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TITLE PAGE

- **Problem Statement ID – 25108**
- **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-**
- **Team Name – VanBandhu Technologies**

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IDEA TITLE

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Our Idea: ImpactChain- An AI powered Geospatial DSS for Tribal Empowerment

Problem statement:

The **Forest Rights Act (FRA)** of 2006 grants rights to forest-dwelling communities. However, its implementation faces significant challenges. Legacy land records are scattered, non-digitized, and hinder verification processes. The absence of a centralized **FRA Atlas** limits real-time tracking of claims and titles. Additionally, decision-makers lack a **decision support system (DSS)** to link FRA beneficiaries with welfare schemes, resulting in forest dwellers missing out on benefits and leading to inefficient planning.

Key Features & Use Cases

- Automated Digitization Pipeline: We'll deploy an advanced **OCR and Natural Language Processing (NLP)** engine, to digitise and standardize millions of legacy FRA records.
- **AI Virtual Assistant** (Chatbot), **Learning & Skill Development Hub**, **SMS/WhatsApp Alert System**, Before and After Impact Slider.
- AI-Powered Atlas & Digital Twin: The platform will feature a dynamic**, real-time map** using high-resolution **satellite imagery.**

Innovation & Uniqueness

- Data-Driven Governance: Our solution provides policymakers with a real-time, interactive dashboard
- Extreme Scalability & Accessibility: Built on a microservices architecture for seamless **pan-India** scalability, including android and **web support**.

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TECHNICAL APPROACH

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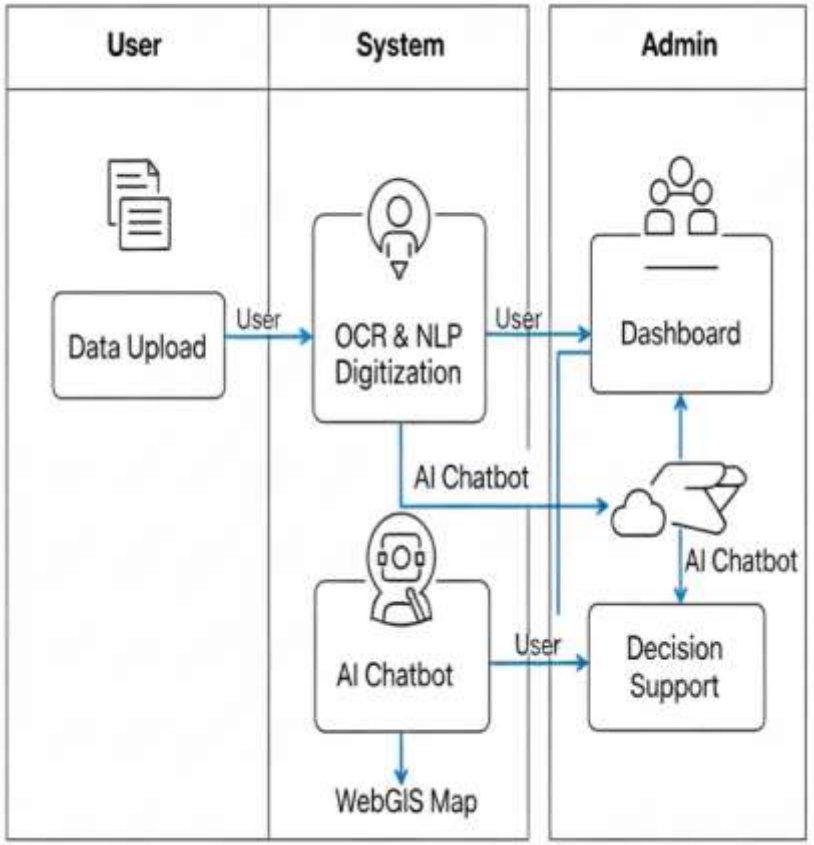
Frontend (WebGIS Portal)
- JavaScript, React.js, Figma
- Leaflet / Mapbox

Backend
-Python (Flask, Django)
-GeoServer

Database
-PostgreSQL + PostGIS (Supabase)

AI/ML & Data Processing
-Python, Tesseract/EasyOCR
-NLTK, SpaCy
-Scikit-learn, TensorFlow, PyTorch
-GeoPandas, Rasterio, GDAL

Cloud & DevOps
-AWS / GCP / Azure
-AWS S3 / Google Cloud Storage
-AWS EC2 / Google Compute Engine
-QGIS



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FEASIBILITY AND VIABILITY

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Feasibility of the Idea

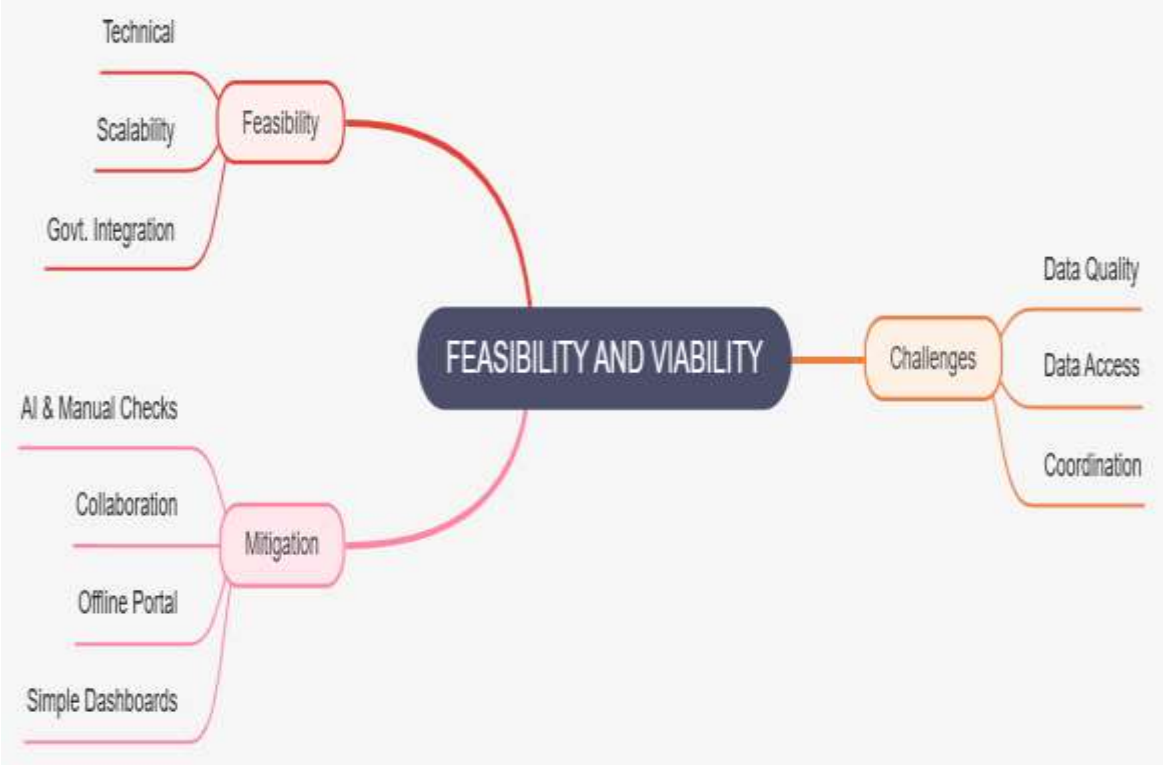
-Technically doable with Python, AI/ML, WebGIS
-Can start small (pilot in 1–2 districts) → then scale to states
-Easily linkable with govt. schemes (**PM-KISAN, MGNREGA, Jal Jeevan Mission**)

Challenges & Risks

-Old FRA records are scattered & poor quality
-Limited high-resolution satellite data
-Low internet access in remote villages
-Multiple govt. departments = coordination issues

Strategies to Overcome

-Use **AI + manual checks** for reliable digitization
-Collaborate with govt. for better **satellite/data support**
-Build **offline-friendly WebGIS** portal
-Simple dashboards for easy adoption by officials



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IMPACT AND BENEFITS

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Impact on Target Audience

-Empowers forest-dwelling communities with clear land rights
-Gives officials a unified tool for FRA monitoring
-Provides policymakers with real-time data for better planning

Benefits of the Solution

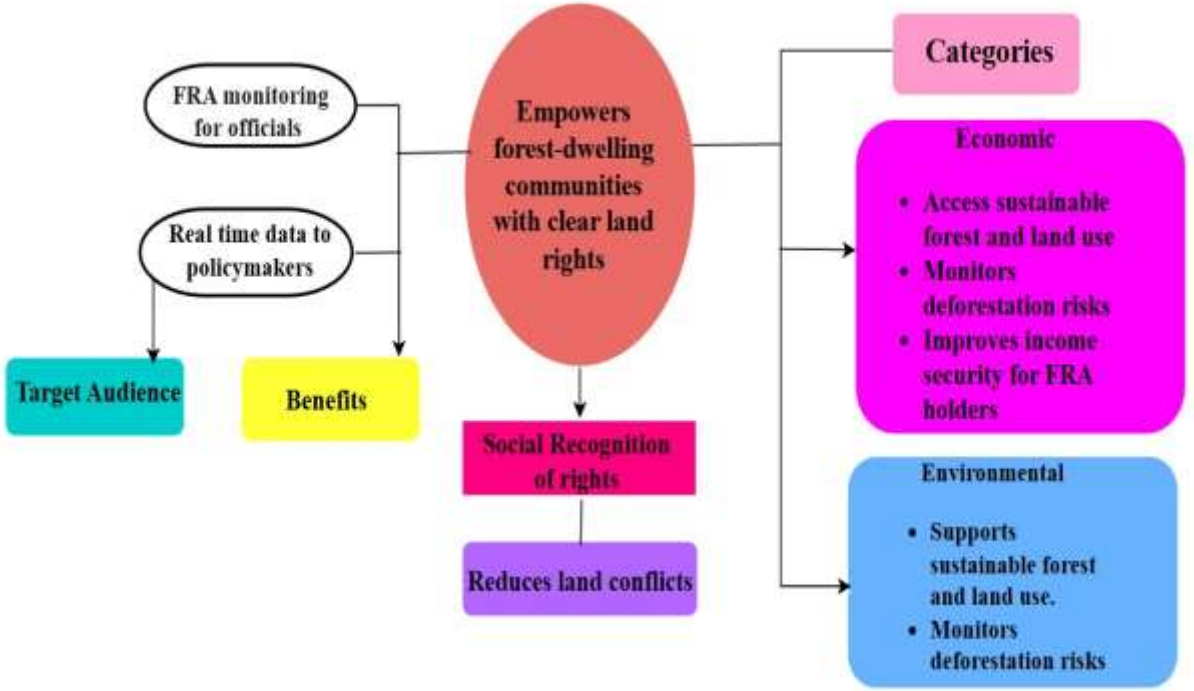
-Social Recognition of community & individual rights
-Reduces land conflicts, builds trust
-Strengthens participation in governance

Economic

-Access to govt. schemes → livelihood boost
-Asset mapping helps in targeted development
-Improves income security for FRA holders

Future Scope

A decentralized blockchain ledger to issue and manage digital FRA pattas(titles). This ensures that land records are immutable, and completely tamper-proof, securing the rights of the beneficiaries.



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RESEARCH AND REFERENCES

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•**Forest Rights Act (2006)** and Ministry of Tribal Affairs→ https://tribal.nic.in

•Explored the **ISRO Bhuvan portal** for satellite and forest datasets → **https://bhuvan.nrsc.gov.in**
•Looked at free satellite datasets: Sentinel-2 → **https://scihub.copernicus.eu**
•**Research papers (IEEE/Springer)** to understand how AI/ML models like Random Forest and CNN are used in remote sensing.
•Explored **open-source GIS tools** like QGIS → https://qgis.org and GeoServer → **http://geoserver.org**
•Also referred to scheme portals:-
-**PM-KISAN** → https://pmkisan.gov.in
-**Jal Jeevan Mission** → https://jaljeevanmission.gov.in
-**MGNREGA** → https://nrega.nic.in
•Connected the solution with **UN Sustainable Development Goals (SDGs)**