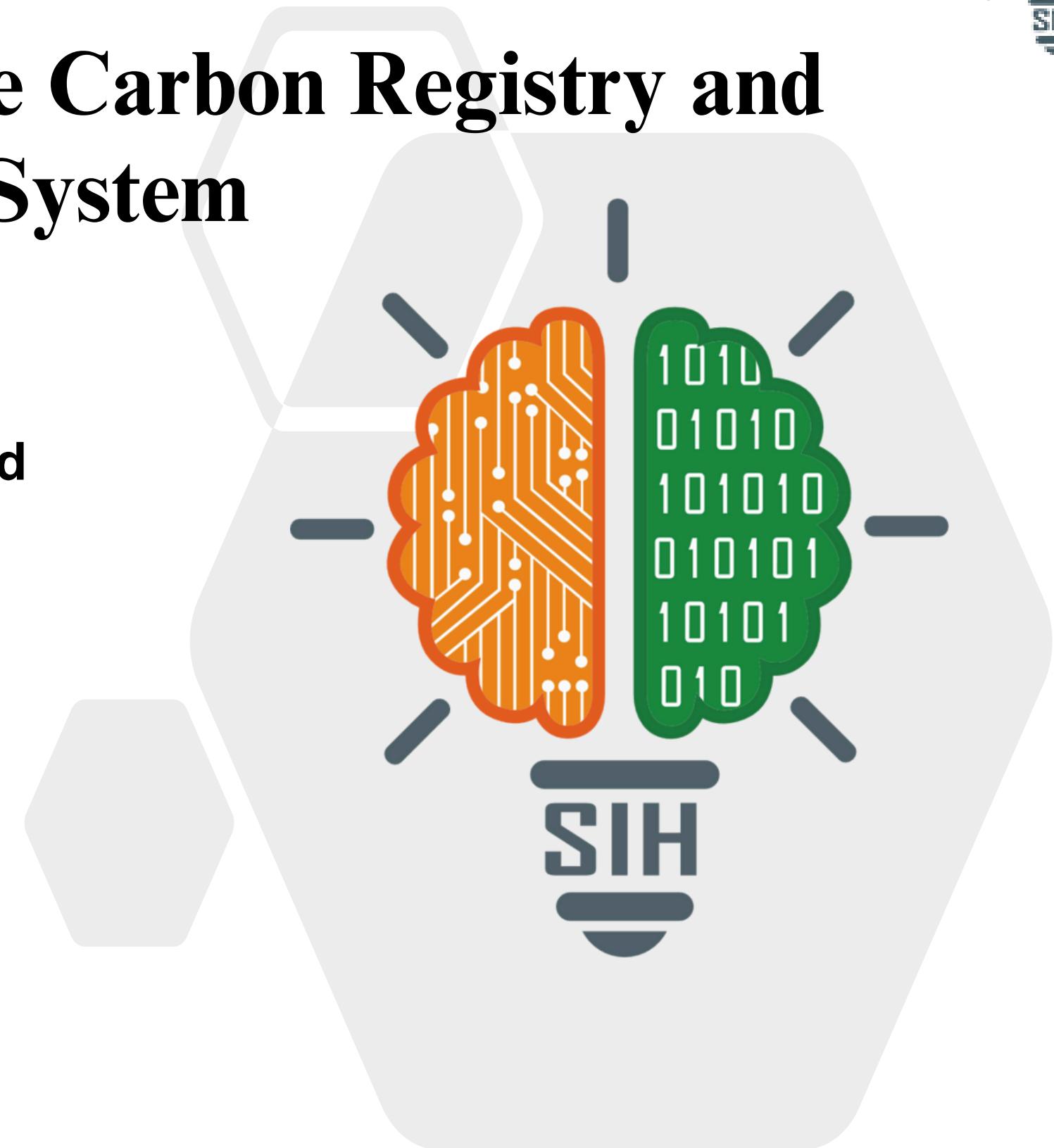


Blockchain-Based Blue Carbon Registry and MRV System

- Problem Statement ID –25038
- Problem Statement Title-Blockchain Based Blue Carbon Registry and MRV System
- Theme- Clean & Green Technology
- PS Category- Software
- Team ID-
- Team Name - DEXTERS



Blockchain-Based Blue Carbon Registry and MRV System

Detailed Solution

- A Blockchain-powered registry records every Blue Carbon restoration effort with full transparency.
- Communities & NGOs use a mobile app to upload geo-tagged plantation data - photos, GPS location, and species details.
- Drones & satellites track growth and verify the biomass captured in coastal ecosystems.
- Smart contracts automatically issue carbon credits once MRV (Monitoring, Reporting & Verification) is complete.
- NCCR gets admin tools to onboard projects, approve data, and oversee carbon credit circulation

How it addresses the problem

- Ensures transparency & immutability of restoration data (no fraud, no double counting).
- Builds a standardized MRV mechanism for India's Blue Carbon projects.
- Provides economic incentives via carbon credits to local communities.
- Helps align with India's climate strategy and supports global carbon markets.

Innovation & Uniqueness

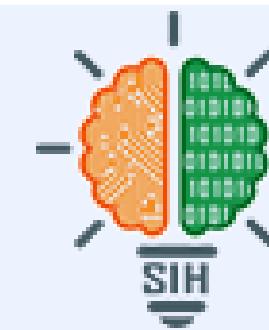
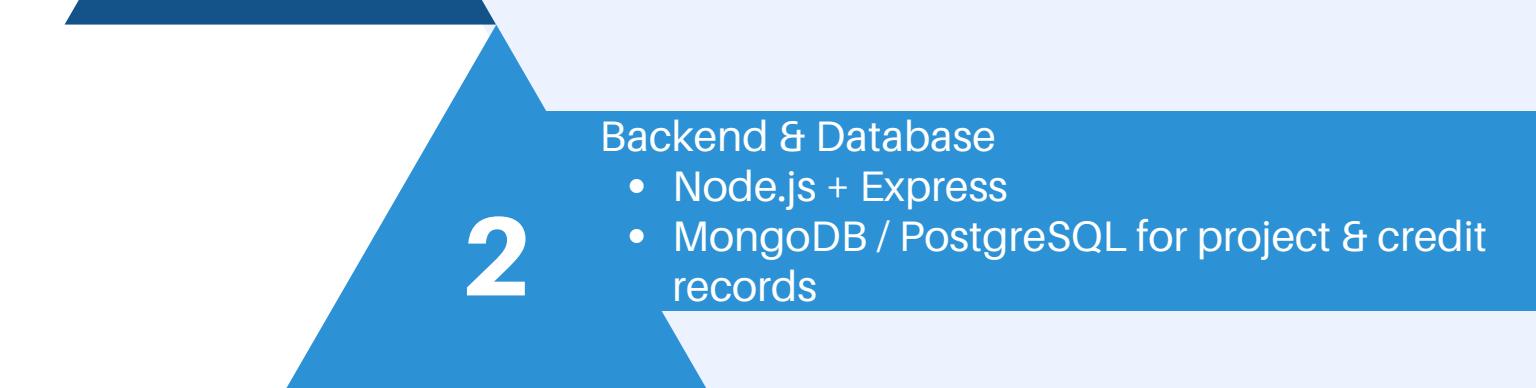
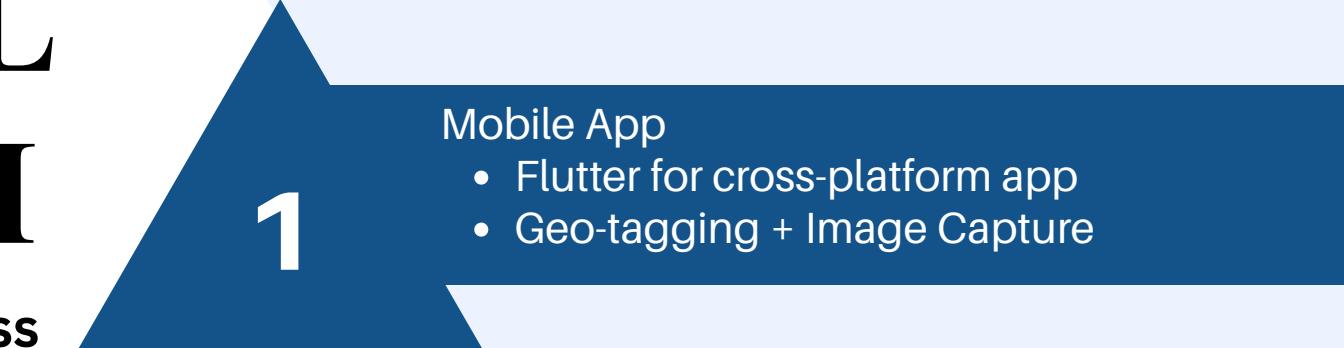
- First decentralized MRV system tailored for India's coastal ecosystems.
- Combines blockchain + AI/ML + drone/satellite data into one platform.
- Community-centric design empowers NGOs, panchayats, and citizens to directly participate.
- Tokenized credits create trust, tradability, and transparency in carbon trading.
- Scalable & replicable across different ecosystems (mangroves, seagrass, wetlands).

TECHNICAL APPROACH

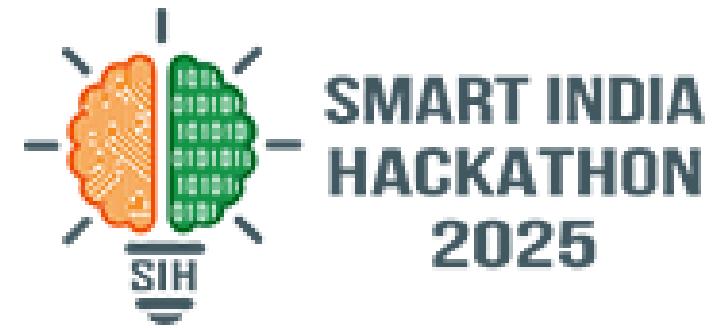
Blue Carbon MRV – Tech Stack & Process

Prototype solution link

The screenshot shows the 'Upload Restoration Data' section of the NCCR Admin Portal. It includes fields for 'Project Type' (dropdown), 'Location' (text input), 'Photo' (file input with placeholder 'Take Photo / Upload Image'), 'Project Description' (text area), 'Carbon Estimate (Optional)' (text input), and 'Blockchain Transaction' (button). Below these are buttons for 'Submit Data', 'Save Draft (Offline)', and 'Multi-Factor Authentication' (info box).



FEASIBILITY AND VIABILITY



Technical Feasibility:

- Blockchain platforms like Ethereum/Hyperledger support immutable data and tokenization.
- Mobile apps (Flutter) and web dashboards (React) are viable with open-source tools.
- Drone data integration via APIs is standard but needs prioritization for MVP.

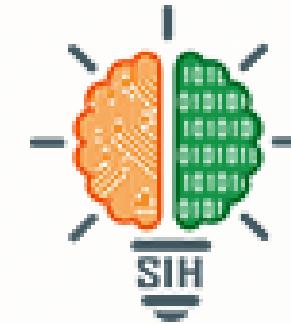
Operational Feasibility:

- Aligns with NCCR's blue carbon goals and India's climate policies.
- Mobile app with offline support suits field workers in coastal areas.
- User onboarding (NGOs, panchayats) is manageable with KYC-like process.

Economic and Regulatory Feasibility:

- Free tools (Ethereum testnets, Flutter) make hackathon prototyping cost-effective.
- Carbon credits align with global standards (e.g., VCS) for market integration.
- Compliance with India's DPDP Act ensures regulatory feasibility.

IMPACT AND BENEFITS



Global Recognition

Positions India as a leader in climate innovation and carbon markets, strengthening international commitments

Environmental Restoration

Large-scale plantation & restoration of mangroves and seagrasses improve biodiversity and coastal resilience



Step 04

Step 05

Step 06

Policy Support

Provides reliable, verifiable MRV data for the Ministry of Earth Sciences & NCCR to design better climate policies



Economic Opportunities

Verified carbon credits create revenue streams for local stakeholders, encouraging sustainable livelihoods.



Community Empowerment

Coastal communities & NGOs gain direct participation in carbon projects, ensuring fair benefit-sharing



Transparency & Trust

Blockchain ensures tamper-proof records, boosting credibility of India's blue carbon credits globally.



Environmental Restoration

Step 01

Step 02

Step 03

Community Empowerment

Coastal communities & NGOs gain direct participation in carbon projects, ensuring fair benefit-sharing



RESEARCH AND REFERENCES

