

SMART INDIA HACKATHON 2025



- **Problem Statement ID – SIH25108**
- **Problem Statement Title –
Development of AI-powered FRA
Atlas and WEBGIS based Decision
Support System (DSS) for
integrated monitoring of Forest
Rights Act (FRA) implementation.**
- **Theme - Miscellaneous**
- **PS Category - Software**
- **Team ID - 87225**
- **Team Name - TRIBALX**



PROBLEMS



Scattered Legacy Records

FRA claims and Pattas (IFR, CR, CFR) are still paper-based, making tracking and verification slow.



No Central FRA Atlas

There's no centralized, real-time repository to visualize FRA claims, progress, and issued Pattas.



Missing Integration with Assets

Mapped assets (land, ponds, forests) from satellite data are not linked with FRA databases.



Lack of Decision Support

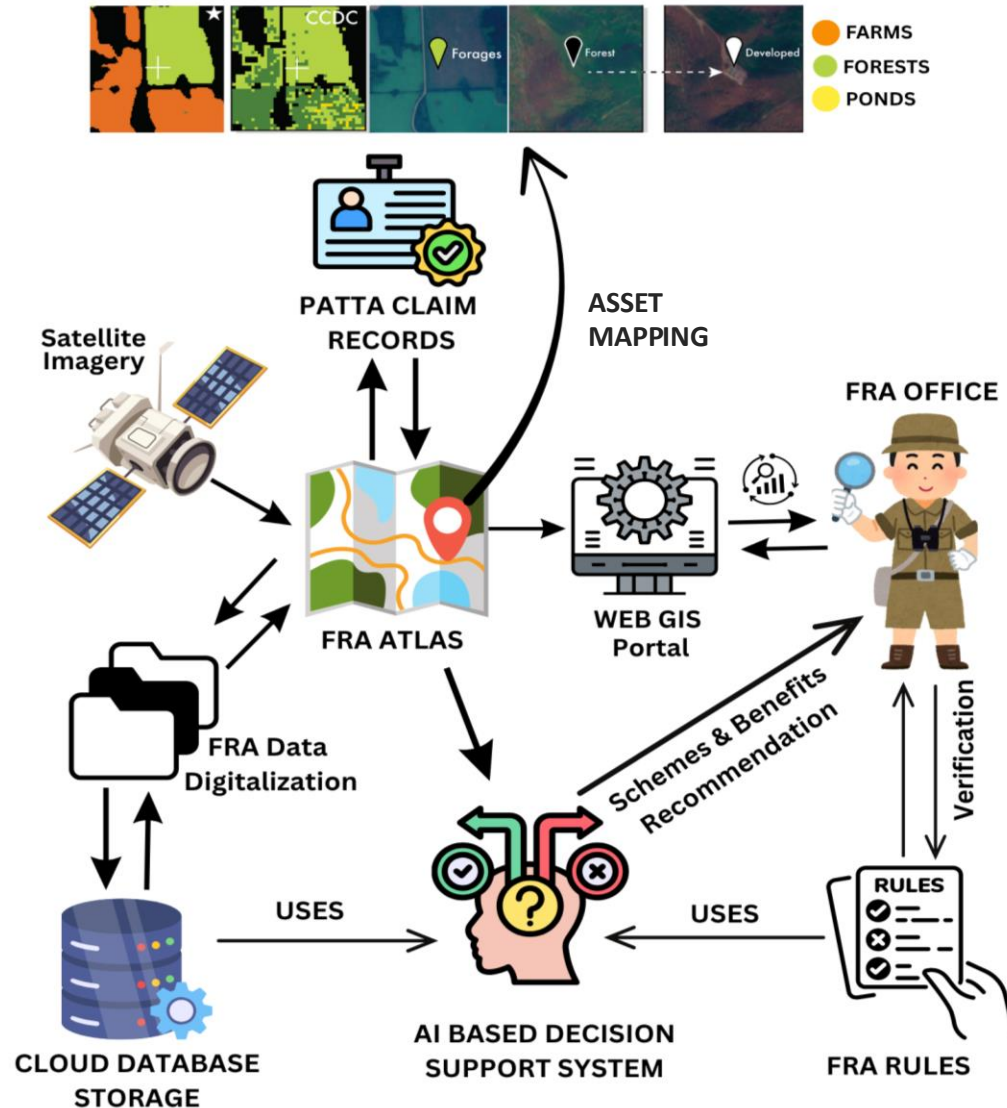
Lack of an AI-based DSS to match FRA data with government schemes blocks targeted benefits.



Data Silos

Legacy records remain disconnected from digital systems, limiting monitoring and policy insights.

OUR SOLUTION



SALIENT FEATURES

DIGITAL FRA ATLAS

- GIS Mapping
- Village Data Layers
- Asset Integration
- Record Digitization

DECISION SUPPORT SYSTEM

- Claim Validation
- Auto-Suggestion Engine
- Policy Insights

SCHEME RECOMMENDATION

- Dynamic Algorithm
- Need-Based Targeting
- Alerts & Notifications
- Integration Layer

FEEDBACK PORTAL

- Two-Way Interaction
- Claim Status Updates
- Evidence Submission
- Transparency & Trust

ACCESS & ANALYTICS

- Village Performance Insights
- Admin & Village Portals
- Cloud Storage Database

Reliability

1. System Resilience
2. Modular & Upgradable
3. Sustained Data Accuracy

IOT SENSOR

1. High-Precision Sensing
2. Cost-Efficient Setup
3. Actionable Insights

FUNDING

1. Tribal Affairs & DAJGUA
2. Modular & Upgradable
3. Digital India & AI Mission

ROI

1. Optimized Scheme Allocation
2. Time Efficiency
3. Cost-Efficient Stack

COVERAGE

1. Nationwide Reach
2. Multi-Layer Integration
3. Offline Access

TECHNICAL

1. Existing Infrastructure
2. AI & Cloud Ready
3. Integration Friendly

EXPECTED COSTING per UNIT

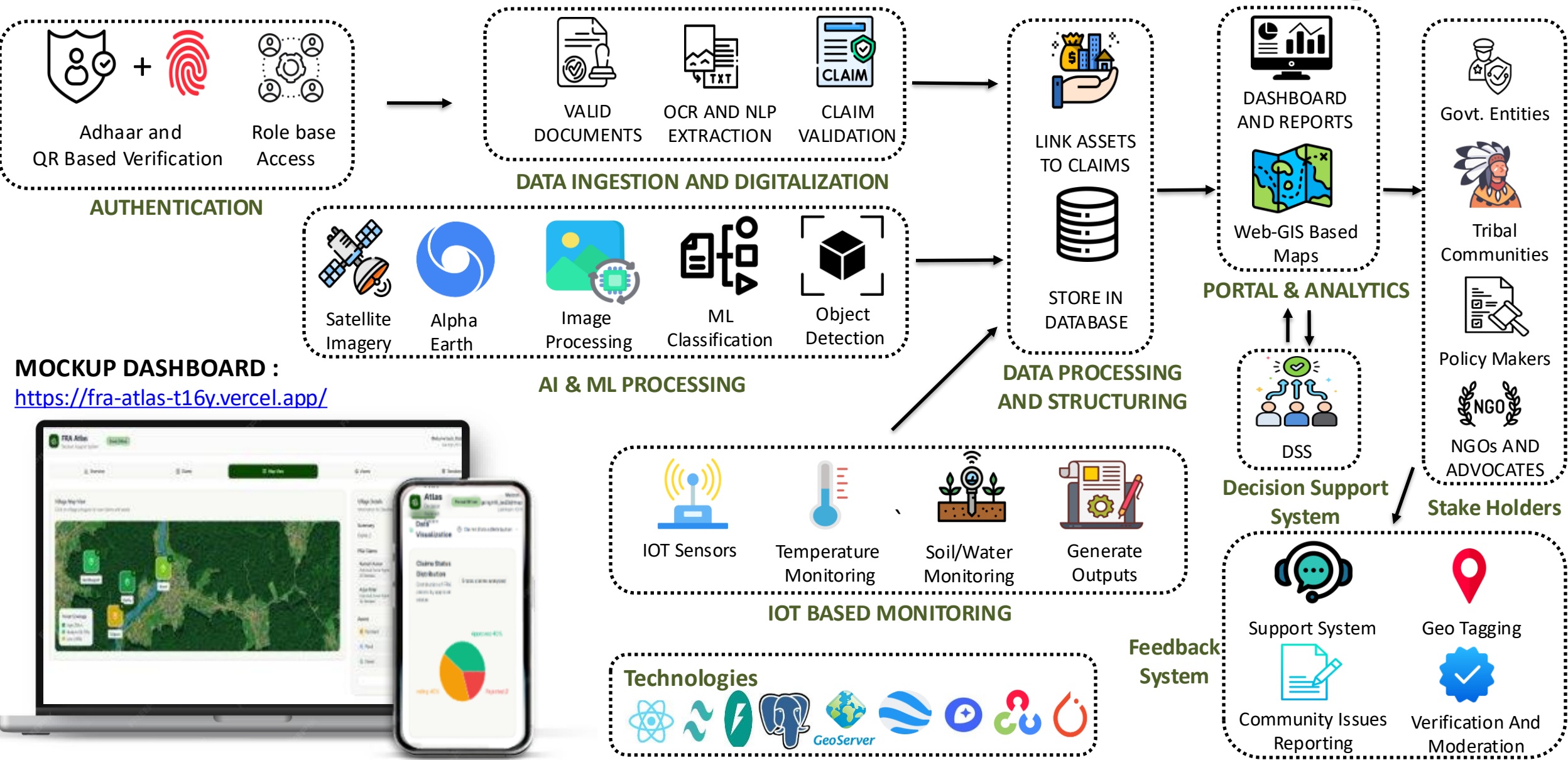
IOT Sensor Costing : Rs. 3,000 Payback Period: 3 – 4 months
Installation Cost : Rs. 1,500 Maintenance : Rs. 4,000
Total Cost per Tribal Village : Rs. 8500

Alignment to Government
Schemes

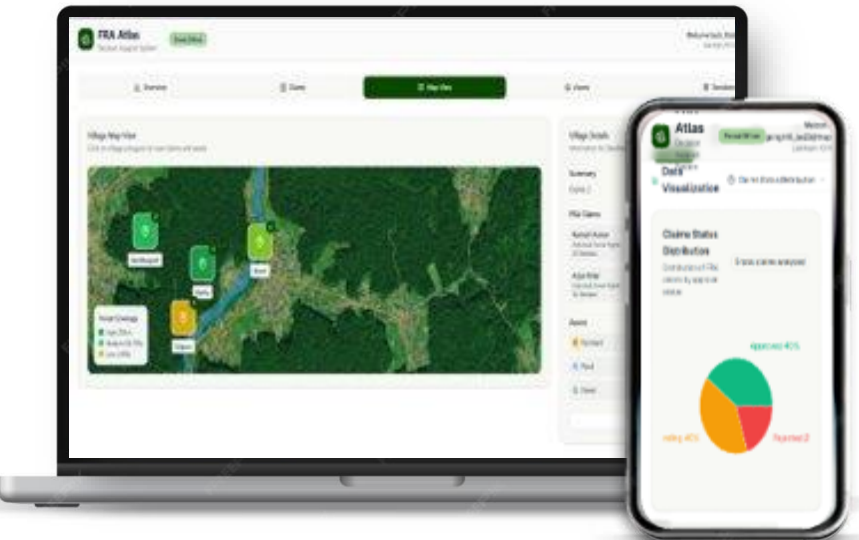
COMPARISON TO EXISITING MODELS :

FEATURE / CAPABILITY	VAN-DARPAN (OUR MODEL)	ESRI INDIA / ARCGIS	PIXCEL (HYPERSPETRAL)	EXISTING GOVT PORTALS (E.G., BHUVAN / FRA MIS)
END-TO-END FRA LIFECYCLE	✓ FULL DIGITAL FLOW: CLAIM → VERIFY → MAP → DSS	✗ PLATFORM ONLY	✗ IMAGERY ONLY	⚠ PARTIAL WORKFLOW
AI-BASED CLAIM VERIFICATION	✓ AUTO BOUNDARY CHECK + TIME-SERIES VALIDATION	⚠ REQUIRES MANUAL SETUP	⚠ SURFACE ANALYSIS ONLY	✗ NONE EXIST
DECISION SUPPORT SYSTEM (DSS)	✓ AI LINKS FRA DATA TO GOVT SCHEMES (PM-KISAN, ETC.)	✗ DOESN'T HAVE	✗ DOESN'T HAVE	✗ DOESN'T HAVE
BLOCKCHAIN-BACKED TITLE REGISTRY	✓ TAMPER-PROOF PATTA + QR + AADHAAR CHECK	✗ DOESN'T HAVE	✗ DOESN'T HAVE	✗ DOESN'T HAVE
REAL-TIME IMPACT & ROI DASHBOARD	✓ TRACKS DEVELOPMENT OUTCOMES & SCHEME REACH	⚠ CUSTOM SETUP NEEDED	✗ DOESN'T HAVE	✗ DOESN'T HAVE
OFFLINE + VOICE ACCESS FOR TRIBALS	✓ WORKS OFFLINE, SUPPORTS VOICE IN TRIBAL DIALECTS	✗ NO OFFLINE SUPPORT	✗ DOESN'T HAVE	✗ DOESN'T HAVE
PATTA DIGITIZATION & AI NER	✓ OCR + NAMED ENTITY RECOGNITION ON FRA FORMATS	⚠ AVAILABLE VIA ADD ONS ONLY	✗ NOT COVERED	✗ MANUAL ENTRY REQUIRED
COMMUNITY FEEDBACK	✓ VOICE-BASED MAPPING + DISPUTE TAGS + DASHBOARD	⚠ LACKS GENUINE FEEDBACK	✗ NO FIELD FEEDBACK TOOLS	✗ DOESN'T HAVE ANY SORT OF FEEDBACK
AI - ASSET MAPPING (FARMS, PONDS, ETC.)	✓ AUTO-UPDATED & CLASSIFIED SEASONAL MAPS + HIGH-RES.	⚠ MANUAL SETUP	✓ HIGH RES. DATA	⚠ SOME LAYERS ONLY

TECHNICAL APPROACH



MOCKUP DASHBOARD :
<https://fra-atlas-t16y.vercel.app/>



IMPACT AND BENEFITS

SOCIO - ECONOMIC IMPACT

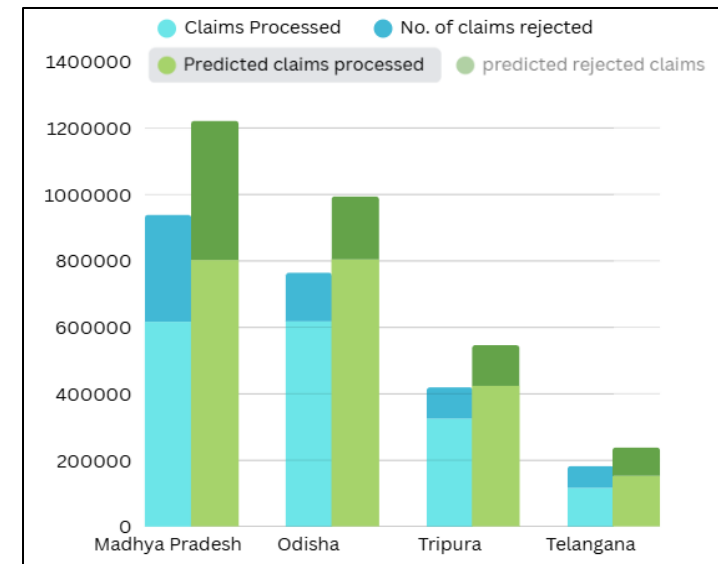
- **AI-Powered FRA Portal:** 63K villages onboarded with automated enrollment for schemes like Ayushman Bharat, PM-Awas, and MGNREGA.
- **Faster Approvals:** Processing time reduced from 8–12 months to 4–6 weeks using AI and satellite-based claim verification.
- **Smart & Transparent Governance:** Blockchain registry prevents duplication; all forms e-signed with zero paperwork.
- **Digital Empowerment & Scale:** 2.5L+ Gram Panchayats trained; ISRO-Bhuvan mapping identifies 1L+ hectare CFR potential, aligned with Digital India & UN SDGs.

BENEFITS TO TRIBAL PEOPLE

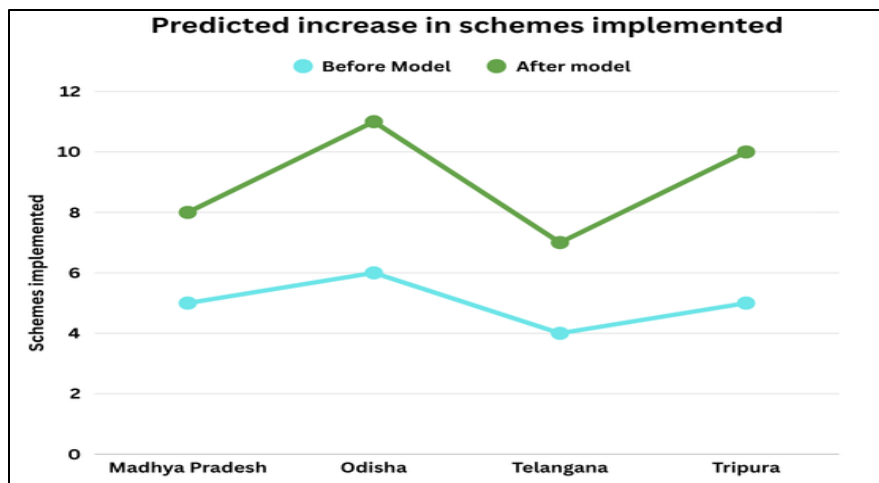
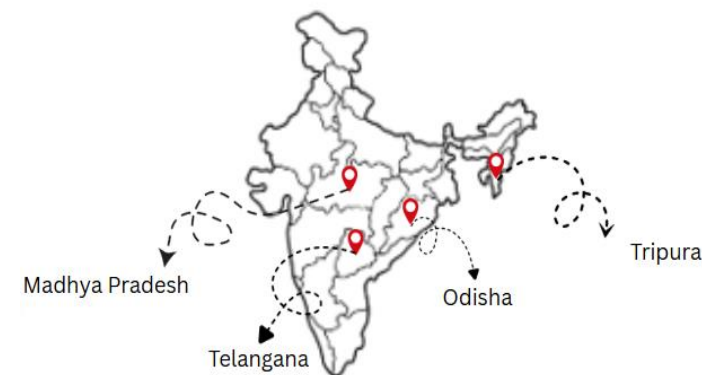
- **30-day SDLC + 30-day DLC** digital workflow with SMS alerts
- **CFR grants:** ₹15L/100 hectare for 1,000 conservation plans
- **38K Van Dhan Kendra** linked to 100 Tribal Marketing Centers
- **Unified DBT portal:** PM-Kisan auto-credit (₹6K/year)
- **Empowerment** through awareness of rights and linked assets

BENEFITS TO GOVERNMENT

- **DSS Insights** – Spot gaps, avoid duplication, set priorities.
- **Geo-Analytics** – Integrates forest, water & infra data for planning.
- **Real-Time Monitoring** – Track FRA progress at district/state levels.
- **Centralized FRA Archive** – Easy access across departments.
- **PVTG geofencing:** More than **75 tribal groups** with habitat tracking.
- **Centralized FRA Archive** – Easy access across departments.



Targeted States



RESEARCH AND REFERENCES

REFERENCES

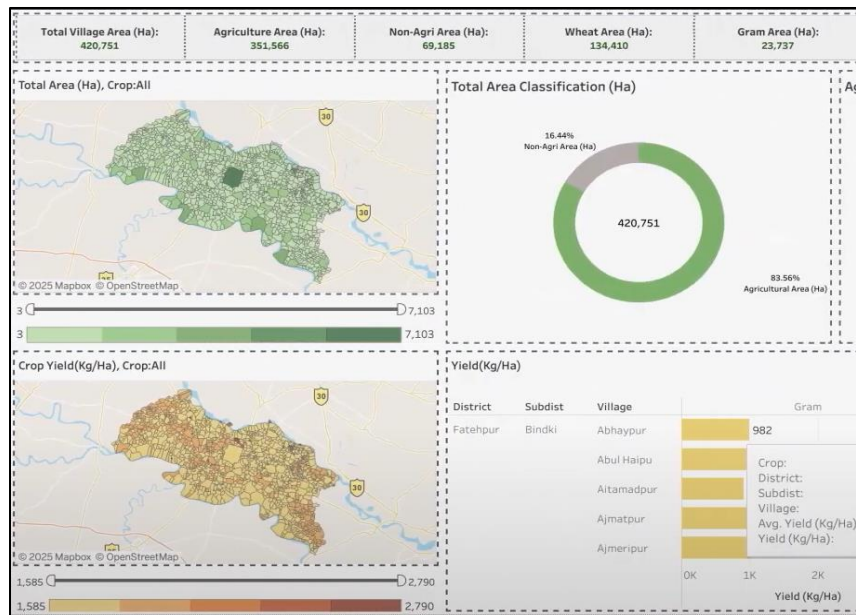
- ❑ [FRA OFFICAL DATASET](#)
- ❑ [FRA Official Page](#)
- ❑ [MoTA FRA](#)
- ❑ [Sentinel-2 Satellite Data \(ESA\)](#)

EXISTING PLATFORMS

- ❑ Esri India - <https://www.esri.in/en-in/home>
- ❑ Pixxel India - <https://www.pixxel.space/>
- ❑ Bhuvan India - <https://bhuvan.nrsc.gov.in/>

RESEARCH PAPERS AND BEST PRACTICES

- ❑ [Promise and Performance: Ten Years of the Forest Rights Act in India – Rights and Resources Initiative](#)
- ❑ [Critical Assessment of Implementation of the Forest Rights Act in India \(Journal article, 2018\)](#)
- ❑ [Tesseract OCR](#)
- ❑ [AWS Textract](#)
- ❑ [GeoServer](#)
- ❑ [AlphaEarth Foundation](#)



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