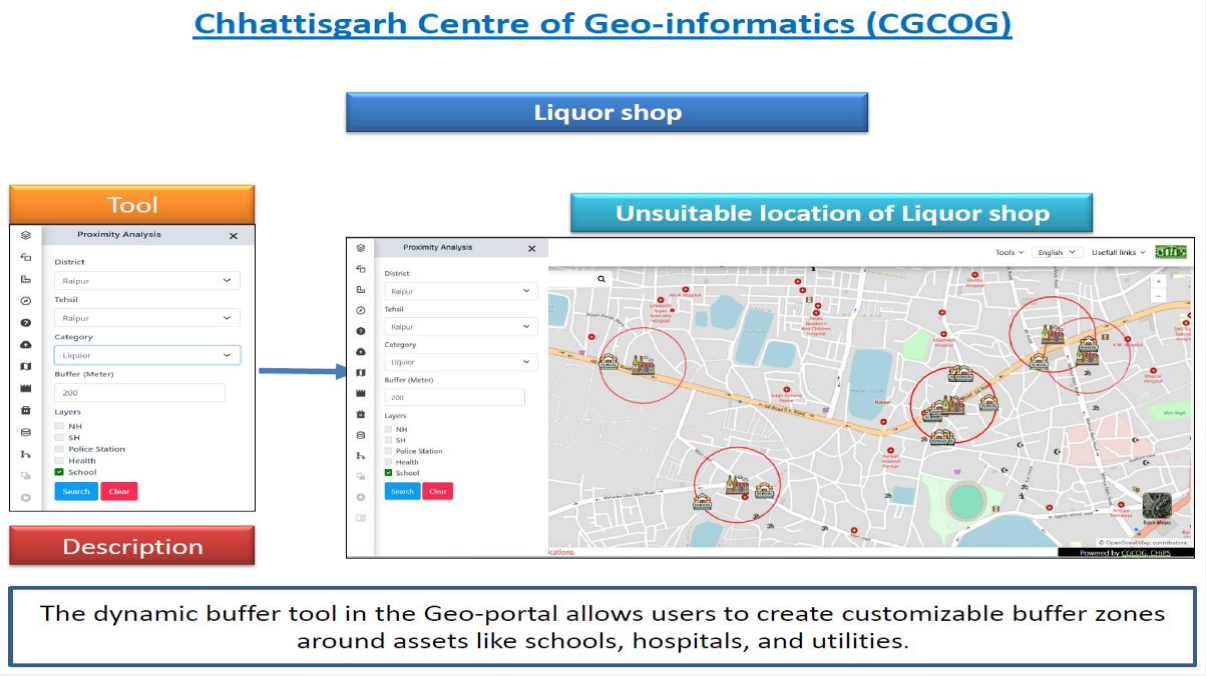


Figure 1: *Identification of unsuitable liquor shop locations in Raipur using Proximity Analysis Tool with 200-meter buffer zone.*

Expected Benefit:

- Enables **proactive identification** of liquor shop locations that violate spatial norms.
- Strengthens **urban regulatory compliance** and zoning enforcement.
- Enhances **public safety and community well-being** by discouraging unsuitable commercial activities near sensitive areas.
- Supports **e-governance and data-backed decision-making** by urban planning and excise departments.
- Allows for **customizable proximity analysis** based on dynamic buffer inputs.

Use Case 8: Gap Analysis of School Locations in Bastar District, Chhattisgarh

Project Brief:

Bastar district, known for its scattered settlements and difficult terrain, often faces challenges in ensuring equitable access to basic education infrastructure. This use case aimed to identify gaps in school coverage and detect uncovered habitations using spatial proximity analysis, supporting evidence-based planning for establishing new schools.

Problem Statement:

Despite the presence of schools in many areas, several habitations in Bastar remain outside the accessible range of educational facilities, especially in remote rural pockets. These coverage gaps hinder efforts to achieve universal access to education. Addressing them requires a targeted approach using spatial tools to identify underserved areas.

Usage of PM GatiShakti / CGCOG Geo-Portal (GIS Operation):

The *Proximity Analysis* tool available on the Chhattisgarh Geo-Portal was employed for school location gap analysis:

- **District:** Bastar; **Tehsil:** Bastar.
- **Category Selected:** School.
- A **buffer of 500 meters** was applied to assess proximity from school locations.
- Layers including **habitations, NH/SH roads, health centers, and police stations** were used to contextualize planning.
- The tool visually and spatially identified **habitations falling outside the defined proximity range**, highlighting areas requiring school infrastructure.

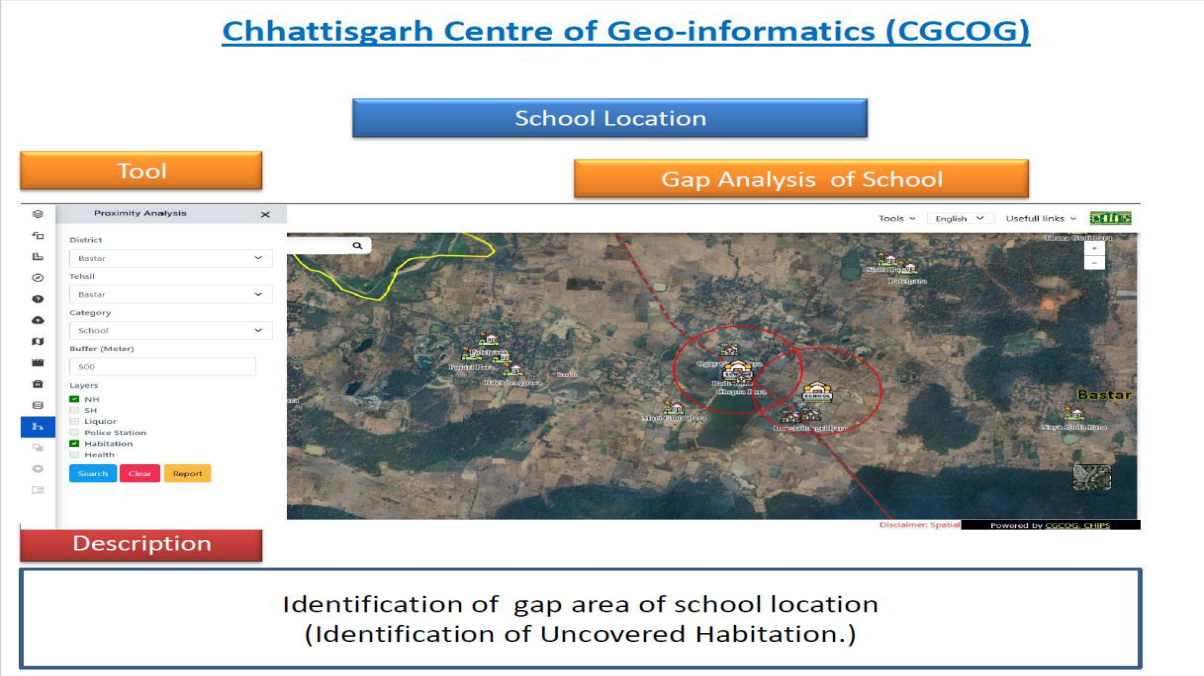


Figure 1: *Identification of uncovered habitations for school infrastructure using Proximity Analysis Tool in Bastar District.*

Expected Benefit:

- Supports **data-driven education infrastructure planning** in remote and tribal regions.
- Helps identify **habitations without nearby school access** to prioritize new school establishment.
- Promotes **inclusive and equitable education** through spatial analysis of service coverage.
- Reduces **planning and survey time** using automated proximity-based analysis.
- Strengthens **policy interventions for universal access to education** in underserved areas.

Use Case 9: Identification of Health Facilities Near National and State Highways (NH/SH) in Raipur District, Chhattisgarh

Project Brief:

Ensuring the presence of health infrastructure near key transport corridors such as National Highways (NH) and State Highways (SH) is critical for emergency response, accident care, and medical accessibility for travelers. This analysis focuses on identifying the location of health centers along NH/SH routes in the Kharora tehsil of Raipur district to support emergency planning and road safety.

Problem Statement:

Highway corridors often experience frequent accidents and health emergencies, but not all sections are adequately supported with nearby medical facilities. A lack of health infrastructure within accessible range of highways can delay emergency response and compromise survival outcomes. Hence, identifying health centers near NH/SH routes is essential for informed infrastructure development and public safety planning.

Usage of PM GatiShakti / CGCOG Geo-Portal (GIS Operation):

The *Proximity Analysis* tool of the Chhattisgarh Geo-Portal was used for this analysis:

- **District:** Raipur; **Tehsil:** Kharora.
- **Category Selected:** NH (National Highways).
- A **buffer of 500 meters** was applied around the highway routes.
- Layers for **SH (State Highways)** and **Health centers** were activated.
- The tool helped visualize and locate **health facilities falling within or outside the buffer zone**, enabling targeted planning for highway-side emergency health infrastructure.

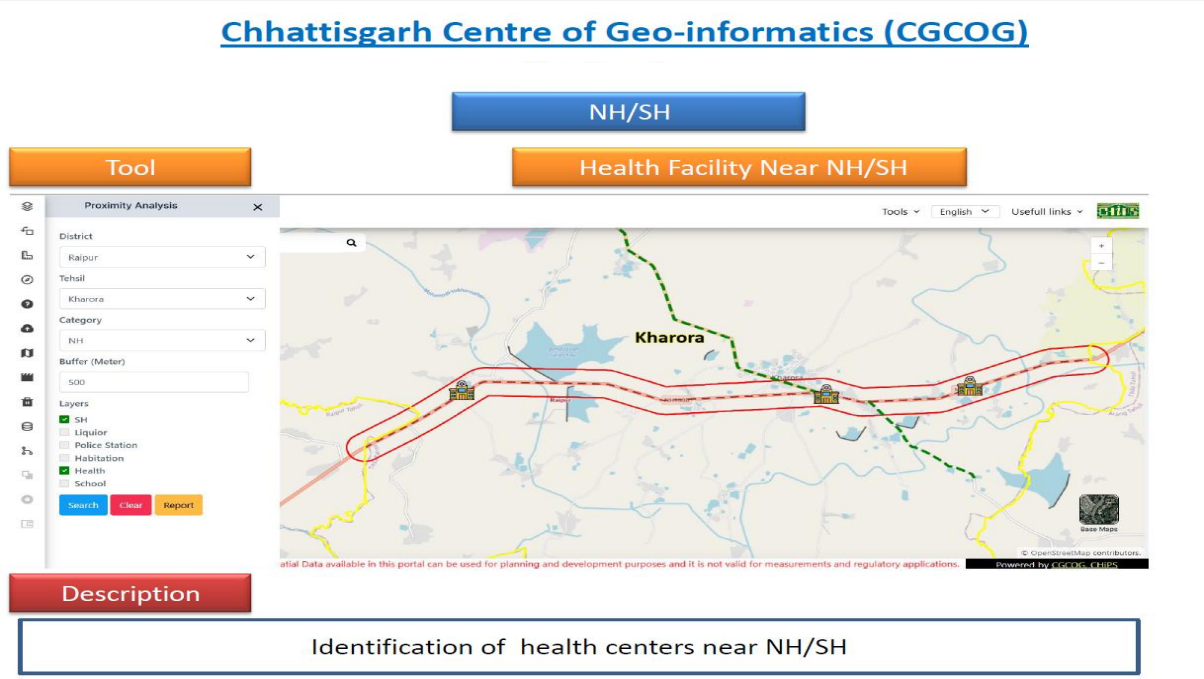


Figure 1: *Identification of health centers near NH/SH corridors using Proximity Analysis Tool in Kharora Block, Raipur District.*

Expected Benefit:

- Facilitates **emergency health infrastructure planning** along highways.
- Enhances **road safety and medical response** capabilities during accidents or crises.
- Supports **data-driven siting of new health facilities** based on proximity to major traffic routes.
- Enables **transport and health department coordination** using shared GIS insights.
- Improves **service accessibility for travelers and remote communities** situated near highways.

Use Case 10: Identification of Habitations Without Anganwadi Facilities in Kanker District, Chhattisgarh

Project Brief:

Charama block in Kanker district of Chhattisgarh consists of multiple small habitations where access to basic services like Anganwadis is essential for delivering early childhood care and nutrition. The aim of this analysis was to identify habitations that fall outside the influence area of existing Anganwadi centers using buffer-based GIS tools for targeted planning.

Problem Statement:

Many habitations in tribal and rural regions like Charama lack proper access to Anganwadi services, which impedes delivery of nutrition, preschool education, and health services to children and mothers. Identifying these gaps spatially is crucial for effective intervention and infrastructure expansion.

Usage of PM GatiShakti / CGCOG Geo-Portal (GIS Operation):

The *Proximity Analysis* tool of the Chhattisgarh Geo-Portal was used to detect service gaps in Anganwadi coverage:

- **District:** Kanker; **Tehsil:** Charama.
- **Category Selected:** Aanganwadi.
- A **buffer distance of 2000 meters** was applied to each Anganwadi center to identify their area of influence.
- The **Habitation layer** was activated to visualize which habitations fall outside these buffer zones.
- The result highlights **uncovered habitations** which can be prioritized for the establishment of new Anganwadi centers.

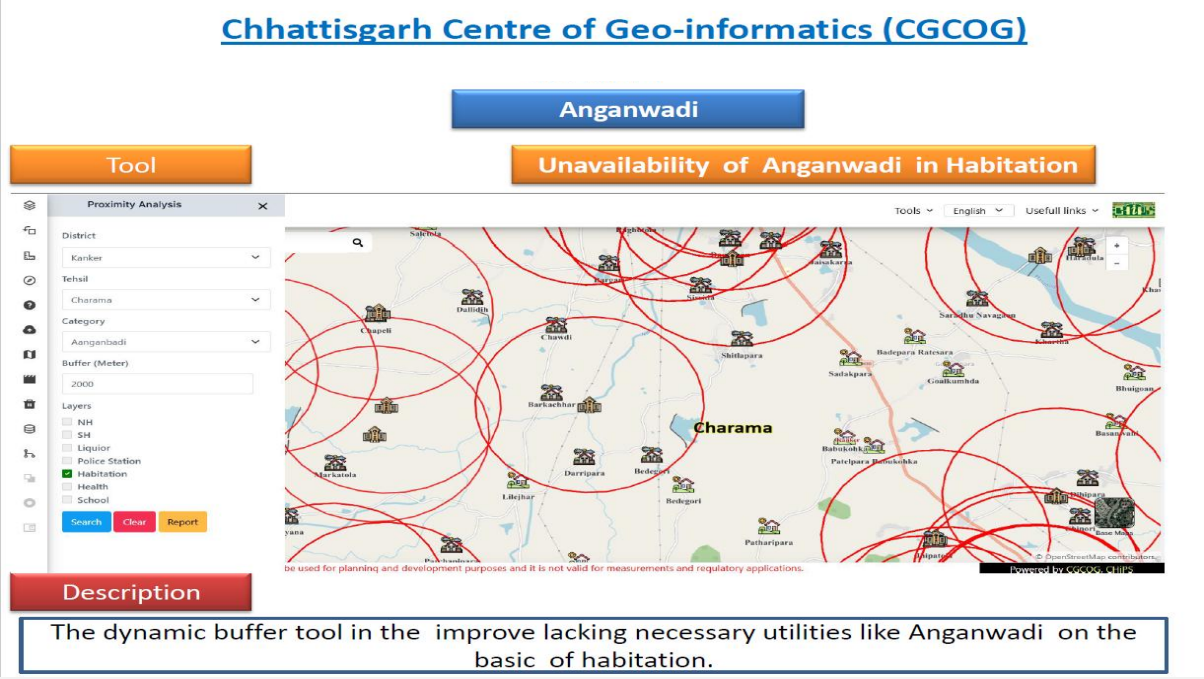


Figure 1: *Identification of habitations without Anganwadi facilities using Proximity Analysis Tool in Charama Block, Kanker District.*

Expected Benefit:

- Helps **identify underserved habitations** in need of Anganwadi services.
- Promotes **child nutrition and early education** access in rural and tribal areas.
- Supports **micro-level planning** for ICDS infrastructure expansion.
- Reduces **manual surveys and delays** by providing real-time geospatial analysis.
- Enables **targeted policy intervention** using proximity and demographic insights.

Use Case 11: Identification of Mason Requirements at Gram Panchayat Level Using PMAY-G Planning Portal in Chhattisgarh

Project Brief:

The Pradhan Mantri Awas Yojana–Gramin (PMAY-G) aims to provide housing for all in rural India. Execution of this mission requires timely availability of skilled manpower, especially masons. The PMAY-G Planning Portal, powered by the Chhattisgarh Centre of Geo-Informatics (CGCOG), enables effective workforce planning by mapping mason demand across Gram Panchayats (GPs) in the State.

Problem Statement:

Construction under PMAY-G often faces delays due to mismatch in supply and demand of skilled workers, particularly masons. Traditional approaches to estimating workforce requirements at the Panchayat level lack precision. A GIS-based digital solution was needed to visualize real-time demand and plan targeted skilling or deployment.

Usage of PMAY-G Planning Portal (GIS Operation):

The *GRIHA (GIS Planning for Rural Infrastructure in Housing) Portal* was leveraged to analyze Gram Panchayat-wise demand for masons:

- Panchayats were color-coded by **mason requirement levels**:
    - Green: 0–50
    - Yellow: 51–75
    - Orange: 76–100
    - Red: 100+
- The portal aggregates live field data and displays spatial clusters where mason shortages exist.
- Additional layers such as **banks and suppliers** were included to aid in logistics and payment planning.
- This geospatial visualization aids the Panchayat & Rural Development Department in **demand forecasting and workforce allocation**.

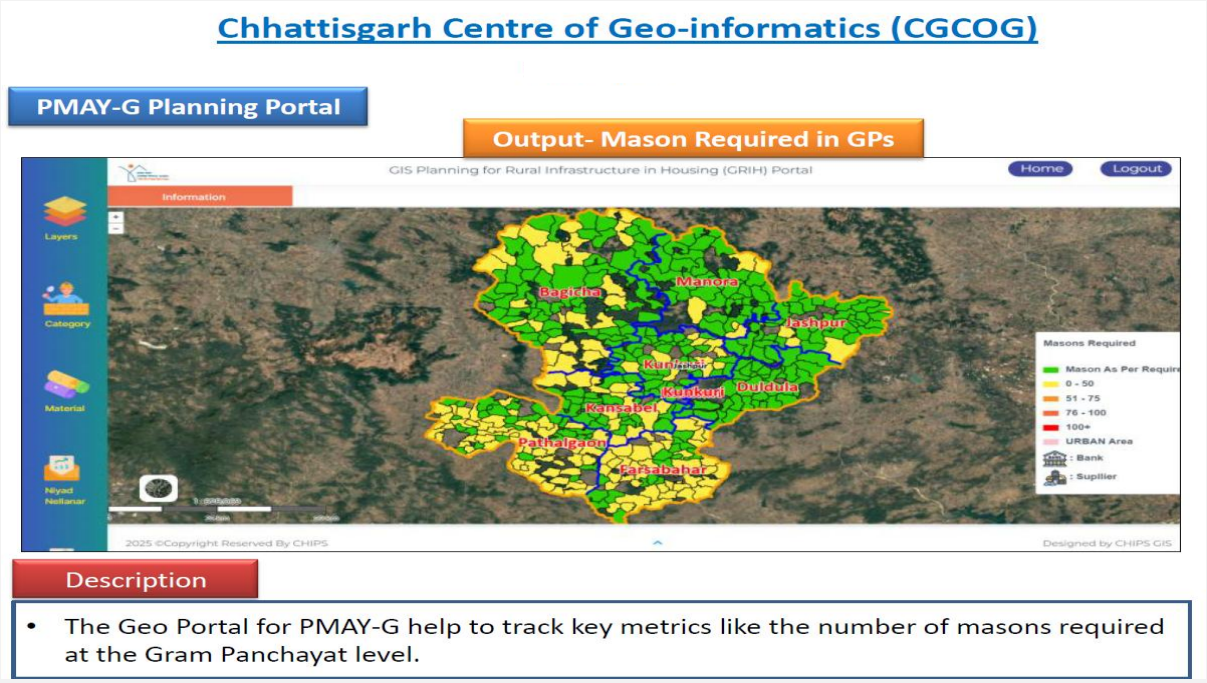


Figure 1: *Gram Panchayat-wise identification of mason requirement using PMAY-G GIS Portal.*

Expected Benefit:

- Provides **real-time visibility** of workforce gaps across rural areas.
- Helps in **efficient mason deployment and skilling program design**.
- Reduces construction delays under PMAY-G through **demand-aligned manpower planning**.
- Facilitates **targeted intervention at Gram Panchayat level** with high granularity.
- Supports **integrated rural housing execution** using GIS-based decision-making.

Use Case 12: Government Land Identification and Planning in Mahasamund District, Chhattisgarh

Project Brief:

Optimal utilization of government land is key for planning future development projects, such as public infrastructure, schools, hospitals, or industrial zones. Identifying available government land parcels with precise geospatial references can significantly streamline decision-making. This use case demonstrates how to locate and visualize government land patches at the village level using the Chhattisgarh Geo-Portal.

Problem Statement:

Government land records are often fragmented, unverified, or scattered across departments. This lack of clarity creates obstacles in project planning, land allocation, and timely approvals. A GIS-based solution is required to **quickly identify, verify, and visualize** available government land within specific administrative boundaries.

Usage of CGCOG Geo-Portal (GIS Operation):

The *Govt. Land Patch Analysis* module in the portal was used to navigate and analyze government land parcels:

- **District:** Mahasamund; **Tehsil:** Mahasamund; **Village:** Mongra.
- The system allows users to input the village and instantly retrieves spatially tagged government land patches.
- Land parcels are displayed on satellite basemaps with **distinct outlines and Khasra numbers** for reference.
- The tool enables rapid ground verification and supports **planning for land allotment and development**.

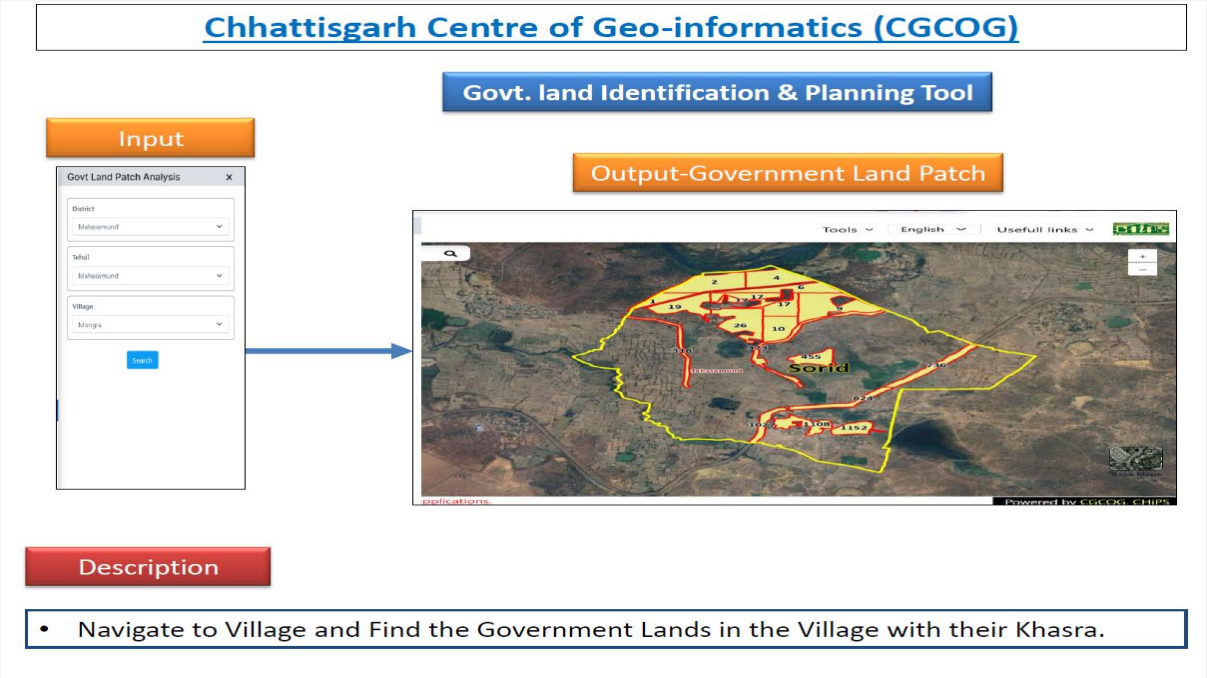


Figure 1: *Identification of government land patches with Khasra details using the Govt. Land Patch Analysis tool in Mongra village, Mahasamund District.*

Expected Benefit:

- Provides **easy access to verified government land data** with geospatial references.
- Enables **rapid land availability assessment** for infrastructure, industrial, or welfare projects.
- Helps **avoid disputes or delays** by clearly identifying public land and its boundaries.
- Supports **digitized, transparent planning** across departments such as Revenue, Industry, and Panchayat.
- Aids in **land bank creation and monitoring** at the village and district levels

Use Case 13: Identification of Potential Locations for Solar Parks

Project Brief:

Chhattisgarh has significant potential for harnessing solar energy, especially in regions with vast stretches of barren or underutilized land. To support the state's commitment to renewable energy and sustainable infrastructure development, a data-driven approach was undertaken to identify suitable sites for developing solar parks by leveraging spatial layers and GIS tools under the PM Gati Shakti NMP portal.

Problem Statement:

Although several solar installations (rooftop and ground-mounted) are already operational across Chhattisgarh, there is a need to expand this network strategically. Identifying optimal locations for new solar parks requires detailed spatial analysis, considering land availability, solar potential, existing infrastructure, and environmental constraints. Without such data-backed planning, investments in renewable energy can face inefficiencies and land-use conflicts.

Usage of PM GatiShakti NMP (GIS Operation):

Layers Used:

- Existing Solar Projects (Rooftop, Ground Mounted)
- Solar Potential Map
- Administrative Boundaries
- Barren Land Layer
- High-Resolution Satellite Imagery

Tools Applied:

- **Dynamic Gap Analyzer Tool** to identify areas with high solar potential but lacking current installations.
- **Proximity Tool** to locate sites near grid infrastructure or roads for ease of evacuation and construction.
- **Basemap and Image Layer** to visualize topography and assess on-ground feasibility.

Mapped all existing solar installations across the state. Identified a high solar potential area near Bhanwarpur village, based on barren land and minimal human intervention Marked the site using Dynamic Gap Analyzer to highlight opportunity zones for solar park establishment.

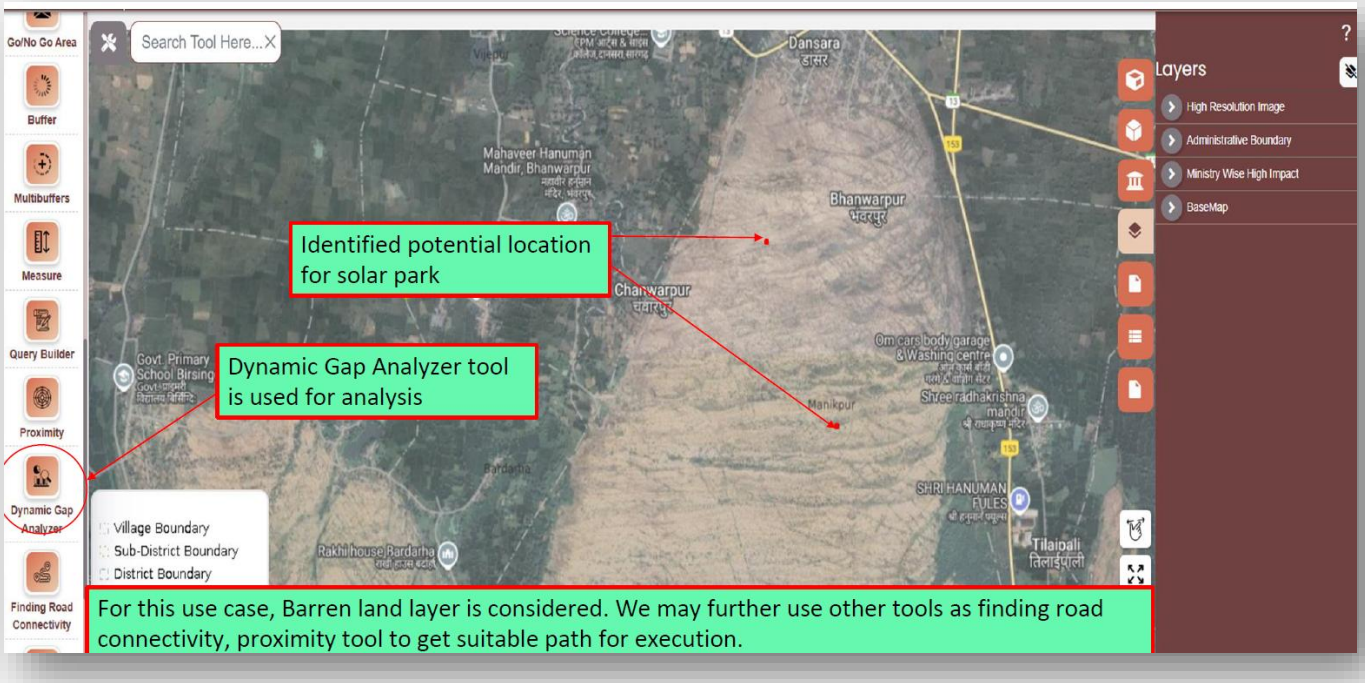
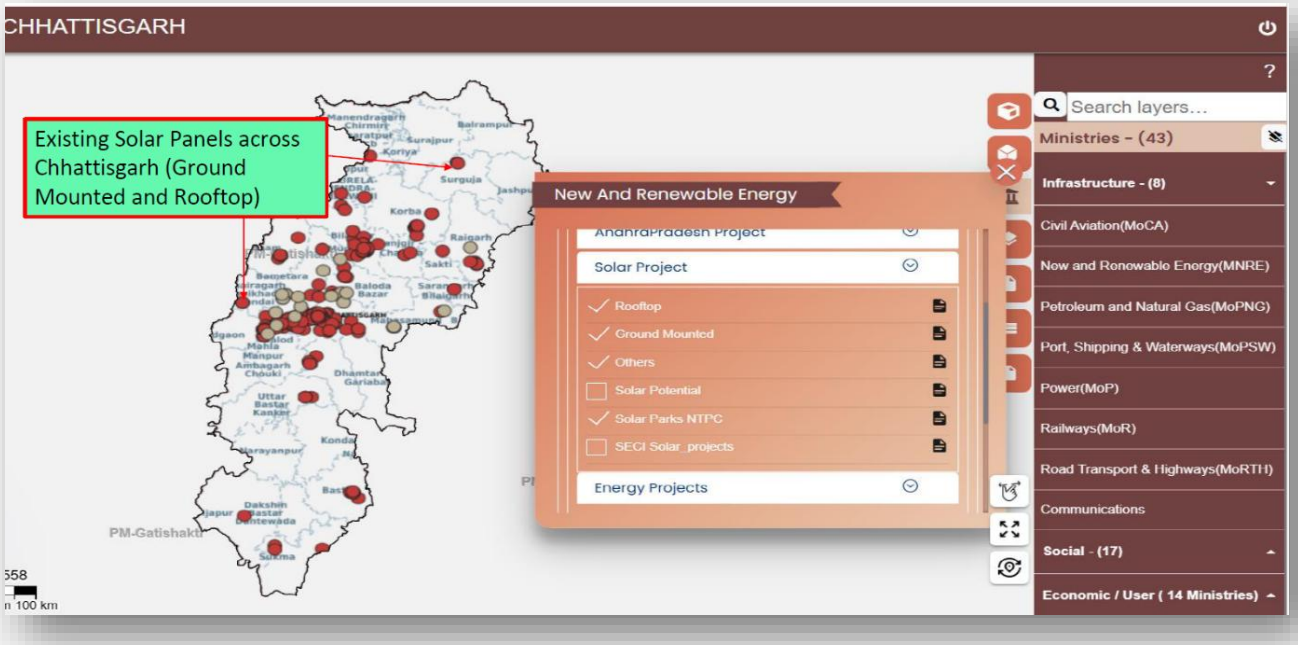


Figure 1: Mapped all existing solar installations across the state.

Figure 2: *Identified potential location for solar park by using Dynamic Gap Analyzer tool.*



Expected Benefit:

- Facilitates evidence-based decision-making for selecting new solar park sites.

- Optimizes land use by targeting barren or underutilized land.
- Promotes green energy transition in alignment with national and state renewable energy goals.
- Reduces cost and time of project planning by pre-assessing site suitability through GIS tools.
- Encourages private sector participation by providing ready-to-use site-level insights.

Use Case 14: Identification of No/ Poor Network Area

Project Brief:

Reliable mobile connectivity is a key enabler for digital services, economic activity, and emergency response. Several remote and forested regions in Chhattisgarh continue to face poor or no mobile network coverage. A GIS-based assessment was carried out to identify underserved areas using spatial data on existing mobile infrastructure and habitations.

Problem Statement:

Despite the presence of mobile towers across many regions of Chhattisgarh, network accessibility remains patchy in various interior and rural areas. Lack of fiberized backhaul and inadequate tower density further exacerbate poor coverage, particularly in tribal belts. Accurate identification of these network-dark zones is essential to bridge the digital divide.

Usage of PM GatiShakti NMP (GIS Operation):

Layers such as **mobile tower locations, habitation data, and land use/land cover** were overlaid for comprehensive analysis. Fiberized and non-fiberized mobile towers were mapped to assess the capacity and strength of existing telecom infrastructure. **Dynamic Gap Analyzer and Proximity Tools** were used to identify areas without nearby mobile towers or backhaul connectivity.
Regions with poor signal presence, as well as habitations beyond tower coverage, were identified using **buffer analysis.** Satellite basemaps further helped visualize terrain and plan feasible routes for future infrastructure deployment. These insights enable targeted telecom expansion by highlighting exact locations lacking adequate mobile connectivity.

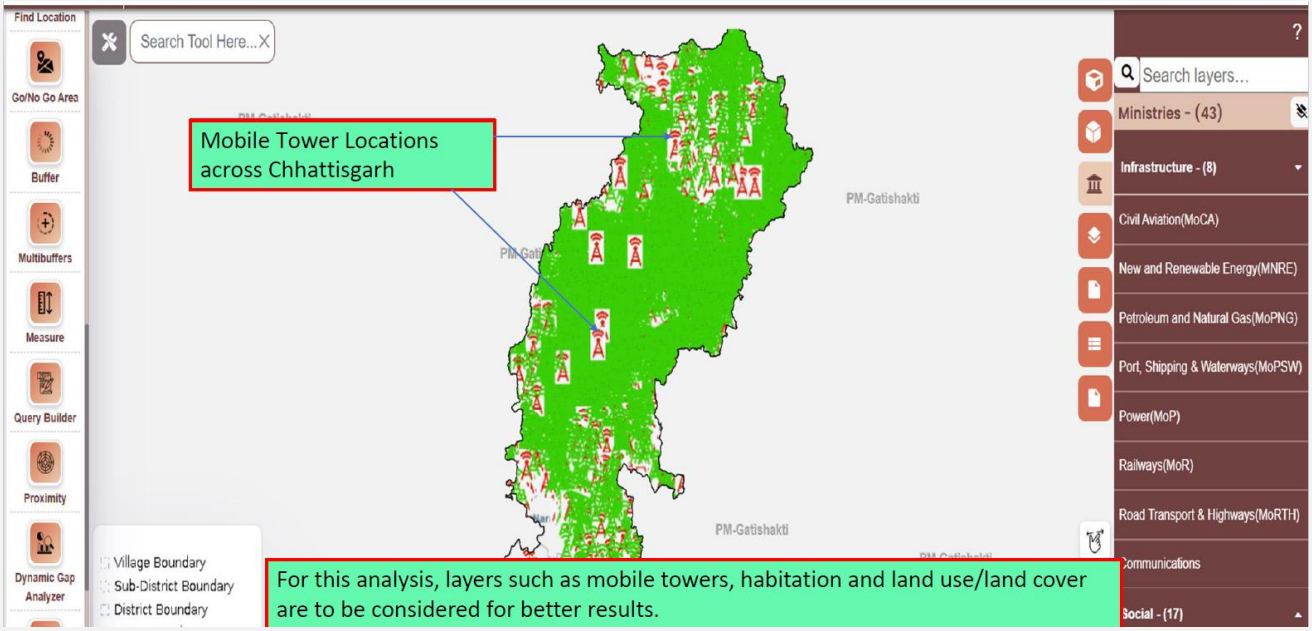


Figure 1: *mobile tower locations, habitation data, and land use/land cover selected.*

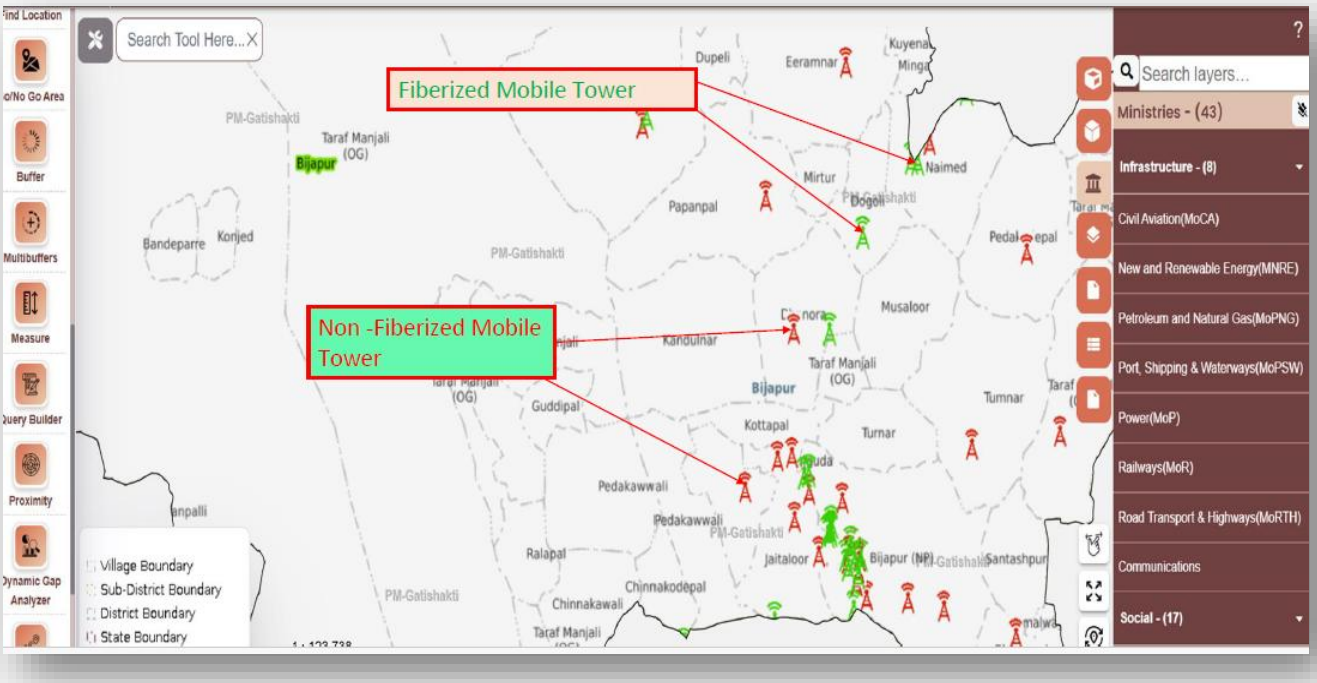


Figure 2: *Mapping of f*iberized and non-fiberized mobile towers

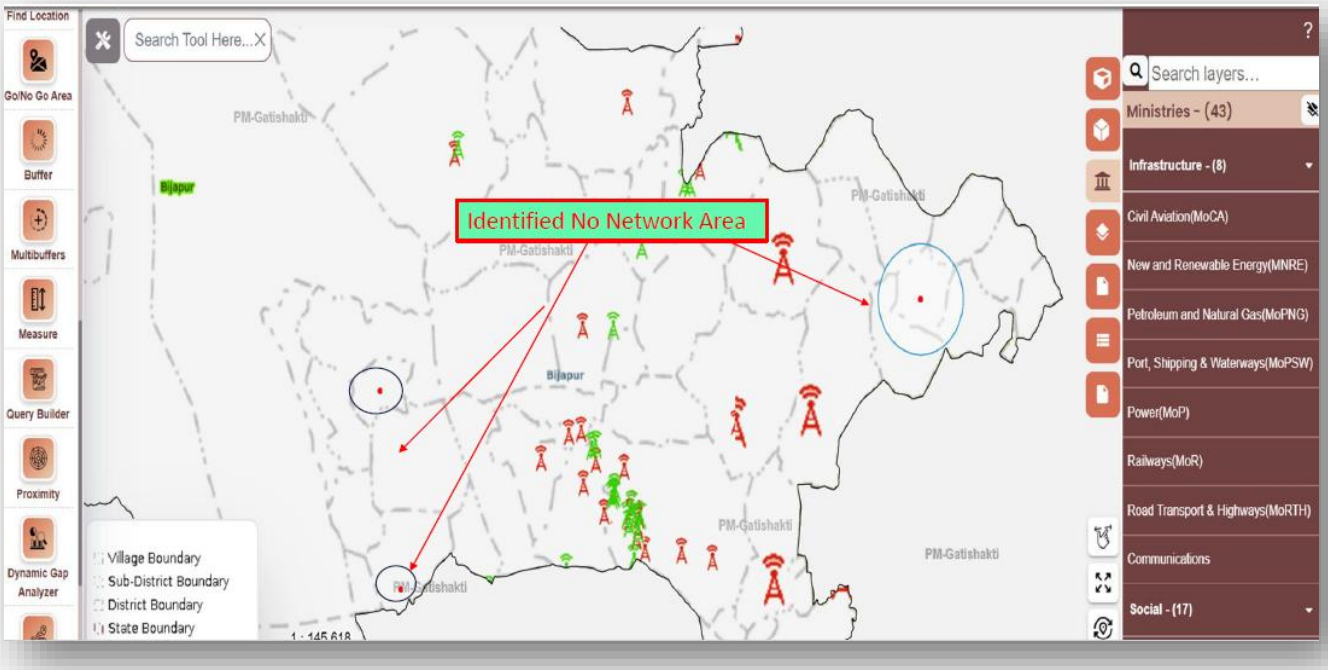


Figure 3: *Identification of no network area using Dynamic Gap Analyzer and Proximity Tools*

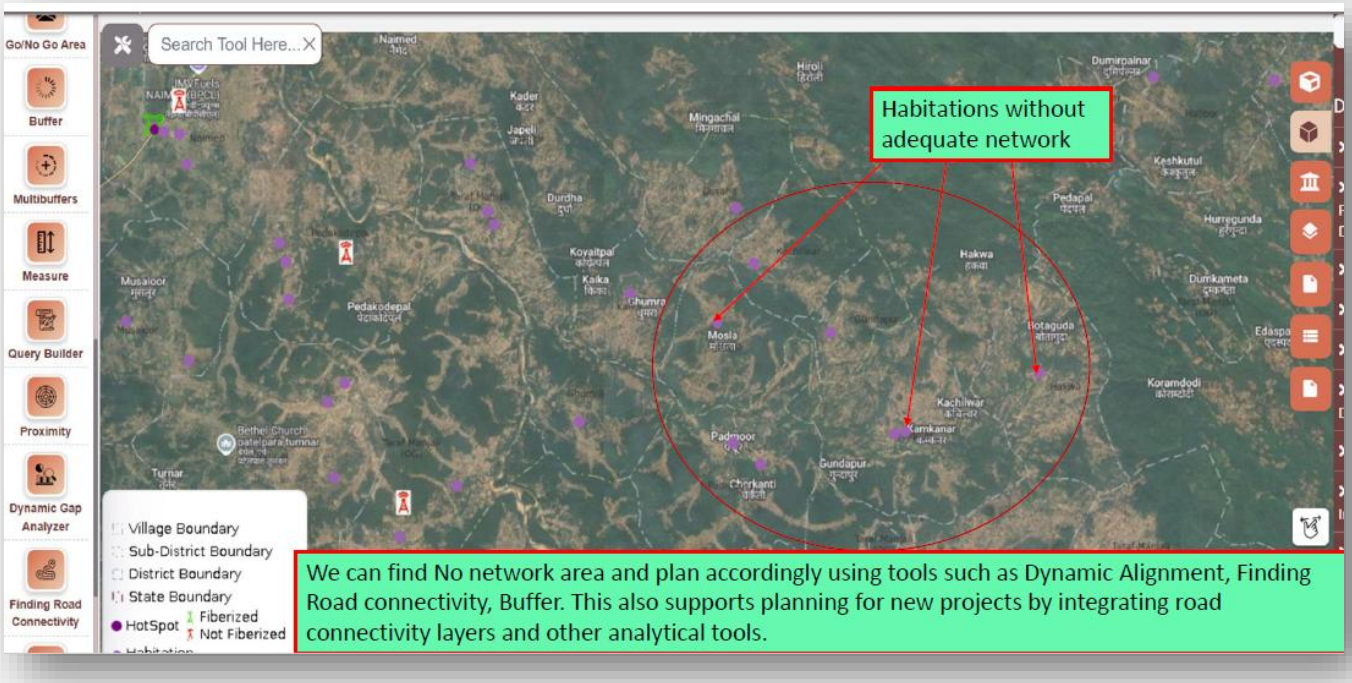


Figure 4: *Identification of habitation without adequate network*

Expected Benefit:

- Supports data-backed planning for expanding mobile network infrastructure in remote and underserved regions.
- Helps telecom authorities prioritize fiberization and new tower installation to strengthen digital inclusion.
- Facilitates coordination with infrastructure projects (e.g., roads, power lines) for cost-efficient network expansion.
- Enhances access to essential services like e-governance, telemedicine, and education through improved connectivity.

Use Case 15: Calculate Distance of Sawmill from Nearest Compartment (forest) Boundary

Project Brief:

Under the PM Gati Shakti National Master Plan, spatial integration and infrastructure planning are critical for optimizing logistics and resource utilization. Forest-based industries, such as sawmills, play a significant role in the supply chain for timber and allied products. Ensuring compliance with forest regulations and sustainable resource management requires accurate geospatial analysis of sawmill locations relative to forest compartment boundaries.

Problem Statement:

There is no standardized mechanism to monitor the distance between sawmills and forest compartment boundaries, leading to regulatory non-compliance, risk of illegal logging, and inefficient planning

Usage of PM Gati Shakti NMP (GIS Operation):

The PM Gati Shakti National Master Plan leverages advanced GIS tools to integrate spatial datasets for effective infrastructure and resource planning. For this use case, the platform overlays sawmill location data with forest compartment boundaries to analyse spatial proximity. Using measuring and buffer tools, the exact distance of each sawmill from the nearest compartment boundary is calculated, enabling compliance checks and supporting sustainable forestry management. This approach ensures accurate monitoring and informed decision-making within the Gati Shakti framework.

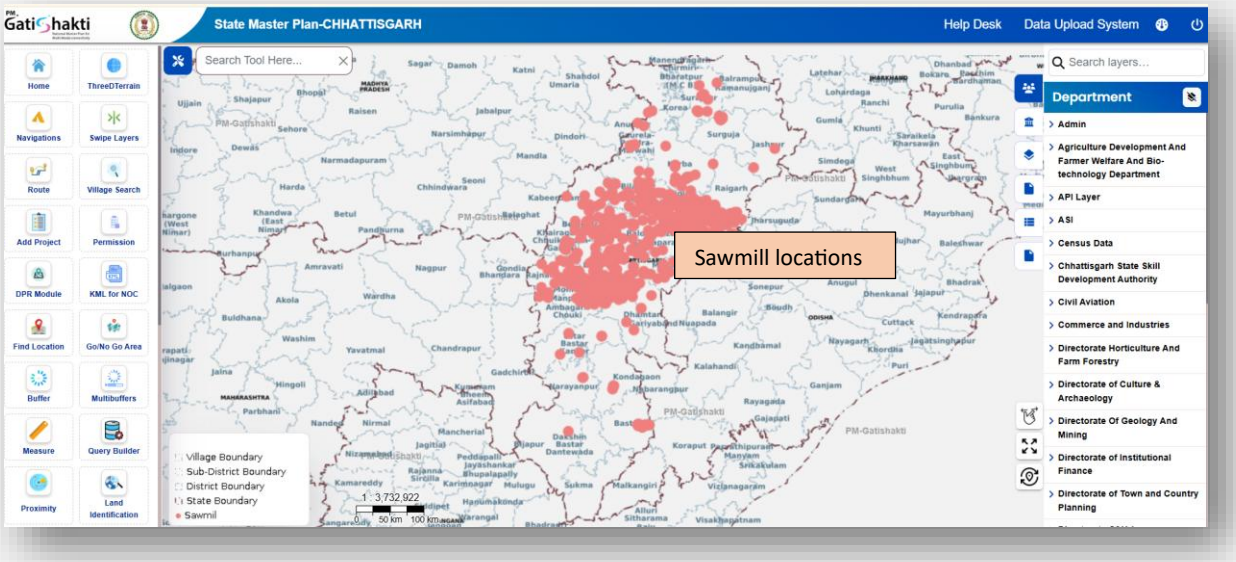


Figure 1: Geospatial Pattern of Sawmill Locations Within the State

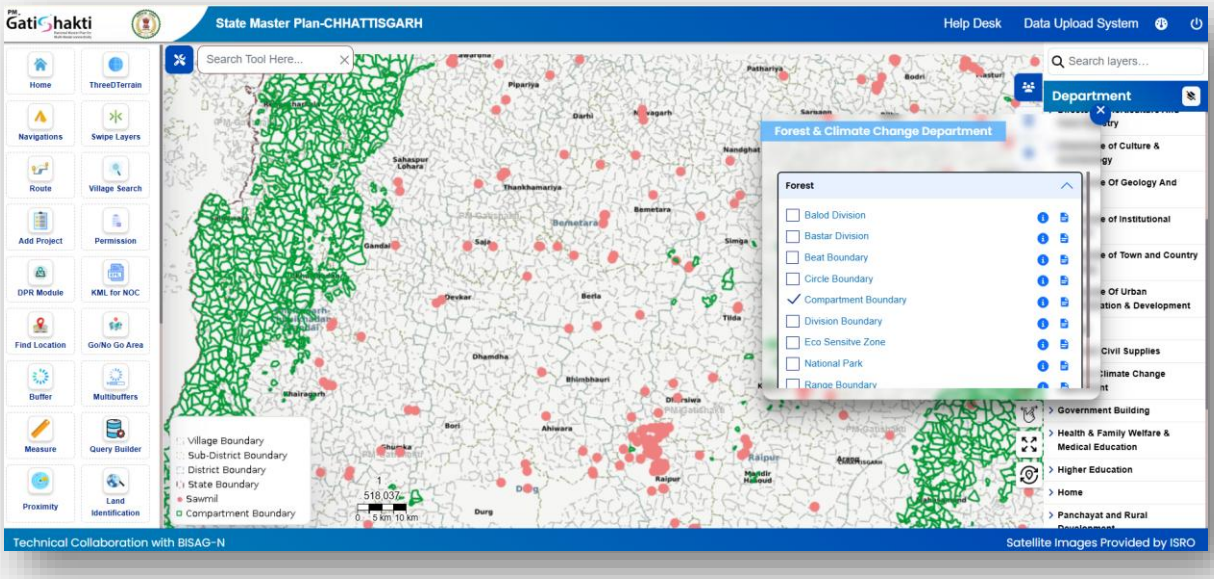


Figure 2: Spatial Distribution of Sawmills in Relation to Forest Compartment Boundaries

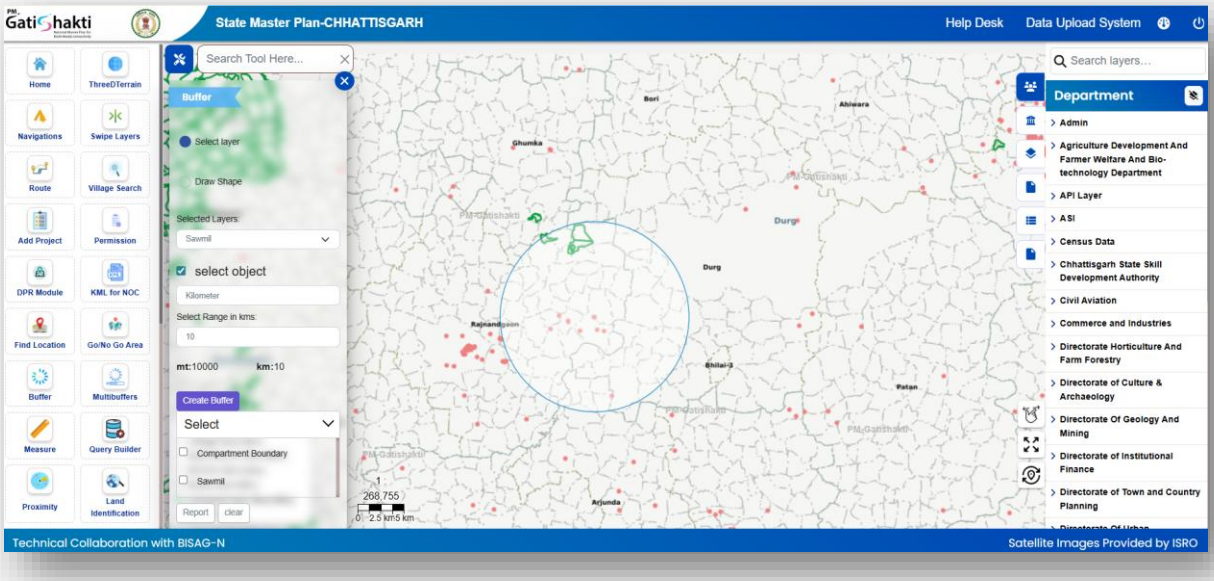


Figure 3: Sawmills Located Within a 10 km Buffer Zone

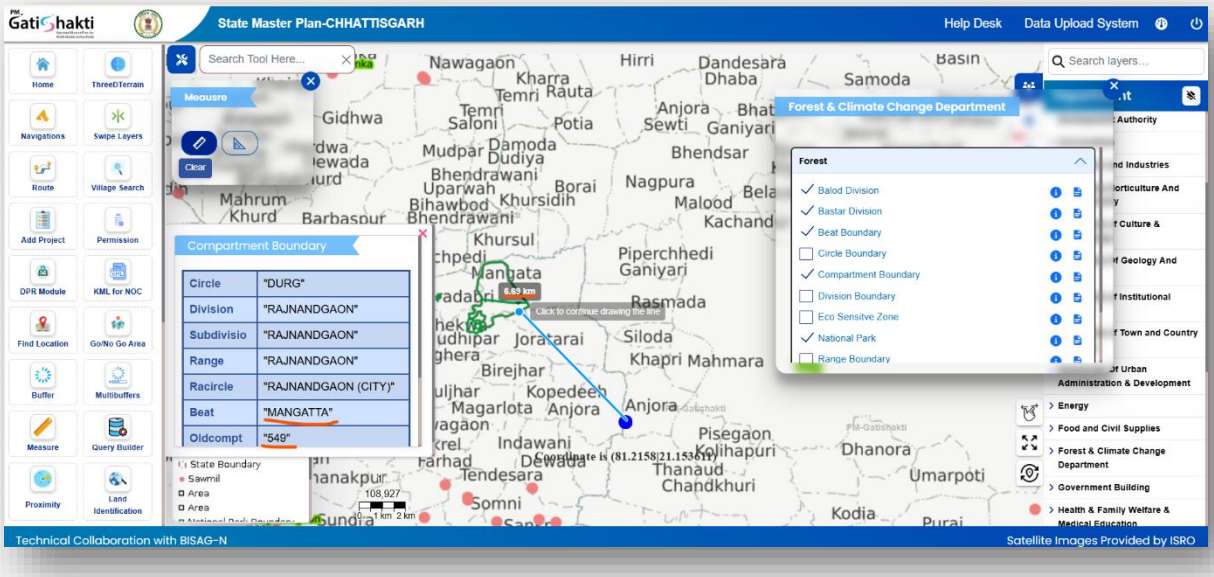


Figure 4: Distance from the nearest compartment boundary

Expected Benefit:

- **Ensures regulatory compliance** by accurately monitoring sawmill proximity to forest compartment boundaries.
- **Supports sustainable forestry management** through spatial analysis and identification of high-risk zones.
- **Facilitates data-driven decision-making** for forest departments and industry regulators under PM GatiShakti.
- **Helps prevent illegal logging and environmental degradation** by highlighting non-compliant locations.
- **Improves planning and coordination** for forest-based industries and infrastructure projects, ensuring balanced development.