

FEASIBILITY REPORT

Project Title: Organic Food Traceability System Using Blockchain

Feasibility Study Developed by:~



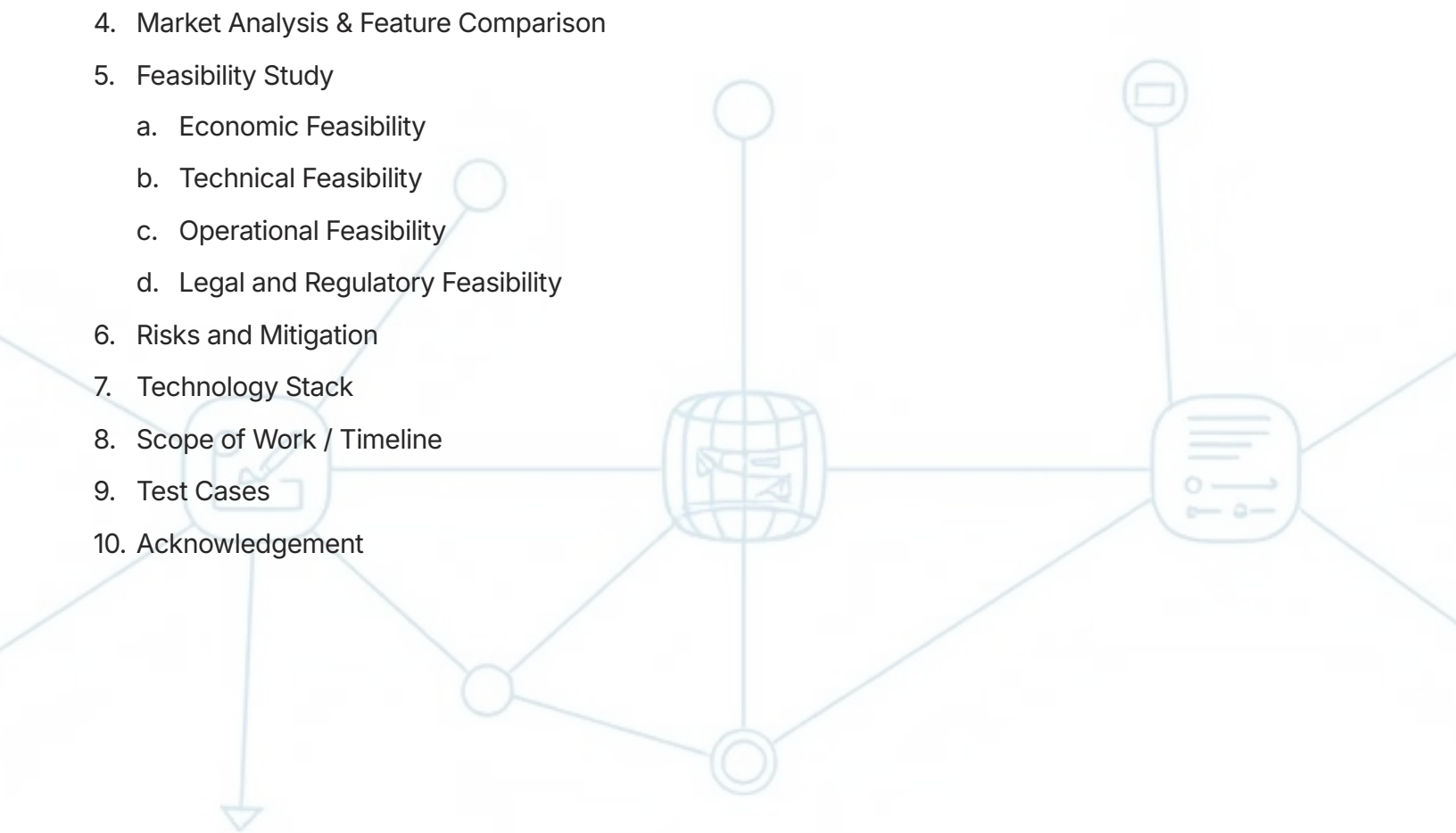
DEVNEST

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1. Project Summary

The supply chains for modern food are becoming more intricate, particularly for organic produce. Strict proof of origin, handling, and certification is required by consumers, regulators, and retailers; however, current systems are disjointed, prone to fraud, and prone to human error. This project suggests a mobile and web platform that logs each significant event that occurs during the organic product's journey onto a safe, permissioned blockchain. Using QR codes for convenient access, the platform enables farmers, processors, certifiers, distributors, retailers, and consumers to instantly confirm the origin, transit, and quality seals of organic food. This strategy fosters market distinction, compliance, and long-term customer trust.



2. Project Objectives



Traceability from beginning to end

for each batch of organic products, from the farm to the customer.



Give Customers more power

to use QR code scans to quickly confirm the full chain-of-custody and organic authenticity.



Simplify adherence to regulations

with auditable, automated record-keeping.



Cut down on expenses and mistakes

by sharing current information with approved supply chain partners and digitizing procedures.



Encourage premium pricing and build trust

by making tamper-evident, transparent certification possible.

3. Supported United Nations SDGs

By encouraging openness, effectiveness, and sustainability in the food supply chain, our Organic Food Traceability System directly supports a number of Sustainable Development Goals set forth by the UN.

SDG 2: Zero Hunger

We greatly improve food safety and fight fraud in organic food supply chains by putting in place a strong and transparent blockchain-based traceability system. By fostering efficiency and trust from farm to table, this guarantees that customers receive genuine, premium organic products, cutting waste and promoting food security. By preventing the distribution of unsafe or counterfeit goods, the ability to confirm provenance at every stage promotes sustainable agricultural methods, which are essential to reaching zero hunger.

SDG 9: Industry, Innovation, and Infrastructure

By directly incorporating cutting-edge blockchain and digital technologies into the intricate agri-food logistics network, our project is a shining example of promoting innovation. In order to promote inclusive and sustainable industrialization, we are constructing robust, transparent, and secure food distribution infrastructure. By encouraging greater efficiency, lowering operational complexity, and improving the overall resilience of the food supply chain infrastructure, this platform makes it easier for new technologies to be adopted within traditional agricultural sectors.

SDG 12: Responsible Consumption and Production

End users can make genuinely informed and sustainable consumption decisions thanks to the system's provision of verifiable information about the provenance, path, and certification of their organic food. We promote more sustainable production patterns, lessen unethical behavior, and lessen our impact on the environment by offering transparency and traceability. This encourages a circular economy strategy, where thoughtful decisions result in improved resource management and conscientious stewardship of our planet, and guarantees accountability across the supply chain.

4. Market Analysis & Feature Comparison

According to Statista (2024), the global organic food market is expected to grow from its 2023 valuation of \$227.8 billion to \$437.4 billion by 2030. Food fraud and inadequate digital connections throughout the supply chain, however, are significant challenges. According to FICCI/FAO reports, as of 2023, less than 25% of Indian organic producers use digital traceability solutions.

A comparative analysis of this system vs. traditional traceability:

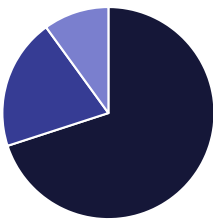
1	2	3
Feature 1. Immutable Records 2. Certification Integration 3. Real-Time Consumer Access 4. Data Privacy 5. Tamper-resistance	Our System (Blockchain) 1. Yes (permanent, blockchain) 2. Automated, verified 3. Yes (QR scan at POS) 4. High (encrypted and role-based) 5. Yes (cryptography-secured)	Traditional System 1. No (centralized, editable) 2. Manual, often fragmented 3. No or limited 4. Usually inadequate 5. No

5. Feasibility Study

5.1 Economic Feasibility

Initial Cost Estimates:

- System development (web/mobile, backend): ₹5,810,000–₹8,300,000 for MVP.
- Blockchain infrastructure (cloud-hosted Hyperledger): ₹41,500–₹166,000/month, scalable by volume.
- Training/Onboarding, pilot phase: ₹415,000–₹830,000.



■ System Development
■ Blockchain Infrastructure
■ Training/Onboarding

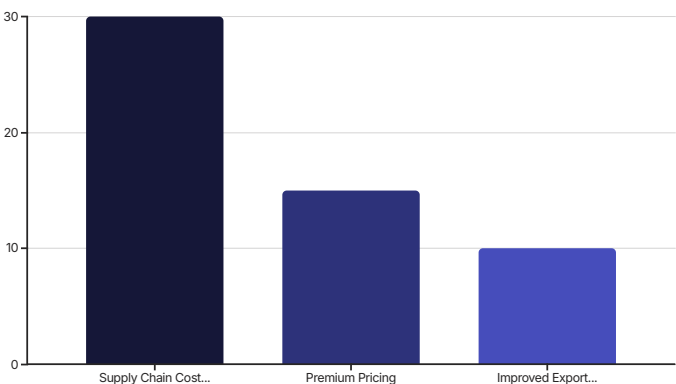
Distribution of Initial Costs

Operating Cost (after launch):

- Maintenance/hosting: ₹24,900–₹83,000/month depending on user volume.
- Certification validation: Minor incremental processing cost compared to paperwork.

Return on Investment (ROI):

- A 2022 IBM study found blockchain-enabled food traceability can lower supply chain costs by 20–30% through automation and reduced fraud.
- Premium pricing: Brands using traceability consistently command a 10–15% higher retail margin (Nielsen survey, 2023).
- Improved export compliance: Faster documentation reduces shipment hold-ups for exporters.



Scope for Cost Savings and ROI

Scalability:

- Scaling to thousands of users and products after initial development primarily raises variable costs (bandwidth, storage), but it does not necessitate corresponding team growth.

Reference: Statista "Organic Foods Market Value," 2024

IBM "Blockchain for Food Trust Economics Report," 2022

Nielsen "Consumer Insights on Transparency," 2023

5.2 Technical Feasibility

- **Mature Blockchain Frameworks:** Tested by Walmart, Carrefour, and Indian organic cotton exporters, Hyperledger Fabric and Ethereum are utilized globally for agri-supply chain pilots.
- **Integration Points:** REST APIs standardize data exchange, mobile integration is established, and open-source libraries facilitate QR generation and scanning.
- **Offline Challenges:** According to the FAO (2022), 48% of smallholder farmers in India experience sporadic connectivity. Solution: When online, the app syncs and stores data locally.
- **Interoperability:** The system can connect to legacy ERP through specially designed adapters and uses common JSON and APIs.

Reference: IBM Food Trust whitepaper, 2023

FAO India ICT in Agriculture Status Report, 2022

5.3 Operational Feasibility

- **User Interface:** With icon-driven menus and support for Hindi, English, and regional languages, the front-end is made for users with little to no technical knowledge.
- **Stakeholder Adoption:** According to AgriTech Pilot (2023), field tests of digital traceability platforms such as eNAM (India) improved user satisfaction and data accuracy. Two weeks of initial training is the anticipated adaptation curve.
- **Consumer Experience:** According to TRAI (2024), more than 85% of Indian urban consumers own smartphones. Trace checks based on QR codes or labels are simple and don't require logins.
- **Support Plan:** System notifications for alerts and status; in-app assistance; video tutorials; and a local helpline for onboarding.

5.4 Legal and Regulatory Feasibility

- **Data Privacy:** GDPR regulations (for export to Europe) require audits of the storage of personal data, explicit consent, and the right to erasure. Only essential PII is processed by the system; access logs are signed and encrypted.

- **Food Law Compliance:** complies with ISO 22000 food safety standards, APEDA organic certification for export, and FSSAI (India) traceability advisories.
- **Audit and Certification:** All logs are independently auditable and permanent, and regulatory acceptance is guaranteed by support for digital signatures and certifier login.

Reference: FSSAI "Traceability in Food Supply Chains" circular, 2023

General Data Protection Regulation (GDPR) compliance notes

ISO 22005:2007 Traceability Standard

6. Risks and Mitigation

Risk	Mitigation Approach
Data Entry Fraud	An external Certification Authority must digitally sign off on all certifications and important events using file uploads and multi-factor authentication.
Adoption Reluctance	a "train-the-trainer" approach, extensive user training, local language resources, and phased rollouts with rewards for early adopters.
Technical Downtime	redundant cloud infrastructure that includes daily data backups and automated failover. performance tracking with a SLA of 99.9% uptime.
Privacy Attacks	quarterly external audits, frequent penetration tests, network firewalling, and end-to-end encryption.
Legacy Integration	Provide manual CSV import/export as a backup and create standardized adapters for ERP and off-chain databases.

7. Technology Stack

Frontend
React.js (web), Flutter or Kotlin (mobile)

Backend
Node.js or Python (REST API with user and event logic)

Blockchain
Hyperledger Fabric for permissioned consortium operation, or private Ethereum instance

Database
MongoDB (document store), optionally PostgreSQL for relational audit/compliance data

QR Code
Open-source libraries, e.g., qrcode.js (web), ZXing (mobile)

Hosting/Infrastructure
AWS, Azure, or on-prem virtual machines with Docker for deployment portability

Monitoring & Analytics
Grafana, Prometheus for uptime and event monitoring

8. Scope of Work / Timeline

Phase	Start Date	End Date
Requirement Analysis	01-Aug-2025	10-Aug-2025
System Design	11-Aug-2025	20-Aug-2025
Development	21-Aug-2025	30-Sep-2025
Testing & Deployment	01-Oct-2025	20-Oct-2025
Training & Rollout	21-Oct-2025	30-Oct-2025

9. Test Cases (Examples)

Feature	Test Case	Expected Result
QR Code Trace	Scan QR on sample product	Displays full trace history & cert.
User Registration	Register new stakeholder	Receives role-based dashboard
Event Logging	Farm logs new batch event	Appears instantly to next actor
Certification Upload	Certifier uploads & signs cert.	Batch flagged as "Certified"

10. Acknowledgement

We are appreciative of the help and direction provided by Prof. Dr. Subhabhrata Sengupta as well as the input from other team members [Names/Roll Numbers]. Additionally, we are grateful to certification organizations, retail partners, and pilot farmers who contributed crucial insights and pilot data for this feasibility study.

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