Solution Steps & Workflow

Step 1: Data Upload (NGO / Community)

- NGO or coastal community uploads plantation data via **mobile app (Flutter)**.
- Data includes:
    - Photos of plantation or drone images (simulated).
    - GPS coordinates.
    - Plantation area and date.
- Backend stores images/videos on **IPFS or cloud**.
- Backend generates a **SHA-256 hash** for each upload (digital fingerprint).

Step 2: Admin / Verifier Approval

- Admin dashboard (React / Flutter Web) displays **pending projects**.
- Admin clicks **Approve** or **Reject**.
- If approved:
    - Blockchain smart contract is triggered.
    - Carbon credits (tokens) are minted.
- If rejected:
    - NGO/community gets notification.

Step 3: Blockchain Record & Tokenization

- Approved project hash is **stored immutably on blockchain**.
- **Carbon Credits Tokens** minted (ERC-20):
    - 1 token = 1 tonne CO_2 captured.
    - Tokens can be transferred or retired (burned) after use.
- All transactions are visible on **Metamask or PolygonScan**.

Step 4: Optional AI Verification

- Use **Python + OpenCV** to process uploaded images.

- AI can detect:
    - Number of trees planted.
    - Green cover / plantation density.
- AI report saved on IPFS → hash stored on blockchain for transparency.

Step 5: Audit & Transparency

- Blockchain explorer shows:
    - Uploaded data hashes.
    - Approval events.
    - Token minting, transfer, and retirement.
- Ensures **no double-counting** and **full transparency**.