Geospatial Knowledge Infrastructure

A Strategic Enabler of Rural Development in India

GEOSPATIAL WORLD
ADVANCING KNOWLEDGE FOR SUSTAINABILITY

FES
FOUNDATION FOR ECOLOGICAL SECURITY

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Foreword

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India's development story is a tapestry of immense diversity of landscapes, people, and institutions, each contributing uniquely to the nation's progress. Every mountain, river, street, forest patch, and village commons carry within it the imprint of human aspiration and ecological interdependence. Yet, our ability to truly understand and respond to this complexity has often been limited by scattered information and unconnected systems of planning. The idea of a Geospatial Knowledge Infrastructure (GKI) marks a new way of reimagining how our country/state can think about development. It is not just about technology or digital maps; it is about building a shared base of knowledge that helps us see the whole picture, how land, water, infrastructure, and people are all linked. With better data and shared understanding, planning and action can become more inclusive, and effective.

A key part of this transformation is the need for foundational geospatial data to be open and easily available to everyone. When such data is accessible and reliable, it becomes a common resource, something that governments, researchers, industry, and communities can all use to create solutions for real challenges. It allows local governments to plan better, scientists to generate new insights, entrepreneurs to build useful tools, and citizens to take part in shaping their futures. When data is open, co-creation happens. Different stakeholders can come together to create practical examples, from improving land governance, water security and forest restoration to strengthening local governance, livelihoods, and climate resilience. When knowledge is shared, the benefits multiply.

This Coffee Table Book highlights how this ecosystem is taking shape in India, through the work of national agencies, research institutions, industry, and civil society organisations. Together, they show how open data and geospatial knowledge can support more balanced, equitable, and sustainable forms of development. The Foundation for Ecological Security through the India Observatory initiative is building database and tools to support communities and partner organisations in their journey. The promise of the Geospatial Knowledge Infrastructure lies in using information for the common good, turning data into decisions that build trust, participation, and stewardship. In doing so, we take another step toward a more informed and inclusive India, where knowledge serves people, and development strengthens both lives and landscapes.

Foreword

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Geospatial World

Rural India represents one of the world's most complex and inspiring development frontiers. It is a mosaic of people, landscapes, and traditions, shaped by centuries of human ingenuity and ecological balance. As India advances toward a more sustainable and inclusive future, the ability to understand this mosaic with greater clarity, coherence, and collective purpose has become indispensable. For decades, rural planning depended on fragmented datasets and isolated decision-making frameworks. Today, however, the convergence of geospatial technologies, digital platforms, and community-driven insights is enabling a new era of integrated development, one where every decision is informed, collaborative, and grounded in a shared understanding of people, land, and ecology.

Geospatial Knowledge Infrastructure (GKI) represents the next frontier in this journey. It moves us beyond the idea of maps as static repositories of information to a dynamic ecosystem of data, tools, workflows, collaboration and intelligence. It signals a shift in how we perceive development itself, from isolated interventions to an integrated way of seeing, understanding, and acting. In the context of rural development, GKI acts as a strategic enabler that links data, technology, livelihoods, land, water, and governance into a unified knowledge ecosystem. This is essential for addressing India's most pressing rural challenges, from water scarcity and land degradation to climate vulnerability, agricultural distress, and fragmented local governance.

India's trajectory is distinguished not only by its technological advances but by the collaborative ethos underpinning its emerging geospatial knowledge ecosystem. National Mapping Agencies anchor the ecosystem with authoritative basemaps and standards; government bodies and Panchayati Raj institutions translate these into actionable local planning; academia and research institutions generate analytical depth; industry delivers scalable platforms and operational tools; and civil society organisations contribute critical last-mile intelligence. Together, they are not peripheral contributors but co-architects of a shared knowledge commons.

When these actors operate in alignment, geospatial technology shifts from a specialised capability to a broadly accessible public resource. This collective infrastructure empowers rural communities to ground their choices in evidence, strengthen the resilience of local ecosystems, and enhance overall quality of life. This convergence reflects a broader shift in mindset, from viewing data as a product, to recognising knowledge as a public good that empowers communities and enriches governance.

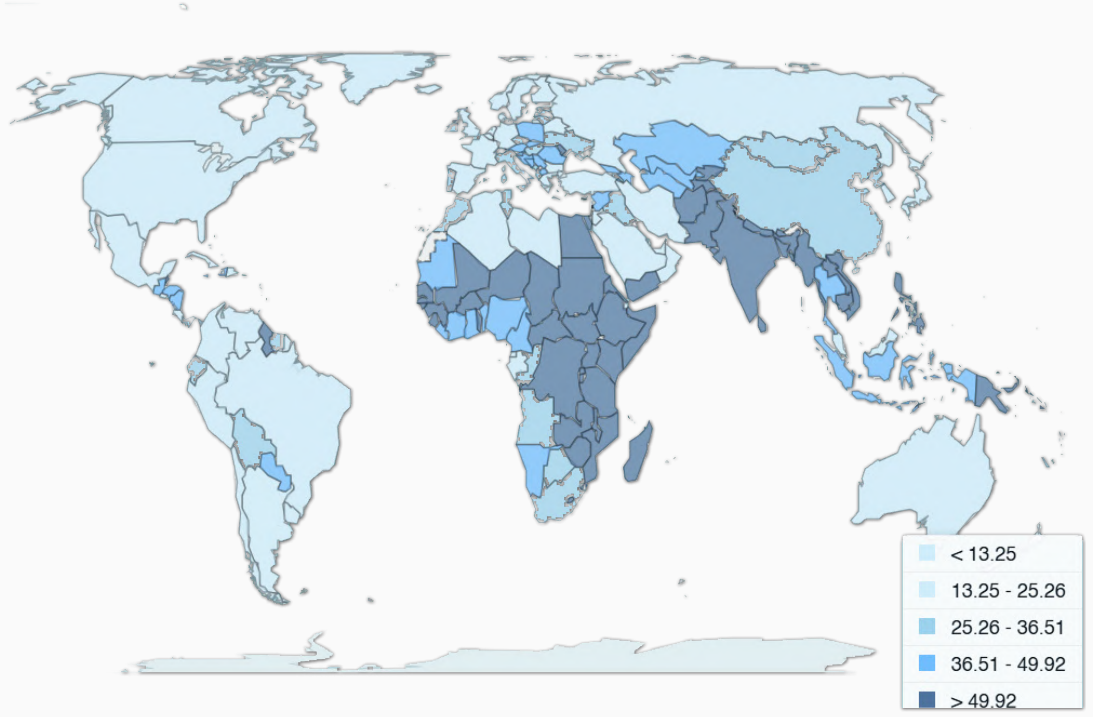
The Coffee Table Book, Geospatial Knowledge Infrastructure: A Strategic Enabler of Rural Development in India, stands as a testament to this evolving ethos. It brings together the voices, experiences, and innovations of organisations that are reimagining rural development through the lens of geospatial intelligence. Their work demonstrates that when knowledge flows freely across institutions and reaches the last mile, it becomes a powerful driver of dignity, resilience, and stewardship. Most importantly, it emphasises that GKI is not merely a technological construct. It is the foundational philosophy of an ecosystem that shapes a well-informed, sustainable, resilient and future-ready rural India, while enabling a more participatory and enduring rural future. As India advances towards building its Geospatial Knowledge Infrastructure, we are reminded that development extends far beyond technological enablement. It is fundamentally about widening future pathways, empowering communities to steer their own development trajectories, enabling landscapes and natural systems to regenerate, and strengthening governance through participatory and transparent mechanisms. The strategic choices made today will determine the resilience, inclusivity, and confidence with which rural India navigates the decades ahead and converts potential into sustained, scalable impact.

Understanding Rural India's Place in a Changing World

Rural India is entering a moment of profound transformation; one where geospatial information does far more than place dots on a map. It becomes the lens through which India can understand its people, its land, and its future with unprecedented clarity. As the country embraces a digital, data-driven development paradigm, geospatial intelligence emerges as the connective tissue linking aspirations to action.

As data becomes dynamic and real-time, it unlocks a deeper ability to see patterns, anticipate needs, and design equitable interventions. This moment calls for a renewed perspective, to view rural India not as a challenge to be solved, but as a landscape of immense possibility supported by geospatial information, local wisdom, and technology-enabled governance.

Rural Population as a Share of National Demography, 2024

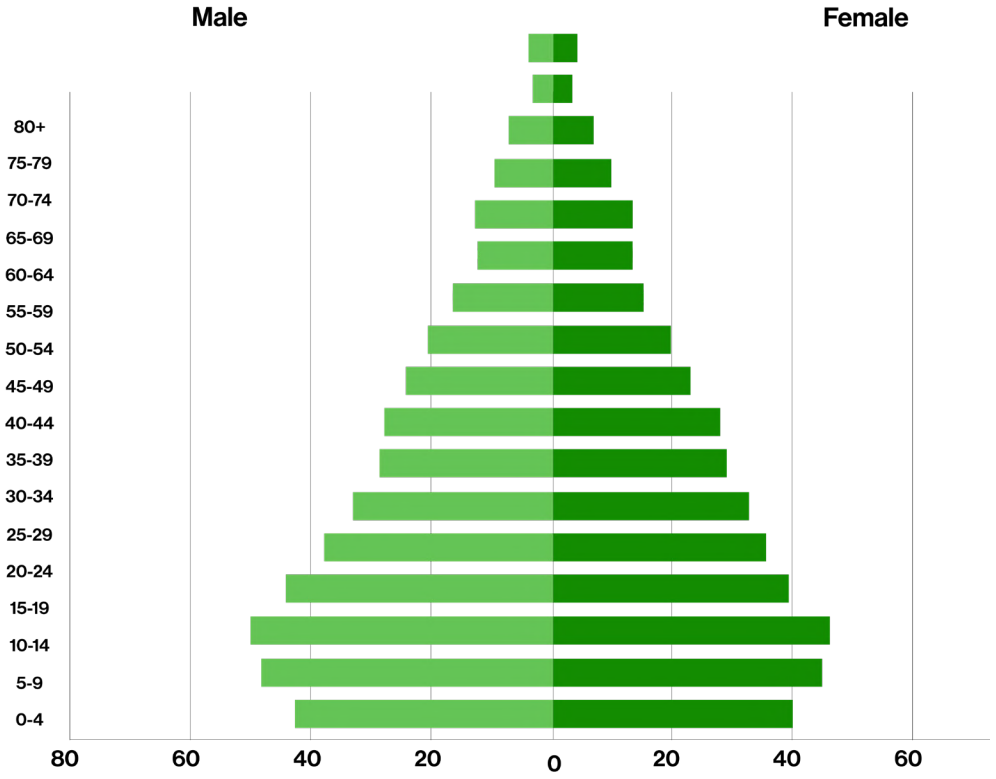


Source: World Bank

Across the world, rural regions remain home to some of the most underserved communities, especially in countries where development gaps run deep. This global reality reinforces a powerful truth: nations cannot advance sustainably unless their rural foundations are strengthened with resilience, equity, and data-driven insight.

India reflects this dynamic at an unparalleled scale. Its 6.65 lakh villages and 2.68 lakh Gram Panchayats form a vast governance network at the heart of national growth. With geospatial intelligence enabling precise and timely decisions, rural transformation becomes more targeted, inclusive, and impactful, strengthening livelihoods, infrastructure, and community resilience.

Rural Population Dynamics in India by Age



Source: Census 2011

India's recent policy momentum reflects a renewed commitment to strengthening self-reliance across its rural communities. Recent budgetary priorities signal a shift from fragmented interventions to integrated support, advancing employment, infrastructure, and economic empowerment as engines of rural prosperity and resilience.

The Rising Strategic Imperative of Geospatial Technology in Rural India

Geospatial intelligence is emerging as a national asset, reshaping development thinking by placing geospatial information at the core of inclusive and resilient rural strategies.

Advances in GIS and Spatial analytics, Earth Observation, GNSS and Positioning have moved far beyond traditional mapping, powering real-time, evidence-led decisions in agriculture, public services, and grassroots governance.

Technological convergence through big data analytics, advanced connectivity, and sensor integration is accelerating the evolution of India's geospatial ecosystem, enhancing evidence-based decision-making and governance.

Flagship initiatives such as SVAMITVA, PM Gati Shakti, and the JAM trinity showcase how geospatial infrastructure enhances transparency, coordination, and access in rural development.

Platforms like the Water Resource Information System (WRIS) and the National Database for Emergency Management (NDEM) have institutionalized geospatial intelligence for sustainable resource planning and disaster response.

1 Geospatial Knowledge Infrastructure: The Blueprint for Rural India's Digital Future

India's rural landscape is evolving fast, shaped by technological shifts and growing development challenges. Climate pressures, urbanisation, and governance needs are making real-time, location-based intelligence indispensable. As geospatial technologies advance through AI, real-time data and multi-source integration, geospatial information now forms the backbone of rural digital transformation.

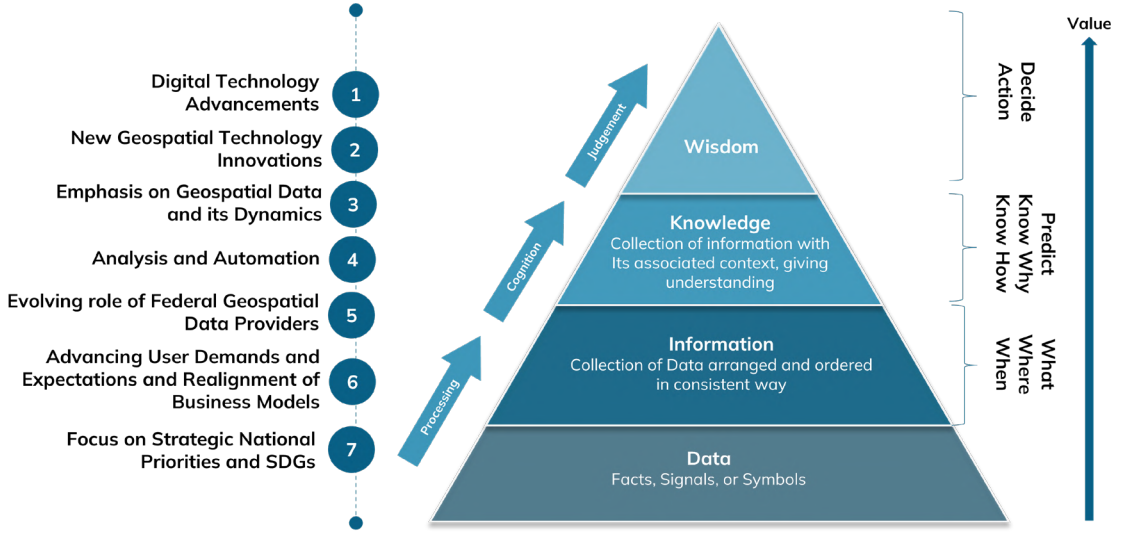
What is GKI?

"The Geospatial Knowledge Infrastructure (GKI) provides a comprehensive blueprint for integrating digital economies, societies, and citizens with geospatial approaches, data, and technologies, aiming to deliver location-based knowledge, services, and automation expected in the Fourth Industrial Revolution (4IR), and by moving beyond the current focus on data infrastructures to knowledge infrastructures, it supports the progression from raw data to applied knowledge and intelligence"

How GKI Powers Rural India's Next Leap

GKI strengthens national resilience by transforming raw geospatial data into meaningful insights that guide rural planning, climate adaptation, infrastructure development, and public service delivery. As India accelerates digital transformation, GKI provides the architecture needed for more responsive governance, efficient resource use, and inclusive rural growth.

GKI: The Blueprint for the Future Geospatial Ecosystem



Source: Geospatial World Analysis

Evolution of the Geospatial Ecosystem

The transition from the traditional data-centric Spatial Data Infrastructures to a multi-dimensional knowledge-driven Geospatial Knowledge Infrastructure (GKI), is enabled by the Integrated Geospatial Information Framework (IGIF). It highlights the shift toward distributed, intelligent, and value-focused ecosystems powered by AI, IoT, and cloud computing. Together, GKI and IGIF enhances global geospatial ecosystems transforming them into integrated engines of digital governance, innovation, evidence-based policy making, resource management, and resilience.

Spatial Data Infrastructure (SDI)

- Data Centric
- Centralized System
- Desktop/Web Portal
- 2D Representation
- Supply-Centric
- Limited Data Range
- Professional Users Only
- Linear Search
- No Analysis/ No Modelling
- Government
- Web 1.0 - Static Web
- Web 3.0 Semantic Web

IGIF - Enabler of GKI

Geospatial Knowledge Infrastructure (GKI)

- Knowledge - Centric (Applied Intelligence)
- Distributed systems
- Distributed Cloud - Based Spatial Computing
- 4D/5D Representation
- Demand Centric (Value Impact)
- Dynamic Data
- Includes Machines
- Intelligent Search
- Advanced Augumented Analytics
- Broader Stakeholder Group
- Web 3.0 Semantic Web
- Network of Integrated Ecosystems of Ecosystems

Moving Up the Value Chain

Enablers and Facilitators

Commercialization and Industrialization | Public Private Partnership | Resilience | Geopolitics and World Order | Sovereign Assets

Technologies

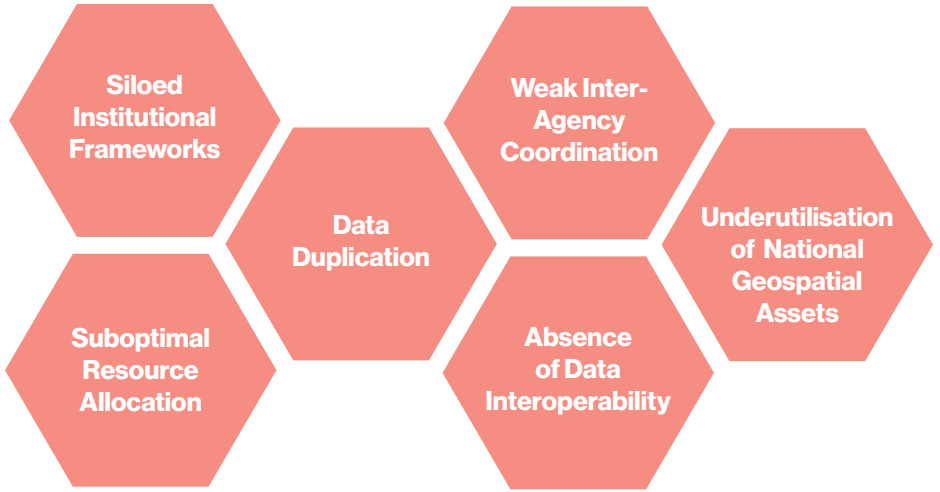
AI/ML | Spatial Computing | Internet of Things (IoT) | 5G and Advanced Connectivity | Blockchain | Digital Twin Enterprises | Open Data Platforms & APIS

Source: Geospatial World Analysis

From Data to Decisions: Imperatives of GKI for Rural Development

The rural development ecosystem across government, private, and civil-society actors, relies increasingly on geospatial data for water management, employment, infrastructure, and local governance. Geospatial Knowledge Infrastructure (GKI) transforms fragmented datasets into integrated, decision-ready insights, enhancing planning, resource allocation, and last-mile delivery. Despite this, many rural initiatives still suffer from siloed departments, disconnected databases without APIs, and limited integration, leading to coordination gaps between agencies.

Geospatial Data Integration Challenges in Rural Development



Source: Takshashila Foundation, Geospatial World Analysis

GKI as the Intelligence Backbone for Future-Ready Rural Development

For rural development, GKI provides a cohesive, knowledge-driven framework that transforms raw geospatial information into practical insights, supporting inclusive growth and improving rural prosperity.

Moving beyond centralised, data-centric systems with limited analytical capacity, the GKI ecosystem introduces a knowledge-first approach. It enables distributed, cloud-based spatial computing, supports 4D–5D geospatial representation, integrates diverse data sources such as IoT and mobile sensors and applies intelligent search, modelling, and advanced analytics. Together, these capabilities position GKI as a dynamic, agile, and forward-looking foundation for India's rural transformation.

Evolving Geospatial Ecosystem in Rural Development

Parameters	Intelligence	Architecture	Representation
Current Pathway	Data-centric	Centralised	2D Mapping
GKI Ecosystem	**Knowledge-centric** (It will integrate GIS, IoT, and AI to provide valuable insights for rural areas).	**Distributed Systems** (Transitioning from static portals, to dynamic, cloud-based geospatial platforms).	**4D/5D Spatial Representation** (Integrate temporal and behavioural aspects while monitoring shifts in environmental, social, and economic landscapes).
Outcome for Rural Development	Facilitates a nuanced comprehension of poverty, livelihoods, and service deficiencies.	Effortless access and timely updates facilitated by local authorities, cooperatives, non-governmental organisations, and community members.	Evaluates the resilience of assets, assesses alterations in land utilisation, and analyses the effectiveness of rural infrastructure continuously.

Purpose	Agency	Insight	Governance
Supply-centric	Human focused	No analysis or modelling	Siloed Institutions
Demand-centric (Transition from a supply-oriented approach to a demand-focused framework for Panchayats, financial institutions, and planners).	**Integrated Intelligence Model** (Geospatial data & technology+ Citizen participation+ Machine learning+ Artificial intelligence).	**Analytics and Decision Intelligence** (Transition from merely illustrating data to employing analytical frameworks and decision-making interfaces).	**Ecosystem Approach** (Establish a comprehensive framework that connects various ministries, innovative startups, academic institutions, and local governance bodies).
Targeted, solution-focused applications, ranging from land-use planning to credit risk assessment.	Integrates collective insights with automated processes to foster equitable decision-making.	Facilitates informed financial planning, evidence-based decision-making, sectoral resilience, and prioritisation of initiatives.	Governance that promotes sustainability and inclusiveness in the utilisation of resources across various domains.

India's Rural Development Challenges

India's rural landscape faces deep-rooted challenges that require a data-driven, ecosystem-based approach. Despite housing 61% of the population, rural regions contribute only 46% of national income and continue to experience concentrated poverty and exclusion. Fragmented landholdings, a persistent digital divide, weak institutions, and inadequate infrastructure, ranging from poor water quality to limited electricity and connectivity, further constrain rural development.

Natural Resource Management

- Rural India faces rising land degradation and water scarcity.
- Climate volatility intensifies risks for communities.
- Biodiversity loss weakens rural resilience.

Agriculture

- Agriculture employs many but yields only modest GDP.
- Wage stagnation and regional gaps persist.
- Resource-poor farmers remain excluded, underscoring sectoral distress.

Lack of Rural Infrastructure

- Infrastructure gaps sharply limit rural productivity.
- Poor connectivity makes it difficult for residents to access the market and essential services.
- With most Indians living in rural areas, these gaps constrain national progress.

Healthcare Inadequacies

- Rural India faces acute healthcare gaps and weak infrastructure.
- Limited equipment and unreliable services persist.
- Severe workforce shortages further undermine health outcomes.

Unemployment

- Rural unemployment persists due to limited industrial growth and poor infrastructure.
- Stagnant job creation limits inclusive economic gains.
- Agriculture-dependent households remain highly vulnerable.

Land Governance

- Insecure land titles undermine investment and productivity.
- Fragmented, inequitable ownership.
- Complex laws and weak institutions stall land reforms.

Poverty and Income Disparities

- **171 Million** exited extreme poverty since 2011.
- Issues of rural deprivation and inequality still persist.
- Three in five rural Indians still live below the global poverty line.

Public Service Delivery and Governance

- Digital access has expanded, but rural capacity remains weak.
- Human resource gaps continue to impede service delivery.
- Digital divide limits equitable reach.

Geospatial Data and Technology Solutions for Rural Development

Geospatial information and technologies are becoming key accelerators of rural transformation. They convert fragmented datasets into precise diagnostics for targeting poverty, strengthening infrastructure planning, optimising agriculture, and enabling data-driven governance.

Natural Resource Monitoring

- Geospatial mapping provides high-resolution intelligence on forests, water, and land resources.
- Spatial analysis guides conservation, restoration, and sustainable use.
- Continuous monitoring strengthens ecosystem governance and long-term resilience.

Rural Infrastructure Advancement

- Geospatial analysis pinpoints priority infrastructure gaps with precision.
- Spatial data optimises road networks and essential service placement.
- Integrated GIS workflows strengthen evidence based rural planning.

Solving the Rural Unemployment Issue

- Remote sensing enables evidence-based employment policy decisions.
- Geospatial tools expand affordable farmer outreach and strengthen access to finance.
- Spatially informed schemes drive sustainable job creation through natural resource management.

Strengthening Rural Land Governance

- GIS data helps assess creditworthiness.
- Drone and LiDAR surveys deliver accurate land boundaries.
- Satellite imagery supports planning and climate-aware land use.

Tackling Obstacles in Agriculture

- Geospatial soil mapping enables precise insights on fertility, moisture, and crop health.
- Spatial diagnostics strengthen pest, disease, and input management.
- Precision fertiliser planning boosts yields while reducing input costs.

Tackling Economic Inequality

- Machine learning with geospatial data generates precise, rapid poverty insights.
- Integrated spatial and socioeconomic datasets enable targeted rural interventions.
- Evidence-rich geospatial intelligence supports sharper, data driven policy decisions.

Rural Health Transformation

- Satellite data combined with GIS and ML can strengthen visibility of rural health facility access.
- Spatial analytics optimise resource allocation, supply chains, and service reach.
- Real-time geospatial intelligence enhances disease surveillance and emergency response.

Public Service Delivery and Governance

- Geospatial mapping pinpoints underserved regions with high accuracy.
- Real-time spatial dashboards strengthen government responsiveness and transparency.
- Integrated geospatial systems enable citizen-informed, data-driven governance.

Reimagining Rural Development through Geospatial Information

Reimagining rural development requires moving from isolated, programme-driven actions to an integrated ecosystem that operates on geospatial intelligence. By embedding geospatial insight into organisational ecosystems, the GKI workflow integration maturity model enables institutions to coordinate decisions, align resources, and accelerate impact across diverse rural ecosystems. It assesses how geospatial data, technologies, and analytics are methodically incorporated into work and business processes. It illustrates a transition to intelligence systems from fragmented, map-centric applications.

From Fragmented Records to Shared Intelligence: The Case for Strong Data Foundations

Programs and policies are only as effective as the information on which they are built. Foundational data, including census figures, land records, and geospatial data, enable governments, communities, and decision-makers to understand broader conditions, identify gaps, and design interventions suited to respond to on-ground realities. Modern systems improve consistency, consolidation, and meaningful insights for faster, informed decision-making. Good governance rests on these systems because they save time, strengthen transparency, support public accountability, and help avoid assumptions that might create unintended or undesired outcomes.

GKI Workflow Integration Maturity Model

Source: Geospatial World Analysis

Geospatial Knowledge Infrastructure for Rural Development

The GKI workflow integrates geospatial intelligence, AI, and interoperable platforms. Together, these create a precise, adaptive, and inclusive rural development ecosystem.

From Insight to Impact: Structuring the GKI-Enabled Rural Development Ecosystem

Rural Development Function	Current Approach	GKI-Enabled Approach	Geospatial Knowledge Technologies/Applications
Poverty Assessment	• Reliance on static, outdated datasets • Generalised needs-based approach	• Integrated ecosystem insight enables sharper, needs driven service delivery. • Continuous, shared intelligence strengthens transparency and institutional agility.	• GIS and remote sensing integrate spatial–socioeconomic layers for granular poverty diagnostics. • AI/ML models predict poverty levels with high accuracy.
Rural Infrastructure	• Centralised, siloed planning • Paper-based, parcel-led registration	• Integrated intelligence makes rural employment monitoring timely and adaptive. • Data-driven forecasting helps predict emerging rural labour demand.	• GIS dashboards for infrastructure planning • GPS for surveying, geo-tagging, and construction monitoring
Natural Resource Management	• Fragmented systems dependent on outdated, low-resolution spatial data. • Episodic monitoring restricts timely ecological intelligence.	• Integrated knowledge ecosystems strengthen timely and field aligned decisions. • Community-based planning and intelligence supports optimal resource allocation.	• Satellite and UAV imaging deliver precise, high-frequency ecological intelligence. • IoT sensor networks enable real-time monitoring and predictive allocation.
Public Service Delivery and Governance	• Service delivery relies on siloed, low-resolution spatial data • Monitoring remains periodic, with fragmented geospatial data	• Integrated ecosystem insight enables sharper, needs-driven service delivery. • Continuous, shared intelligence strengthens transparency and institutional agility. • Participatory GIS platforms deepen citizen oversight and accountability.	• Geo-enabled citizen platforms strengthen participatory oversight and accountability. • Web-GIS and accessibility modelling optimise service placement and delivery.

Rural Development Function	Current Approach	GKI-Enabled Approach	Geospatial Knowledge Technologies/Applications
Employment	• Centralised planning relies on limited spatial intelligence. • Paper-driven programmes lack real-time geospatial visibility.	• Integrated intelligence makes rural employment monitoring timely and adaptive. • Spatial–employment analytics guide context-specific job creation.	• Mobile geotagging strengthens real-time employment visibility. • Integrated dashboards fuse geospatial and labour datasets.
Agriculture	• Limited digital monitoring constrains field-level insights. • Fragmented soil–crop datasets hinder coherent analysis.	• Localised planning and intelligence supports resilient, region-specific crop choices. • Geospatial analytics enable locally optimised crop selection.	• Remote sensing and GIS optimise crop health planning. • Drones and GeoAI drive precision agriculture decisions.
Land Governance	• Outdated and inconsistent land records • Fragmented institutions cause disputes and inefficiencies.	• Collaborative governance aligns decision makers across land ecosystems. • Integrated land intelligence supports sustainable governance and future ready planning.	• GIS-based cadastral mapping and spatial databases. • Drone and LiDAR surveys for high-precision parcel mapping.
Healthcare	• Limited spatial analytics weaken healthcare accessibility insights. • Uneven connectivity constrains timely health surveillance.	• Transparent access data improves fairness in care delivery. • Stronger links between communities and facilities support continuous care.	• Remote sensing evaluates facility conditions with precision. • EO and satellite links enable hotspot detection and remote care.

Role of Key Stakeholders in Rural Development

Mapping agencies provide core geospatial datasets, governments and panchayats enable integration and implementation, academia contributes research and capacity-building, industry drives technological innovation and NGOs ensure community inclusion. Together, they convert fragmented information into shared intelligence for evidence-based rural development.

While GKI offers a pathway to stronger governance and institutional coherence, several constraints still limit its full potential. Geospatial technologies are advancing rural development across strategic domains through policy, technology, and community-led action.

Responsibilities

National Mapping Agencies

- Create authoritative geospatial baselines underpinning rural planning.
- Define interoperability standards to unify national spatial systems.
- Enforce data governance across agencies.

Governments

- Embed geospatial information across policy design and service delivery.
- Use real-time dashboards to drive agile, inclusive governance.
- Enable open data exchange, participatory governance through GIS-based citizen engagement.

Academia and Research Organisations

- Develop collaborative geospatial models that inform rural development solutions.
- Deliver impact assessments using spatial and socio-economic analytics for policy feedback.
- Build national capacity through training and open geospatial research.

Industry and Private Sector

- Build scalable geospatial platforms and deploy IoT, drones, and EO for real-time rural intelligence.
- Co-develop data innovations with government through structured public-private partnerships.
- Expand accessible platforms while investing in open geospatial data ecosystems.

NGOs and End Users

- Enable community-led geospatial inputs through trusted local validation.
- Build last-mile capacity through digital and spatial literacy.
- Strengthen accountability via community dashboards and conduct impact assessment of government schemes to ensure inclusivity.

2 Thematic Pathways for GKI in Rural Transformation

Geospatial information creates local impact when data, technology, and institutions operate within a unified GKI ecosystem. Integrating spatial intelligence into fundamental rural development processes enhances planning through evidence-based approaches. It ensures precise resource allocation and strengthens collaboration and participatory governance among stakeholders.

Translating Geospatial Intelligence into Local Impact

Geospatial information is the foundational layer of a nation's digital infrastructure; it links location data, statistical data, and intelligence through advanced technologies (artificial intelligence and machine learning) to drive evidence-based governance, accelerating resilient and sustainable growth. In rural development geospatial intelligence forms the analytical core of GKI, enabling data-driven decisions, equitable resource allocation, and participatory rural governance.

Role of GKI in Driving Localized Rural Impact

Operationalizes information through integrated use of geospatial technologies and advanced analytics.

Drives collaboration, evidence-based decision-making, cross-sectoral coordination.

Enhances trust, transparency, and accountability in rural development

Enables efficient resource management and helps monitor progress

India's Transition Toward a Geospatial Ecosystem

Rural development in India is advancing toward a unified geospatial ecosystem, integrating advanced technologies and collaboration to maximize last-mile impact.

India's Rural Development Champions: Using Geospatial Intelligence to Drive Local Impact

Leading organisations advancing geospatial ecosystem adoption in rural development include:

1. **The CoRE stack initiative**
2. **WELL Labs**
3. **INREM Foundation**
4. **Foundation for Ecological Security (FES)**

The CoRE stack initiative, Anchored by the CommonsTech Foundation for Participatory Technologies (CFPT), the CoRE stack is an open-source digital public good for climate adaptation and natural resource management developed in collaboration with many partners

- **Technology:** GIS, remote sensing, ML, GPS, big data, and cloud architecture.
- **Impact:** United stakeholders and strengthened geospatial governance, impacting 800+ villages and 2.5 million people.

A non-profit institution dedicated to improving the health and sustainability of rural communities by addressing water quality and water security challenges.

- **Technology Used:** Artificial intelligence, GIS platforms, GPS, and geospatial data.
- **Impact:** Enabled geospatial local governance, producing water quality maps and empowering 55,000 Water Quality Champions across eight states.

The organization is working to transform water systems at scale across India through research, partnerships, and collective action.

- **Technology:** Open-source GIS, Satellite Data, Drone Imagery, and IoT.
- **Impact:** Aligned governments, NGOs, and communities, advancing participatory geospatial development and improving livelihoods.

A non-governmental organization working towards the conservation of nature and natural resources to enhance the economic and social well-being of rural communities.

- **Technology:** Geospatial data platforms, GIS-based mobile tools, GPS for village-level planning.
- **Impact:** Collaborations empowered 40.38 million lives by restoring 17.66 million acres of Commons.

India's geospatial ecosystem is rapidly strengthening through technology integration, data-driven decisions, and cross-sector convergence. Enabling the GKI ecosystem approach will require open data collaboration and embedding geospatial intelligence into rural development workflows to ensure equitable and locally meaningful impact.

PRIORITIZATION OF AREA OF INTEREST USING GEOSPATIAL INFORMATION

Geospatial information and technologies support rural planning by showing geographic variations and local needs. By integrating socio-economic, ecological, demographic, and infrastructural datasets, geospatial platforms empower planners to visualise geographic variations, assess development requirements, and identify priority areas where interventions can achieve the most significant outcomes. Atlases such as the Wasteland Atlas of India, the Human Development Index Atlas, and FES's Atlas integrate critical datasets to highlight vulnerabilities, guide restoration priorities, and shift planning toward evidence-led, location-specific, impact-orientated action.

ORGANISATION PRIORITIZING RURAL DEVELOPMENT USING GEOSPATIAL INFORMATION

FES Atlas and India Observatory

- FES's Atlas and the India Observatory unify socio-ecological and economic datasets into high-resolution decision platforms.
- Together, they help planners prioritise districts through integrated, granular geospatial intelligence.

The CoRE Stack initiative

- CoRE Stack integrates land, water, and socio-economic layers to identify high-priority villages and enable sharper MGNREGA alignment.
- Strengthens transparency and accountability by embedding community-validated, datadrivendecision processes.

WELL Labs: Hydrology and Agriculture Diagnostics

- The WISER framework combines multi-layered geospatial and household datasets to pinpoint village-level water vulnerabilities and enable precise, spatially grounded interventions.
- Strengthens transparency and ensures strategic, evidence-based allocation of limited resources.

INREM Foundation: Water Quality Risk Mapping

- Maps contamination hotspots and identifies high-vulnerability areas using geospatial tools.
- Applies AI diagnostics to rank at-risk populations for targeted interventions.

Strengthening Community Governance

Geospatial data and technologies shift community governance towards evidence-based decision-making and participatory action.

GKI Ecosystem for Community Governance

The Geospatial Knowledge Infrastructure creates a shared, interoperable ecosystem that fosters accountability, convergence, transparency, and collective ownership.

Enabling the GKI Ecosystem for Community Governance

Architecture	Geospatial Knowledge Infrastructure	GKI in Community Governance
Infrastructure	Geospatial Data Providers (NMAs), Public and Private Data Platforms	Village boundary layers, service access maps, community assets and grievance registries
Institutions	Central and State Governments, Local Institutions	Integrate geospatial information in operational processes across State Government and local organisations
Industry Ecosystem	Geospatial technology providers	GIS-enabled mobile field tools, WebGIS portals, GPS-tagged evidence capture
Advanced Technologies	AI, ML, Big Data, Cloud, Spatial Modelling	Object detection, predictive modeling, and risk assessment
User Ecosystem	Civil Society Organizations, NGOs	FES, CoRE Stack, INREM, WELL Labs.
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Encourages civic engagement and enhances decision-making through a participatory approach. Citizens can become “co-producers” of services, offering valuable local knowledge and feedback

Community Governance Champions in India

Foundation for Ecological Security (FES)

Uses India Observatory, Data Platform, and CLART with GIS, satellite data, and analytics to support evidence-based government planning and help communities manage resources while ensuring equitable access to schemes.

CoRE Stack Initiative

Uses geospatial data, GIS, remote sensing, and cloud platforms to create digital village resource plans, supporting community governance with co-created insights across water, land, forest, and livelihoods.

INREM Foundation

Uses AI geospatial dashboards like JalXChange and GPS-linked test kits to empower rural stakeholders, supporting community governance by mapping and monitoring water sources and quality across eight states.

WELL Labs

Uses open-source GIS, GPS, drones, IoT, and satellite data to support accountability, evidence-based planning, and community governance, enabling rural development via ePRA and field mapping.

Transforming Farming Systems

Geospatial data and technologies reveal patterns in crop health, water stress, and soil conditions, helping shift farming towards precision, resilient, evidence-based agriculture.

GKI Ecosystem for Farming

A Geospatial Knowledge Infrastructure (GKI) ecosystem for farming would integrate geospatial data, technologies, digital platforms, and advanced analytics to provide evidence-based information to farmers and community stakeholders, creating a unified intelligence network.

Enabling the GKI Ecosystem for Farming

Architecture	Geospatial Knowledge Infrastructure	GKI in Farming Systems
Infrastructure	Geospatial Data Providers, Public and Private Data Platforms	Crop-mapping layers, land-use maps, soil-water datasets, climate indicators, data layers on pest and disease monitoring
Institutions	Central and State Governments, Local Institutions	ntegrate geospatial information in operational processes across State government and local organisations
Industry Ecosystem	Geospatial technology providers	Satellite Imagery, drones, IoT sensors, GIS
Advanced Technologies	AI, ML, Big Data, Cloud, Spatial Modelling	Crop-health diagnostics, drought forecasts, suitability assessments
User Ecosystem	Civil Society Organizations, NGOs and Local Government	WELL Labs, and FES
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Shared planning platforms, evidence-driven agricultural decisions, resilient farming systems

Farming Systems Leaders Applying Geospatial Information

WELL Labs

Uses Sentinel crop classification, drone imagery, Earth Engine, GIS, and IoT to map hydrology, crops, and vegetation, enhancing monitoring, accountability, and climate-resilient agricultural planning.

Foundation for Ecological Security

Uses GIS, Android tools, and open data platforms to empower farmers and support climate-smart agriculture, enabling regional monitoring, groundwater budgeting, and Panchayat coordination for better water security and productivity.

India's geospatial ecosystem is driving precision agriculture, equipping communities with intelligence to manage climate risks and strengthen resilience.

Empowering Panchayat Engagement

Geospatial data and technologies are transforming panchayat functioning by bringing precision, transparency, and evidence into village decision-making. Geospatial data layers, GPS trails, participatory maps, and socio-economic as well as ecological datasets highlight local assets, vulnerabilities, land use, entitlements, and service gaps.

GKI Ecosystem for Panchayat-Led Engagement

A Geospatial Knowledge Infrastructure (GKI) ecosystem for Panchayat engagement enables governments, private industry stakeholders, and civil society organisations at the rural level to collaborate on a common geospatial information network.

Enabling the GKI Ecosystem for Panchayat Engagement

Architecture	Geospatial Knowledge Infrastructure	GKI in Panchayat Engagement
Infrastructure	Geospatial data providers (NMAs), Public and Private Data Platforms	Village-level datasets, socio-ecological layers, economic layers, asset maps
Institutions	Central and State Governments, Local Institutions	Integrate geospatial information in operational processes across state government and local organisations
Industry Ecosystem	Geospatial technology providers	GIS, remote sensing, participatory mapping tools
Advanced Technologies	AI, ML, Big Data, Cloud, Spatial Modelling	Dashboards, Decision Support Systems, Automated planning insights
User Ecosystem	Civil Society Organizations, NGOs and local government	FES, CoRE Stack, INREM, WELL Labs
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Shared platforms enabling evidence-based Gram Panchayat planning, resource allocation, and participatory decision-making. Enhances transparency and accountability

Panchayat Engagement Champions Using Geospatial Approaches

The CoRE Stack Initiative

GIS, remote sensing, ML, GPS, and tools like Commons Connect enable evidence-based planning, strengthened through partnerships with stewards, governments, tech partners, and civil society for participatory governance.

INREM Foundation

Created the JalXChange platform with WhatsApp-integrated geospatial dashboards using GIS, AI, and GPS tools, enabling data-driven governance, coordination, and alignment of government, industry, and community priorities.

FES

Uses GPS and GIS for land mapping, entitlement tracking, and asset mapping, supporting data-driven planning, community conservation, welfare delivery, and collaboration with governments, NGOs, and rural stakeholders.

WELL Labs

Uses open-source geospatial platforms, citizen tools, satellite/drone data, and IoT sensors for context-specific, evidence-based planning, enhancing participation, resource management, and participatory governance.

Securing Commons Tenure and Community Registry

Geospatial technologies and data help communities map, document, and legally secure rights over their shared landscapes. Undocumented village boundaries, forest patches, and seasonal resource use patterns can now be mapped, shifting tenure governance to evidence-based, community-owned, legally verifiable Commons registries.

GKI Ecosystem for Commons Tenure

A GKI ecosystem connects communities, governments, NGOs, and researchers on shared platforms for mapping claims, validating boundaries, securing rights, and co-managing resources sustainably.

Enabling the GKI Ecosystem for Commons Tenure

Architecture	Geospatial Knowledge Infrastructure	GKI in Commons Tenure and Community Registry
Infrastructure	Geospatial data providers (NMAs), Public and Private Data Platforms	Community Forest Resource maps, common boundary layers, land-use and vegetation datasets
Institutions	Central and State Governments, Local Institutions	Integrate geospatial information in operational processes across State government and local organizations
Industry Ecosystem	Geospatial technology providers	Participatory GPS mapping, tenure-verification layers, habitat models
Advanced Technologies	AI, ML, Big Data, Cloud, Spatial Modelling	Automated boundary validation; predictive restoration and threat mapping
User Ecosystem	Civil Society Organizations, NGOs and local government	FES, CoRE Stack
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Community-led mapping, digital claims preparation, shared registries, restoration planning

Commons Tenure Champions Leveraging Geospatial Information

Foundation for Ecological Security (FES)

- Used Participatory GIS, GPS mapping, satellite imagery, CLM, FRA Tool, and WebGIS-based biodiversity intelligence for community rights and restoration.
- Partnered with Gram Sabhas, NGOs and rural stewards improving resource management.

India's geospatial ecosystem is uniting communities and institutions, using GPS evidence, satellite imagery, WebGIS, and participatory mapping to secure rights and enable confident community stewardship of shared landscapes.

Right to Employment and Resources

Geospatial technologies and information are strengthening the right to employment by aligning wage work with resource regeneration and entitlement access. Through location-based data, IoT, GPS-linked evidence, and entitlement tracking, communities are shifting from fragmented scheme uptake to targeted, rights-based livelihood security.

GKI Ecosystem for Employment and Resource

A GKI ecosystem for employment and resource management integrates geospatial and government initiative-related data to expand livelihood opportunities, improve resource planning, strengthen governance, and support resilient investments.

Enabling the GKI Ecosystem for Right to Employment and Resources

Architecture	Geospatial Knowledge Infrastructure	GKI for Right to Employment and Resources
Infrastructure	Geospatial data providers; public and private data platforms	Land diagnostics, geospatial data layers, asset and geotagging
Institutions	Central, State and Local Governments	Integrate geospatial information in operational processes across state government and local organisations.
Industry Ecosystem	GIS, mobile mapping tools, cloud dashboards	GIS dashboards, remote sensing, satellite and drone data
Advanced Technologies	AI, ML, geospatial modelling	AI-driven Skill Matching, ML for Worksite Monitoring and Asset Quality, Mobility & Migration Pattern Analysis
User Ecosystem	State governments, Civil society, NGOs	FES
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Creates a comprehensive GKI ecosystem improving resource management, empowering communities, and driving evidence-based planning.

Leaders Advancing Employment and Resource Rights with Geospatial Information

The Foundation for Ecological Security

- Uses GIS tools like CLART and Core Stack, aligning right to employment and right to resources.
- Works with governments to steer investments in natural resources, ensure transparent MGNREGS implementation, and improve rural resilience.

India's geospatial ecosystem is advancing the right to employment and resources by enabling context-specific, evidence-driven, rights-based planning that secures livelihoods, guides resource regeneration, and strengthens long-term rural resilience.

Enabling Water Governance

Geospatial data and technologies are essential for mapping and monitoring India's water resources. By collecting, analysing, and visualising geospatial data, they assess surface water, groundwater fluctuations, and basin health. National initiatives, including Clean Ganga, the Hydrology Project, and the Jal Jeevan Mission, demonstrate the power of data-driven water management.

GKI Ecosystem for Water Governance

A GKI ecosystem for water governance connects institutions, communities, hydrological datasets, geospatial platforms, and AI tools into one decision network, enabling real-time water intelligence, coordinated action, and sustainable community stewardship.

Enabling GKI for Water Governance

Architecture	Geospatial Knowledge Infrastructure	GKI in Water Governance
Infrastructure	Geospatial data providers (NMAs), Public and Private Data Platforms	Hydrological datasets, water usage and demand layers, hydro-meteorological data, water infrastructure layers.
Institutions	Central, State and Local Governments	Integrate geospatial information in operational processes across State government and local organizations.
Industry Ecosystem	Geospatial Technology providers	GIS, Remote Sensing, EO.
Advanced Technologies	AI, ML, geospatial modelling	AI, ML, Spatial Computing
User Ecosystem	Civil Society Organizations, NGOs and local government	FES, Well Labs, INREM
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Create a comprehensive geospatial knowledge infrastructure ecosystem that promotes sustainable water resource management, as well as water equity and fairness.

Water Governance Champions Applying Geospatial Information

CoRE Stack Initiative

CoRE Stack uses geospatial data, ML analytics, groundwater layers, and GPS mapping to guide scientific water planning, while local stewards, volunteers, and CSOs use these insights to strengthen Panchayat decisions, NRM demands, and equitable water and groundwater management.

WELL Labs

Uses GIS, GEE, satellite data, drones, and IoT sensors for hydrology mapping, crop assessment, and watershed design, and partners with governments for water security assessment and evidence-based planning.

Foundation for Ecological Security

Uses GWMT and CLART to collect GPS-linked well and conservation data, integrating inputs from government, NGOs, and communities into a national groundwater repository, strengthening transparent and equitable community-led groundwater decisions across states.

Enabling Forest Governance

Geospatial data transforms forest governance by revealing boundaries, community forest resource areas, biodiversity, and degradation patterns. Satellite imagery, GPS trails, participatory maps, and ecological datasets help communities and institutions assess forest use, vulnerabilities, rights, and conservation needs, shifting management to evidence-based, rights-driven, community-anchored governance.

GKI Ecosystem for Forest Governance

A GKI ecosystem for forest governance connects geospatial datasets, community evidence, institutions, and analytics. It enables forest departments, local governments, committees, NGOs, and researchers to collaborate, strengthen tenure security, and improve forest health monitoring.

Enabling the GKI Ecosystem for Forest Governance

Architecture	Geospatial Knowledge Infrastructure	GKI in Forest Governance
Infrastructure	Geospatial data providers (NMAs), public and private data platforms	CFR maps, canopy density models, habitat and watershed datasets
Institutions	Central and State Governments, Local Institutions	Integrate geospatial information in operational processes across State government and local organisations.
Industry Ecosystem	Geospatial Technology providers	WebGIS, remote sensing, satellite time-series, drone-based forest mapping, participatory GPS mapping
Advanced Technologies	AI, ML, Big Data, Cloud, Spatial Modelling	Forest rights verification, Real-Time monitoring and mapping, predictive analytics for threat management (Wildfire, Disease Outbreak)
User Ecosystem	Civil Society Organizations, NGOs	FES, and CoRE Stack
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Community-led mapping and governance of forests, rights recognition, ecosystem restoration and monitoring

Forest Governance Champions Using Geospatial Information

Foundation for Ecological Security (FES)

Uses georeferencing, GPS, and GIS tools with government and community partners to legitimise CFR claims, improve tenure security, and support evidence-based restoration and biodiversity insights through IBIS.

The CoRE Stack Initiative

Integrates geospatial data, ML, and participatory tools to drive equitable, resilient resource governance, supported by collaborative forest management among communities, civil society, and governments.

Enabling Land governance

Geospatial technologies are transforming land governance by improving visibility of boundaries, ownership, and resource use. GIS, high-resolution imagery, drones, GPS evidence, and blockchain enable secure, transparent land administration, strengthening tenure security and supporting sustainable development.

GKI Ecosystem for Land Governance

A GKI ecosystem links governments, tech providers, communities, and civil society through a unified framework, integrating cadastral layers, commons maps, tools, and community evidence to strengthen property rights, speed tenure recognition, and improve sustainable land-use planning.

Enabling the GKI Ecosystem for Land Governance

Architecture	Geospatial Knowledge Infrastructure	GKI in Land Governance
Infrastructure	Geospatial data providers; public and private data platforms	Land registries, parcel boundaries, Land Use and Land Cover (LULC) layers, Legal and Administrative Boundaries
Institutions	Central and State Land Departments, Local Governments	Integrate geospatial information in operational processes across state government and local organisations.
Industry Ecosystem	GIS, remote sensing, GPS mapping tools	Participatory land mapping, property tax mapping, encroachment on government land
Advanced Technologies	AI, ML, geospatial analytics	Automated boundary verification, conflict detection, and change monitoring
User Ecosystem	Civil Society Organizations, NGOs and local government	FES
Partnerships	Collaboration between data providers, industry, user ecosystem and rural stakeholders	Rights recognition, transparent land records, community-led land use planning

Land Governance Leaders Using Geospatial Information

Foundation for Ecological Security (FES)

Uses GPS mapping, WebGIS, and boundary tools with Gram Sabhas, tribal communities, and state agencies to democratise land evidence, supporting CFR recognition, stronger claims, improved commons documentation, and better shared-landscape governance.

India's emerging geospatial ecosystem is linking cadastral layers, community maps, land institutions, and analytics to strengthen tenure and transparency. A cohesive GKI ecosystem will improve decision-making, enhance security of tenure, and enable rights-driven, sustainable land governance across diverse geographies.

"Natural resource management is inherently a spatial challenge defined by the shifting extents of water and land-typologies across seasons and years. Geospatial data and intelligence provides the critical lens to understand these dynamics and enable fair, sustainable, and science-led management of our shared resources."

Vivek Grewal
Managing Partner, Technical Consulting

"The CoRE stack vision is to empower communities to manage their landscapes in a social-ecological manner on their own terms. We equip them with crucial datasets and knowledge to do this effectively and equitably."

Aaditeshwar Seth
Co-founder, CoRE stack initiative

The future of rural development lies in how effectively we translate data into local action. At INREM Foundation, we believe geospatial knowledge and intelligence are the bridges between community realities and systemic solutions, enabling every village to see, understand, and act on its water and environmental challenges on the path to becoming Water-Safe communities"

Dr. Senderrajan Krishnan
Executive Director, INREM Foundation

3 Strengthening India's Rural Fabric: The Foundation for Ecological Security and CoRE Stack

Amid growing pressures of climate change, biodiversity loss, and resource degradation, the Foundation for Ecological Security (FES) has positioned Ecological Security as a cornerstone of rural development, asserting that sustainable and equitable growth depends on healthy, restored, and collectively governed ecosystems. This vision aligns naturally with the principles of Geospatial Knowledge Infrastructure (GKI), where geospatial data, institutional collaboration, and informed decision-making reinforce community resilience. Across India's rural landscapes, FES has demonstrated how geospatial intelligence, when combined with strong local governance, can rebuild the ecological foundations essential for long-term rural prosperity.

Core Model of FES

SECURE COMMUNITY LAND RIGHTS

Ensuring communities have legal control over shared natural resources.

RESOURCE MANAGEMENT AND GOVERNANCE PLANS

Supporting village institutions to manage forests, grasslands, and water bodies.

ACCESS TO RESOURCE AND FINANCE

Enabling investments in ecological restoration and livelihood diversification.

IMPROVED ECOLOGICAL HEALTH

Reviving landscapes through community stewardship.

RESILIENT RURAL LIVELIHOODS

Strengthening income and well-being through sustainable natural resource use.

Spatial Knowledge as a Common Good

Geospatial intelligence is most impactful when embedded within community institutions. Mapping the commons, visualizing watershed dynamics or overlaying ecological and socio-economic layers helps Panchayats and local user groups articulate priorities and manage trade-offs between conservation and use, between environment and economy

These spatially anchored dialogues enable a form of bottom-up planning that strengthens both ecological and social capital, transforming degraded commons into assets of shared prosperity

~65,000+
Village Institutions Strengthened

40 Mn+
Lives Impacted

17.6 Mn +
Acres of Commons under Community Governance

From Practice to Platform: Towards the India Observatory

The evolution from field-based learning to a nationwide platform led to the creation of the India Observatory (IO), a geospatial knowledge system designed to broaden access to environmental and socio-economic data. By offering a unified spatial view of forests, land, and water systems, IO supports practitioners and policymakers in advancing conservation, restoration, and sustainable resource management.

Ecological Protection and Restoration through Data and Technology

The India Observatory serves as a digital backbone for rural transformation, integrating over 1,800 data layers across ecological, social, and developmental domains. Its dynamic platform brings together decades of datasets from national agencies, state departments, and research institutions, providing simple, web- and mobile-based, open-source tools to support planning, implementation, and monitoring by communities, NGOs, governments, and researchers.

Key features include:

- **Comparative Mapping:** overlay or split maps for side-by-side analysis
- **Temporal Visualization:** track changes in land, water, and livelihoods over decades
- **Analytics Tools:** calculate, compare, and visualize trends for informed decision-making
- **Multilingual Interfaces & Infographics:** ensure accessibility and inclusivity

These features transform static datasets into interactive, contextualized knowledge, helping bridge the gap between national data infrastructures and local decision-making ecosystems

India Observatory at a Glance

India Observatory Tools
Tools are being used by 210+ partners including governments and NGO's across 14+ states.

Technology Scale
Tools like CLART have been scaled across 17,300+ villages across 5 states to enable scientific MGNREGS planning.

Program Infrastructure
CLART integrates with Jan Sanjeevani for Gomala sub-plans, while the FRA tool links with Chhattisgarh State Infrastructure to support CFRR claim filings.

GWMT
This was used by 143 partners to monitor the pre and post monsoon water levels of 40,000+ wells across 12 states.

Empowering Action: India Observatory Tools

Data Platform

An online platform that brings together available dara and knowledge products on a common platform. It houses rich and diverse datasets on India's social, economic and ecological parameters with spatial and temporal analytics, presented through easy to understand and insightful visualisations for better decision making and enhancing local stewardship.

Scan to learn more

Groundwater Monitoring Tool (GWMT)

A Tool to enable communities to measure and monitor the depth of their wells - pre and post - monsoon to understand the status of groundwater resources and make informed decsions for its better usage, governance and management.

Scan to learn more

Composite Land Assesment and Restoration Tool (CLART)

A Geographic Information System (GIS) based Android tool - developed to enhance the planning of region - specific soil and water conservation measures.

Scan to learn more

Crop Water Budgeting (CWB) Tool

A farmer centric android tool which enables rural communities to input primary information and assists them in managing their surface and ground water efficiently without depleting their resources. It generates discusions on water as a collective resource and the need for better governance.

Scan to learn more

Common Land Mapping (CLM) Tool

CLM helps identification and demarcation of shared common land and resource through geo - referencing and enables the communities to map and seek tenure over them. it supports preparation of claims with evidence under the Forest Rights Act.

Scan to learn more

Indian Biodiversity Information System (IBIS)

IBIS is a web-based platform, making biodiversity knowledge more accessible in India. Integration of species records, ecological data & conservation tools in a searchable database (birds, mammals, plants & more). Built for researchers, practitioners & communities to power citizen science & evidence-based conservation.

Scan to learn more

GIS - enabled Entitlement Tracking System (GEET)

A tool to enable rural communities to access various government entitlements and schemes as per their eligiblity.

Scan to learn more

Forest Rights Act. (FRA) Tool

This tool uses GPS facility and satellite images to help communities document and submit Individual Forest Right (IFR) and Community Forest Rights (CFR) .

Scan to learn more

Reimagining Rural Knowledge Systems

Most rural development relies on fragmented data and administrative boundaries, missing the links between ecology and livelihoods. The India Observatory uses GKI to integrate spatial data, satellite imagery (EO), and community knowledge, creating living knowledge ecosystems. It bridges local wisdom, policy, and science, enabling anticipatory, landscape-based planning and participatory decision-making for resilient and sustainable rural development. Through its data platform, the India Observatory bridges the divide between practice and policy, science and governance and local wisdom and national insight. It embodies the principles of Geospatial Knowledge Infrastructure (GKI), not as a distant digital framework, but as a grounded system that serves people, panchayats and policymakers alike

Traditional vs India Observatory GKI-enabled approach to Rural Development

Dimension	Traditional Rural Development Approach	India Observatory and GKI - Enabled Approach
Knowledge Source	Field experience and fragmented project data.	Integrated spatial datasets combining field insights, satellite imagery, and Community knowledge.
Planning Lens	Administrative Boundaries (Districts/Block level).	Ecological landscapes (watersheds, ecosystems).
Decision - Making	Reactive and scheme - specific interventions.	Anticipatory, data - driven, and landscape - based planning.
Data Accessibility	Scattered, expert - dependent, and often siloed.	Open - access geospatial platform (India Observatory).
Community Role	Beneficiaries or data providers.	Co - creators through participatory mapping and monitoring tools.
Knowledge Flow	Top - down, Centralized.	Bottom - up and networked across users and geographies.
Outcome Orientation	Asset creation and compliance.	Ecological balance, resilience, and custained rural prosperity.

Bridging the Gaps in Rural Development Practice

Rural development faces persistent gaps, data disconnected from realities, insights scattered, and local decisions underserved. The India Observatory bridges these gaps by weaving ecological intelligence, geospatial data, and community knowledge in 12+ languages, creating a living system where planning is informed, collaborative, and resilient.

The CoRE Stack: Building the Digital Commons for Rural India

The Collaborative Resource and Ecosystem (CoRE) Stack represents a new digital foundation for rural transformation, where data, intelligence, and collaboration converge to serve people and the planet. As an open, interoperable Digital Public Infrastructure (DPI) for climate adaptation and socio-ecological sustainability, it integrates geospatial datasets, machine learning analytics, and participatory planning tools, turning fragmented information into a shared digital Common. CoRE connects satellites with soil, analytics with awareness, and algorithms with human agency, enabling decentralized, data-driven governance.

Piloted in Rajasthan (Bhilwara) and Odisha (Angul), CoRE Stack empowers communities and Panchayats through platforms like Commons Connect and the Know Your Landscape (KYL) Dashboard. Citizens can visualize resources, plan interventions, and act even offline, while governments and NGOs gain granular insights for equitable resource allocation and ecological restoration. Already reaching over 800 villages, CoRE Stack demonstrates how localized, participatory action can scale into regional and national impact, creating a living digital commons for rural India.

Open by Design: Principles of Collaboration and Trust

The CoRE Stack empowers communities to understand, manage, and restore their landscapes through shared intelligence, bridging scientific insight and local wisdom while enabling open data to flow between research institutions, Panchayats, and local decision-makers. Embedded with openness, transparency, and innovation, it turns data into dialogue, maps into mediators, and technology into a tool for collective action. By fostering lateral flows of information among communities, researchers, and governments, CoRE Stack redefines governance as stewardship rather than top-down control. Platforms like Commons Connect and the KYL Dashboard translate ecological insights into actionable plans, while open APIs and transparent data governance build trust and collaboration.

The Commons in Code

The CoRE Stack extends the idea of Commoning, the shared governance of land, water and forests into the digital realm. It transforms technology into a public good, guided by three foundational principles:

The Three Foundational Principles of CoRE Stack

Principle	Meaning in Practice
Open Access	APIs and datasets are public, interoperable and reusable across domains, turning isolation into collaboration
Data Sovereignty	Contributors retain control; data is governed by transparency, consent and mutual trust
Shared Innovation	Algorithms, analytics and tools are open-sourced to enable experimentation across institutions and regions

This open architecture ensures that the stack remains dynamic, not static, an evolving ecosystem that anyone can contribute to, improve and scale

Case Studies

Case Study

Restoring Landscapes through Geospatial Intelligence: The CLART Initiative

Overview

The Composite Landscape Assessment and Restoration Tool (CLART), demonstrates how geospatial intelligence can enable participatory, data-driven approaches to rural landscape restoration. Designed to address land degradation and water scarcity, CLART integrates spatial datasets with local governance processes, translating geospatial insights into actionable community-level interventions for sustainable resource management in rural India

SDG Adressed

Challenges

The **Foundation for Ecological Security (FES) introduced CLART in 2016** to address chronic agricultural and water scarcity challenges in Odisha, Meghalaya, Karnataka, Andhra Pradesh Chhattisgarh, and Rajasthan.

90% of the population dependent on rainfed agriculture without any infrastructure support for land and water, growing crops was a monumental task

Erratic spells of rain and drought triggered large-scale migration, including nearby areas and scuffles over water use

Due to limited understanding and availability of scientific information and data, village communities rely on intuition-based decisions to prepare for work taken under MGNREGA

Turning Vision into Action

Sustainable agriculture depends on restoring linkages with local biodiversity, nutrients, and water through integrated farming of crops, livestock, and commons.

- CLART is an open-source GIS-based mobile tool that provides location-specific recommendations for soil and water harvesting structures based on recharge potential, slope, and land use.
- Through this tool, a user can view a map of the area on the basis of the recommended treatment code which indicates where a good recharge engineering structure can be constructed to increase the groundwater table
- Focus on developing self-sufficiency and sustainability for through CLART, over 4,50,000+ soil and water conservation plans have been developed across seven states, advancing local self-sufficiency and sustainability.

Synergy for Sustainable Impact

CLART also assists communities and village authorities in taking informed decisions concerning development works under government welfare schemes.

- CLART provides color-coded maps based on terrain and land-use data, with GPS-enabled, offline guidance for location-specific interventions
- Users can document site data and use the design-estimation module to calculate costs, manpower and time for each intervention
- Efficient water use and soil health management has helped elevate villagers' lifestyles providing them with additional savings, more revenue through excess fodder auction

Stakeholders

FES
FOUNDATION FOR ECOLOGICAL SECURITY

Case Study

Data-Driven Groundwater Resource Planning in Water-Stressed Village

Overview

The CLART pilot in Om Sagar (Panbari), Assam was launched to address chronic domestic and agricultural water scarcity, using a scientific, community-led approach to enhance groundwater recharge and secure local water sources. Supported by P&RD, Arghyam, FES, and CML, the project applied CLART to improve long-term water sustainability

SDG Adressed

Challenges

The pilot project was conceptualized to tackle critical water management issues affecting rural communities in Kamrup Rural District

The village faced acute and recurring shortages for both domestic consumption and agricultural use, threatening livelihoods and local sustainability

Watershed interventions under schemes like MGNREGA and GPDP often lacked scientific assessment, leading to inefficient site selection and resource utilization

Planning processes were hindered by the absence of integrated scientific and community knowledge, slowing down implementation and reducing the impact of water conservation measures

Turning Vision into Action

The CLART pilot translated a shared vision for sustainable water management into on-ground results through collaboration, science, and community participation.

- Soil, terrain, and hydrological conditions were mapped to identify suitable sites for check dams, LBCDs, and CCTs, improving the accuracy of watershed interventions
- The initiative united P&RD, Arghyam, FES, and CML with local bodies and officials, aligning scientific expertise with government execution mechanisms
- Participatory tools like PRA exercises and transect walks ensured that local insights shaped data-backed and inclusive water management plans

Synergy for Sustainable Impact

Demonstration of how data-driven planning, community participation, and inter-institutional collaboration can together create lasting ecological and livelihood benefits

- CLART used geospatial layers (slope, lithology, drainage, land use) to map recharge zones and guide 51 LBCDs, 4 check dams, and contour trenches using a ridge-to-valley approach to reduce runoff and boost infiltration
- The plan recommended repairing JJM pipelines, adding solar pumps, and installing rapid sand filters to ensure safe and reliable water access
- The initiative improved DPR approvals and fund use, enabled community-led conservation planning, and supported holistic socio-economic development

Stakeholders

Case Study

Integrated Forest Management Toolbox (IFMT): A Digital Ecosystem for Data-Driven Forest Governance

Overview

India's forest management has long depended on timber-focused methods and disconnected data systems, limiting ecosystem-level decision-making. To meet the scientific and ecosystem-based requirements of the National Working Plan Code (NWPC) 2014, the Integrated Forest Management Toolbox (IFMT) was developed in 2016 as a GIS- and remote sensing–based decision-support system. By integrating spatial and field data, IFMT enables evidence-based planning, biodiversity monitoring, and sustainable forest governance, and has since been deployed across forest divisions in Rajasthan.

SDG Adressed

Challenges

Traditional forest working plans were designed primarily for timber extraction, not for holistic ecosystem management or biodiversity conservation.

Field data collection relied on manual, paper-based surveys that were inconsistent, time-consuming, and prone to errors or data loss

Forest departments lacked the digital infrastructure and training to manage and integrate diverse datasets, ranging from vegetation and topography to socio-economic information

The absence of centralized and reusable data repositories led to repeated surveys and delays in preparing working plans across divisions

Turning Vision into Action

To modernize forest governance, the **Foundation for Ecological Security (FES)** collaborated with the **Forest Departments of Rajasthan** under the guidance of the **Commissionerate of Forests**

- FES trained forest officials and guards to use the **Forest Data Kit (FDK)** for standardized, digital field surveys, ensuring data consistency across regions
- Forest departments' field data and species inventories were combined with geospatial datasets, while community insights guided local interventions
- The process followed NWPC 2014 guidelines, embedding geospatial analysis and ecological modelling into official working plan preparation and approvals

Synergy for Sustainable Impact

The IFMT established a unified, data-driven system that combined geospatial analytics, mobile surveys, and ecological modelling to improve ecological planning, operational efficiency, and institutional transparency

- The Forest Resources Observatory centralized all spatial datasets, enabling long-term monitoring, data reuse across schemes, and reduced operational costs
- Tools like CLART and SDM enabled targeted water recharge, soil conservation, and species selection, strengthening biodiversity and climate resilience
- GPS-based tracking and digital workflows improved field accountability, while training programs built durable digital capacity within forest departments

Stakeholders

FES
FOUNDATION FOR ECOLOGICAL SECURITY

Government of Rajasthan
Forest Department

Case Study

GEET: GIS-Enabled Entitlement Tracking for Inclusive Welfare Delivery

Overview

Underprivileged and remote communities in India often miss out on welfare benefits due to limited awareness, inconsistent data systems, and weak last-mile delivery. To address this gap, the Foundation for Ecological Security (FES), with support from the United Nations Development Programme (UNDP), developed GEET, a GIS-Enabled Entitlement Tracking system

SDG Adressed

Challenges

Many rural households lacked information about their entitlements, while inconsistent and outdated records across government departments made beneficiary tracking difficult

Low literacy, poor internet connectivity, and limited availability of smartphones required the platform to work offline, be multilingual, and remain extremely user-friendly

Combining welfare programmes from central and state governments into a single unified system required extensive coordination, frequent updates, and customisation for state-specific contexts

Accurate household mapping depended on intensive surveys, verification, and alignment with local governance institutions

Turning Vision into Action

FES and UNDP transformed the idea of inclusive welfare delivery into a digital, GIS-backed solution implemented at scale.

- GIS-enabled household mapping enabled beneficiaries into receiving a unique entitlement card creating a digital record of entitlements to track eligibility and coverage, accessible via app or dashboard
- JSLPS (Jharkhand) and OLM (Odisha) adopted GEET into their state livelihood programmes, integrating 18+ schemes and linking eligible households
- The platform incorporated multilingual support, offline functionality, and a grievance redressal mechanism, ensuring overall inclusivity

Synergy for Sustainable Impact

GEET created a unified, transparent, and citizen-centric welfare delivery ecosystem.

- Integrating geospatial intelligence with welfare data, GEET strengthens government accountability and provides a template for inclusive governance
- The GIS dashboard visualizes welfare coverage, enabling officials to identify underserved areas, detect gaps, and ensure targeted delivery
- By removing dependence on intermediaries, the platform ensures equitable access and empowers marginalized communities to claim what they deserve

Stakeholders

Case Study

1000 Springs Initiative: GIS-Enabled Spring Atlas for Water Security in Tribal Areas

Overview

The 1000 Springs Initiative, launched by Gram Vikas and partnering with UNDP, ACWADAM, and MoTU, aims to enhance water security across India's tribal regions by sustainably harnessing natural springs. Given the difficulty of traditional groundwater extraction in hilly and forested terrains, the initiative uses GIS-based mapping, hydrogeological assessments, and a digital Spring Atlas to convert springs into reliable community water sources

SDG Adressed

Challenges

Groundwater extraction in hilly and forested terrains is traditionally difficult due to environmental constraints

Accessing spring sources in rugged, forested terrains was difficult, limiting field survey coverage and complicating aquifer mapping and hydrological assessments

Absence of baseline datasets and limited earlier documentation of springs created hurdles in ensuring accuracy, standardisation, and scientific validation of spring-related data

Multiple field contributors required uniform training and protocols to maintain data consistency, while seasonal fluctuations in spring discharge complicated long-term monitoring of water availability

Turning Vision into Action

Field surveys are conducted with help of geospatial technology, creating a participatory and continuously updated digital inventory

- MoTA, UNDP, state tribal departments, and community institutions collaborated closely. MoTA offering policy and funding support, and UNDP leading the GIS-based Spring Atlas design and training
- Trained tribal youth surveyed and geotagged springs, measured discharge, and uploaded data through a mobile app for real-time updates
- State and local institutions coordinated fieldwork and integrated the initiative with wider rural development and water conservation programmes

Synergy for Sustainable Impact

The Spring Atlas now serves as a national knowledge system for planning water security interventions in ecologically fragile landscapes

- Through the GIS-enabled Spring Atlas, over a thousand springs were mapped, catalogued, and analysed for factors such as discharge levels, water quality, recharge potential, and seasonality, building a robust scientific repository
- Communities gained year-round access to safe water, reducing drudgery, especially for women while improving health, agricultural stability, and livelihood resilience in tribal regions

Stakeholders

FES
FOUNDATION FOR ECOLOGICAL SECURITY

Government of India
Ministry of Rural Development

MINISTRY OF TRIBAL AFFAIRS
GOVERNMENT OF INDIA

Case Study

Community Atlas: Participatory Commons Mapping and Management Project in Chittorgarh

Overview

The Community Atlas of Commons, Chittorgarh is a district-wide effort to empower communities in managing their shared landscapes, pastures, forests and wastelands through simple digital and geo-referenced tools. Using the Common Land Mapping (CLM) tool and open geospatial data, 950+ villages helped map over 46,000 hectares of Commons. By blending local knowledge with spatial evidence, the Atlas enables communities to voice priorities, engage more effectively with government institutions, and co-develop sustainable pathways for managing natural resources.

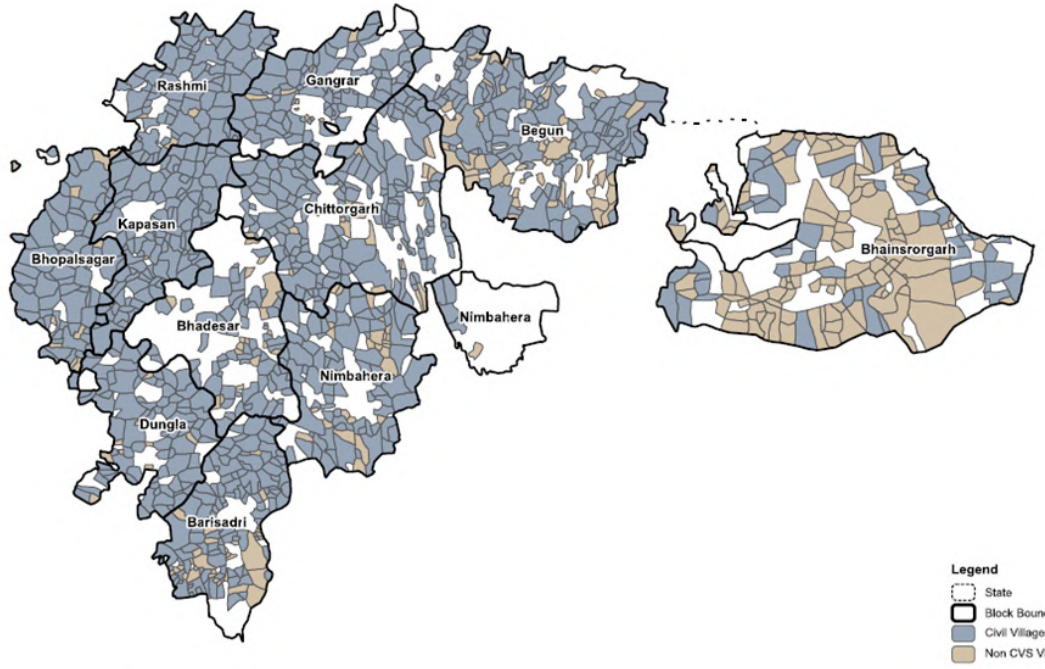
SDG Adressed

Challenges

Chittorgarh's Commons were rapidly degrading due to unsustainable land use, overgrazing, encroachments, and unclear boundaries. Limited spatial information made planning and dispute resolution difficult.

High community dependence on Commons, often 80–100% for livelihoods, combined with inadequate pastureland and top-down governance reduced local agency.

Droughts, erratic rainfall, and declining soil productivity further weakened grazing capacity. Lacking reliable data, communities had little leverage in negotiations with government departments.



Turning Vision into Action

- **Participatory mapping with the CLM tool** enabled communities to geo-reference pasture, forest, and wasteland boundaries using a GPS-enabled app, combining spatial data with local ecological knowledge.
- **920+ Charagah Vikas Samitis led district-wide efforts,** mapping 46,000+ hectares across 950+ villages and driving restoration planning, encroachment removal, sustainable grazing, and MGNREGS-supported works.
- **Community maps integrated with India Observatory and government datasets,** including NDVI, produced village-level Commons profiles that improved vegetation monitoring, evidence-based planning, and coordination with government agencies.

Synergy for Sustainable Impact

- The Atlas empowers communities to create and interpret their own maps, strengthening tenure security, reducing boundary disputes, and enabling evidence-based decisions for managing Commons.
- Geospatial insights highlight degraded zones and guide grazing, restoration, and soil–water conservation, resulting in tangible improvements in vegetation health, soil moisture, and fodder availability.
- By blending community knowledge with digital tools and institutional collaboration, the Atlas enables data-driven planning and negotiation with state agencies, offering a scalable model for Commons governance across India.

Stakeholders

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Case Study

Shram Shakti: National Migration Support Portal for Tribal Migrant Data and Development Planning

Overview

Shram Shakti provides a unified digital system to capture and manage tribal migrant data for improved policy planning and welfare delivery. It is a comprehensive digital platform developed by the Ministry of Tribal Affairs (MoTA) in partnership with the Disha Foundation to record, manage, and analyse data related to tribal migrant workers across India. Addressing the long-standing lack of structured migration data, the portal captures migrant profiles, migration routes, work sectors, and socio-economic indicators through both web and mobile interfaces

SDG Adressed

Challenges

Lack of structured data highlights the key operational, technical, and community-level challenges

Collecting accurate data from remote tribal regions with limited digital infrastructure required innovative field approaches and strong community engagement

Safeguarding sensitive demographic information raised data privacy and security concerns that demanded robust protection mechanisms

Low digital literacy among local enumerators and migrant communities necessitated extensive capacity-building and hands-on training

Turning Vision into Action

Field enumerators collect demographic and socio-economic details through the mobile app, generating unique digital profiles for each migrant

- MoTA provided policy direction, governance structure, and financial support to drive the initiative at a national scale and The Disha Foundation led digital system development, field implementation, and creation of training modules to ensure smooth adoption.
- State welfare departments with help of Local NGOs integrated migrant data into existing welfare mechanisms, enabling state-specific migration interventions.
- Complementing the portal, 'Shram Saathi' training modules build awareness among migrants about their rights, social protection schemes, and access to legal and livelihood support systems.

Synergy for Sustainable Impact

Shram Shakti delivers long-term value by strengthening data-driven governance and empowering migrants.

- The Shram Saathi modules provide vernacular-language learning materials to raise awareness of legal rights, welfare schemes, and safe migration practices.
- The real-time national database improves cross-department coordination, enabling targeted interventions, reducing duplication, and minimizing resource wastage.
- Digital tracking boosts transparency, cuts administrative burden, strengthens accountability, and helps migrants access entitlements directly.

Stakeholders

FES
FOUNDATION FOR ECOLOGICAL SECURITY

disha
FOUNDATION

Government of India
Ministry of Rural Development

MINISTRY OF TRIBAL AFFAIRS
GOVERNMENT OF INDIA

Case Study

IndiaSAT: Monitoring Agricultural Landscape Change Across Cropping Cycles using High-resolution LULC Maps

Overview

High-resolution LULC (Land Use Land Cover) maps developed under developed by the CoRE Stack team at IIT Delhi provides annual, plot-level visibility into cropping frequency across India's agricultural landscapes. Using satellite imagery and machine learning, these maps capture changes in cropping intensity, such as shifts from triple to double or single cropping, revealing the effects of water scarcity, soil degradation, and changing agricultural conditions. By comparing multiple years, the maps highlight how farmlands are evolving and offer evidence for better agricultural and water-management planning.

SDG Adressed

Challenges

Several practical and methodological hurdles were identified in developing accurate, field-validated cropping-frequency maps.

Historical dependence on slow, manual, and outdated mapping processes led to delays and sometimes inaccurate outputs.

Existing national and global LULC products had coarse spatial resolution, PNG-only formats, and unclear methods, limiting usability and replicability of many land-use datasets in India.

Field validation faced issues like inaccurate memory recall, inconsistent sowing/harvest dates, and long-duration crops outside standard seasons, complicating accurate verification.

Turning Vision into Action

Several steps were taken to generate, refine, and operationalise high-resolution cropping-frequency maps

- IIT Delhi produces annual LULC maps using EO (Sentinel-1 and Sentinel-2) data in Google Earth Engine. It applies a machine-learning workflow combining random forests and unsupervised classifiers to progressively improve resolution.
- A hierarchical method classifies land into built-up, barren, water, and greenery, then refined into trees and crops, and finally categorised into single-, double-, or triple-cropped areas.
- WELL Labs, Prarambha, and Gram Vaani strengthen map accuracy by collecting and validating field-level cropping information through tools like QField and structured enumerator surveys.

Synergy for Sustainable Impact

Collaborative processes that enable accuracy and refinement.

- Remote-sensing (EO) researchers, grassroots field experts and community organisations together interpreted cropping patterns and land–water relationships, enabling more reliable annual LULC maps.
- Community organisations, enumerators, and technology partners coordinate data collection, transmission, and cleaning to ensure robust validation datasets.
- Iterative feedback loops between researchers and field teams ensured real-time moderation and corrections, supporting better-informed agricultural planning and water management decisions.

Stakeholders

gramvaani

WELL LABS

Conclusion: Data, Communities, and the Future of Shared Value

The experience of India's Commons, community mapping initiatives, and emerging data frameworks underscores a fundamental insight: **the value of data is fully realized when it is shared, contextualized, and put in the hands of those who generate it.** Across landscapes and sectors, integrating geospatial tools with local knowledge and institutional support has enabled communities to make evidence-based decisions, manage resources sustainably, and participate meaningfully in governance. Principles such as ownership, consent, transparency, equitable benefit sharing, and participatory governance are central to this approach. They highlight that geospatial data is not merely an economic asset, but a collective resource, one that, when responsibly governed, strengthens planning, builds trust, and fosters inclusive outcomes.

The work showcased here demonstrates a replicable model for aligning geospatial technology, knowledge, and institutions. When communities have access to actionable insights and governance frameworks are clear and accountable, the result is smarter decision-making, resilient institutions, and sustainable development.In essence, the journey of geospatial intelligence, digital platforms, and community engagement points to a broader lesson: shared, well-governed data is both a catalyst for innovation and a foundation for inclusive growth, illustrating how economic and social value can advance together.

Abbreviations

FES	Foundation for Ecological Security
GKI	Geospatial Knowledge Infrastructure
CLART	Composite Landscape Assessment and Restoration Tool
GMT	Ground Water Moitoring Tool
CWB	Crop Water Budgeting systems
FRA	Forest Rights Act
CFRR	Community Forest Resource Rights
IFR	Individual Forest Right
GEET	GIS-Enabled Entitlement Tracking
CLM	Common Land Mapping Tool
4IR	Fourth Indstrial Revolution
AI	Artificial Intelligence
ML	Machine Learning
IoT	Internet of Things
GIS	Geographic Information System
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
SDI	Spatial Data Infrastructure
IGIF	Integrated Geospatial Information Framework
APIs	Application Programming Interfaces
GDP	Gross Domestic Product
UAVs	Unmanned Aerial Vehicles
SDSS	Spatial Decision Support Systems
EO	Earth Observation
NMA	National Mapping Agency
NGO	Non-Governmental Organization
IO	India Observatory
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
IBIS	Indian Biodiversity Information System
IFMT	Integrated Forest Management Toolkit
GPDP	Gram Panchayat Development Plan
DPI	Digital Public Infrastructure
CoRE	Collaborative Resource and Ecosystem
CFPT	CommonsTech Foundation for Participatory Technologies
IIT	Indian Institute of Technology
KYL	Know Your Landscape
CSO	Civil Society Organization
P&RD	Panchayat & Rural Development Department
CML	Centre for Microfinance & Livelihoods
LBCD	Loose Boulder Check Dams
CCT	Continuous Contour Trenches
PRA	Participatory Rural Appraisal
JJM	Jal Jeevan Mission
DPR	Detailed Project Report
NWPC	National Working Plan Code
FDK	Forest Data Kit
UNDP	United Nations Development Programme
SDM	Species Distribution Model
JSLPS	Jharkhand State Livelihood Promotion Society
OLM	Odisha Livelihoods Mission
MoTA	Ministry of Tribal Affairs
IMF	International Monetary Fund
UNDESA	United Nations Department of Economic and Social Affairs
SDG	Sustainable Development Goals
GeoAI	Geospatial Artificial Intelligence
FRO	Forest Resource Observatory
GEOINT	Geospatial Intelligence
INREM	Indian Natural Resource Economics and Management
WELL	Water Environment Land Livelihood
CSR	Corporate Social Responsibility
IITM	Indian Institute of Technology Madras

IBM	International Business Machines
UNESCO	United Nations Educational, Scientific and Cultural Organization
IIHS	Indian Institute for Human Settlements
NRSC	National Remote Sensing Centre
WISER	Water Index for Sustainability, Equity & Resilience
ePRA	Electronic Participatory Rural Appraisal
WUAs	Water User Associations
SOPPECOM	Society for Promoting Participative Ecosystem Management
SMDPSC	Shramik Mukti Dal Pani Sangharsh Chalwal
ORGI	Office of the Registrar General and Census Commissioner of India
SVAMITVA	Survey of Villages and Mapping with Improvised Technology in Village Areas
NBSSLUP	National Bureau of Soil Survey and Land Use Planning
CGWB	Central Ground Water Board
MoRD	Ministry of Rural Development
PRADAN	Professional Assistance for Development Action
CBO	Community-Based Organization


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