SMART INDIA HACKATHON 2025

Problem Statement ID	SIH25045
Problem Statement Title	Blockchain-Based Supply Chain Transparency for Agricultural Produce
Theme	Agriculture, Food-Tech & Rural Development
PS Category	Software
Team ID	89086
Team Name	Entropi

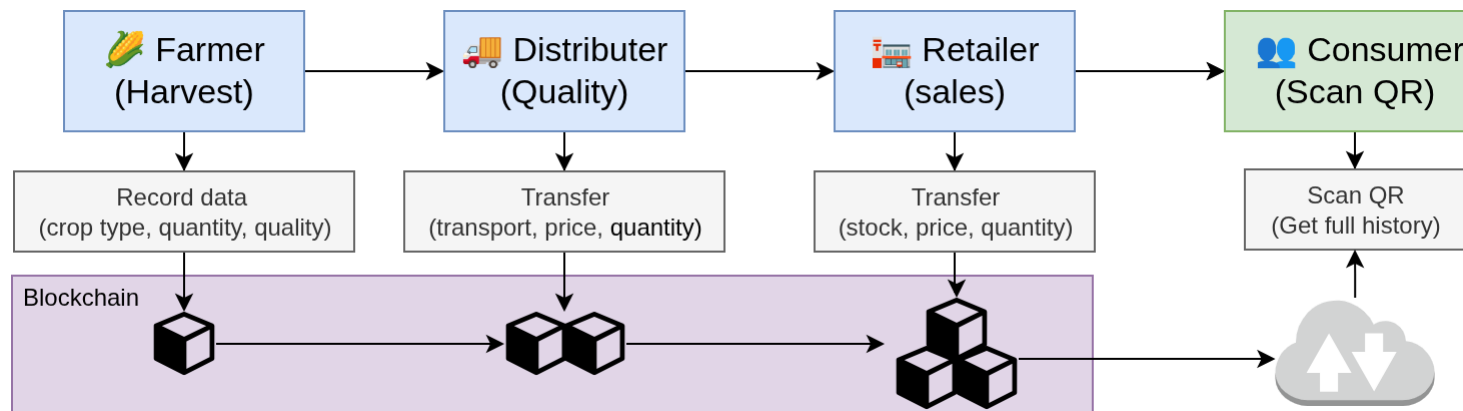# Blockchain-based Supply Chain
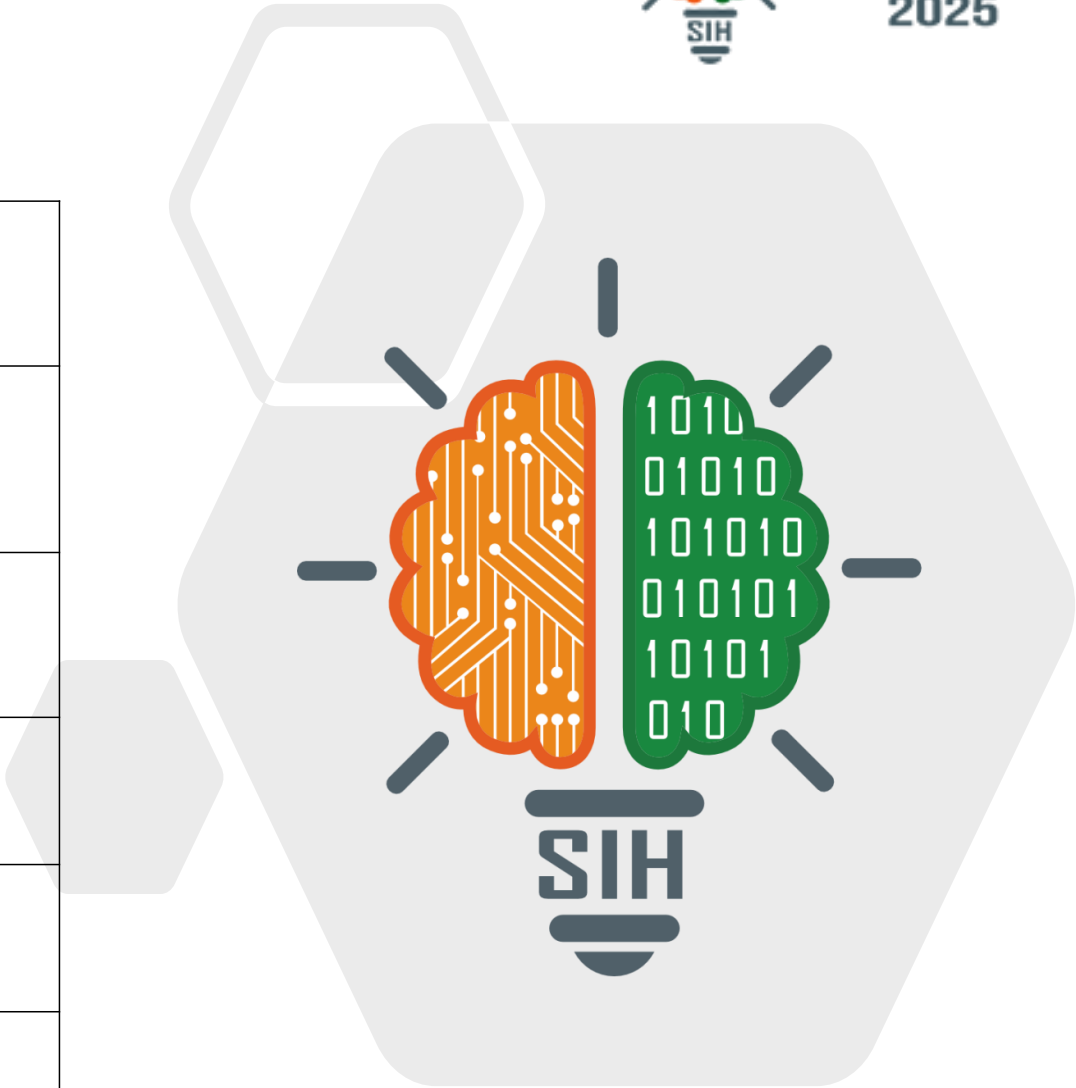
Problem

- Lack of transparency and traceability in agricultural supply chain.

- This causes cheating, unfair prices, and no way to check where food comes from or how good it is.

Proposed Solution

- A blockchain system with smart contracts, server, and website (mobile app coming soon).

- Stakeholders (farmers, distributors, retailers, inspectors) registered on-chain.

- Each harvest batch is recorded with:
  - Basic info + Hash (extra details)
  - Quality report hash

- Ownership transfers are tracked on-chain (similar to tokens on blockchain)

- Quality inspectors can attach reports to enhance trust.

- QR code provide complete batch history for consumer.

🌽 Farmer (Harvest) → 🚚 Distributer (Quality) → 🏪 Retailer (sales) → 👥 Consumer (Scan QR)

| Record data (crop type, quantity, quality) | Transfer (transport, price, **quantity**) | Transfer (stock, price, quantity) | Scan QR (Get full history) |

Blockchain

GitHub Link
@idityage/food-chain

TECHNICAL APPROACH

Entropi

Frontend

- Next.js
- Expo (mobile)

Backend

- Express.js
- PostgreSQL

Blockchain

- Polygon
- Solidity

Why Polygon?

- Faster Transaction
- Lower gas fee
- Ethereum Compatible

STAKEHOLDERS

- Farmer — register & upload batch
- Quality Inspector — submit quality report
- Distributor — ownership transfer
- Retailer — ownership transfer
- Consumer — scan QR code

FRONTEND: Mobile/Web App

BACKEND: Node.js / Express API — interact with blockchain

BLOCKCHAIN: Smart Contract → Polygon; emit events; Event Logs; read & verify data

PRODUCT: QR Scanner — generate QR code

OFFCHAIN STORAGE: S3, PostgreSQL — store/retrieve data & docs

fetch batch history

FEASIBILITY AND VIABILITY

Feasibility Assessment

Leveraging proven systems like Ethereum and Polygon for reliable product tracking.

Smart verification through AI analysis, storing only essential data on-chain.

QR codes provide familiar, intuitive interaction patterns consumers trust.

Clear value proposition for farmers, retailers, consumers, and government.

⚠ Possible Problems	⊘ How We'll Solve These Problems
👥 Resistance to new technology	⊘ Create simple apps in local languages and offer rewards for early users
⚡ Handling many transactions	👥 Use Polygon (a faster, cheaper blockchain system) to handle more users
🔒 Data Accuracy	☆ Use independent inspectors and AI tools to verify photos and documents
<> Working with existing systems	🖥 Design flexible API connection points to link with existing business and government systems

IMPACT AND BENEFITS

Social

- Creates trust among farmers, distributors, retailers, and consumers through clear, secure records.
- Helps consumers feel safe about food quality by showing batch history through QR codes.

Economic

- Ensures farmers get fair prices, helping them earn steady income.
- Reduces cheating and fake products, making trade more efficient.
- Helps quality products stand out in the market with proof of where they came from.

Environmental

- Allows quick tracking of bad products, reducing food waste.
- Promotes better farming practices since everything is visible to the public.
- Helps government check if rules are being followed through unchangeable records.

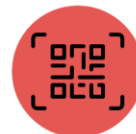Now my onions are more famous than me - thanks to blockchain

Farmers

Access to real-time prices and demand, eliminating exploitation.

Consumers

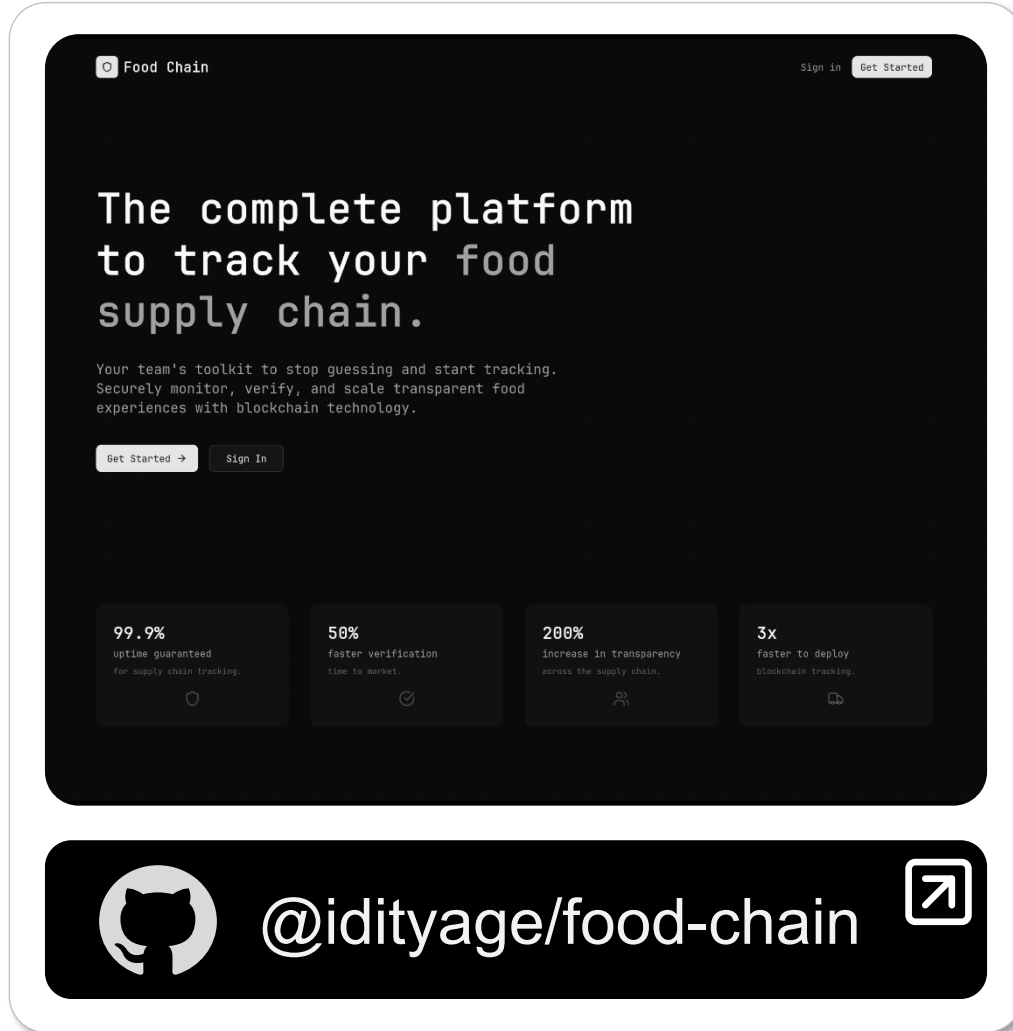Traceability of food origin, quality, and price history via QR codes.

Distributors/ Retailers

Ability to prove product authenticity and quality to customers.

Government

Reliable transaction records for informed decisions and fraud detection.

Entropi

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SIH

Food Chain

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Your team's toolkit to stop guessing and start tracking. Securely monitor, verify, and scale transparent food experiences with blockchain technology.

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99.9%	50%	200%	3x
uptime guaranteed for supply chain tracking.	faster verification time to market.	increase in transparency across the supply chain.	faster to deploy blockchain tracking.

@idityage/food-chain

Research Papers

A Conceptual Model for Blockchain-Based Agriculture Food Supply Chain System

Blockchain in the Food Supply Chain by Vadim Belski & Dennis Taului

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