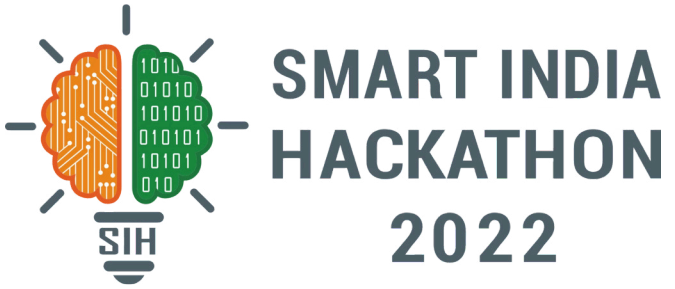
SMART INDIA HACKATHON 2025

- Problem Statement ID – **25038**
- Problem Statement Title- **Blockchain-Based Blue Carbon Registry and MRV System**
- Theme- **Clean & Green Technology**
- PS Category- **Software**
- Team Name- **git commit –m "WIN"**



The Case

The urgent need for a transparent and verifiable **Monitoring, Reporting, and Verification system** to support India's climate strategy.

The Expected Solution

A Blockchain application for MRV, smart contracts for tokenized credits, a user-friendly mobile interface for data uploads, and robust admin tools for $NCCR$.

The Challenge

Despite the growing importance of blue carbon restoration, a critical gap exists in ensuring the integrity of conservation efforts. **The current system lacks a decentralized, verifiable framework**, leading to:

1. **Opacity:** Data is siloed, making it difficult for communities, NGOs, and government bodies to access and verify project information.
2. **Insecurity:** Centralized records are vulnerable to loss, alteration, and disputes.
3. **Inaccuracy:** There is no standard, immutable system to ensure the accuracy of reported data.

Problem Resolution

BlueLog is a **Blockchain-powered registry designed to restore integrity to blue carbon conservation**. It provides a shared, immutable ledger where all stakeholders can:

1. **Record: NGOs, communities, and coastal panchayats** can submit and track their projects, so local actors get visibility and credit.
2. **Validate:** An administrative body (e.g., NCCR) verifies and approves submissions, with the approval permanently recorded on the blockchain.
3. **Empower:** Each carbon credit created has a clear origin (which project and which approval), so buyers and auditors can see where it came from.

The Process

Our approach ensures a seamless and transparent workflow:

1 **Data Upload**

Field data from apps and drones is immutably stored on the blockchain.

2 **Verification & Audit**

The data is reviewed by an authorized body ($NCCR$) using a dedicated admin tool. This process is fully transparent to all stakeholders.

3 **Credit Issuance**

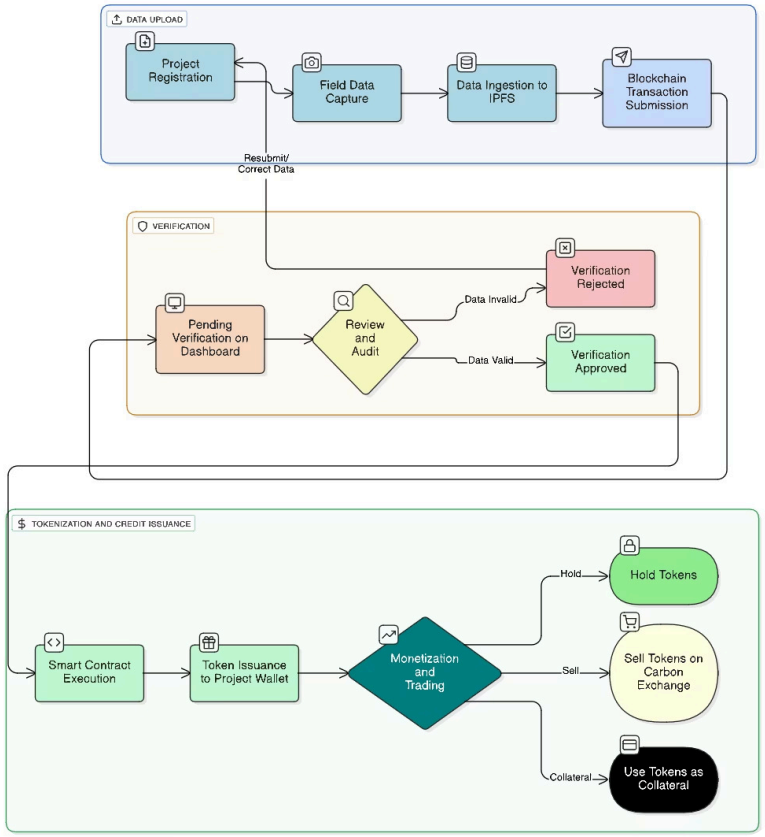
Verified data triggers a smart contract to **tokenize** the carbon credits, which are then issued to the project wallet.

Innovation and uniqueness

1. Tokenizing credits and keeping immutable records of blue carbon registry and working with community actors in India.
2. We are not just creating a database; we are building a foundation of trust that ensures every conservation effort is verifiably and permanently credited.

TECHNICAL APPROACH

- **Mobile App Development: React Native** or **Flutter**. These frameworks allow for building a single codebase that can be deployed on both iOS and Android
- **Platform: Ethereum** or **Polygon**. These platforms are well-established, have a large developer community, and a robust ecosystem for Decentralized Apps.
- **Smart Contract Frameworks: Hardhat** or **Truffle**. These frameworks provide essential tools for smart contract development
- **Server-Side Logic: Node.js** with **Express.js** to handle API requests from the mobile app
- **Cloud Services: AWS** or **Google Cloud Platform** for hosting the backend API and database



FEASIBILITY AND VIABILITY

1. **Feasibility:** The project is highly **feasible due to the maturity of its core technologies** (Polygon, IPFS, Solidity). It is also economically viable as it **creates a new revenue stream for conservation projects and increases efficiency** by automating the MRV process.
2. **The Digital Divide:** We will address the lack of digital literacy and technology access in rural communities through extensive **community training** and user-friendly mobile interfaces.
3. **Evolving Regulations:** We will ensure the project's long-term viability by actively engaging in **collaboration with government bodies** to align with evolving digital asset regulations.
4. **Data Integrity:** We will enhance data integrity through a **multi-layered verification system**, which includes both human review and automated checks.

IMPACT AND BENEFITS

Potential Impact

Local Communities: It transforms environmental stewardship into **economic empowerment**, providing a direct financial return for their conservation efforts.

NGOs & Environmental Organizations: The system streamlines project management and reporting, allowing them to showcase their work with verifiable, transparent data to donors and stakeholders.

Government (NCCR/MoES): The registry provides a secure, centralized database for monitoring and reporting on climate action.

Benefits of the Solution

Social: It fosters **economic empowerment for coastal communities**, turning environmental stewardship into a tangible source of income.

Economic: The solution **unlocks a new, verifiable revenue stream from the global carbon market**, attracting private investment and **promoting sustainable financing** for conservation projects.

Environmental: The registry directly incentivizes the **protection and restoration of vital mangrove ecosystems.**

The Conclusion

BlueLog presents a viable, ethical, and scalable solution to a critical environmental challenge. By leveraging proven technology, we provide a system that is:

1. **Feasible**

   Our core technologies are mature and ready for implementation.

2. **Accountable**

   It provides irrefutable proof of conservation work, mitigating risks of fraud and data loss.

3. **Impactful**

   It directly empowers communities and streamlines the work of conservation.

The credibility of any climate solution rests on its ability to be transparent and verifiable. We propose that a system built on these principles is not merely an innovation—it is a necessity.

RESEARCH AND REFERENCES

Research

- https://www.mdpi.com/1996-1073/15/9/3134

Demo WebApp

- https://v0-12-two-kappa.vercel.app/