## **Requirements Documents.**

## **1. Introduction**

The agricultural supply chain in Kenya faces significant inefficiencies, a lack of transparency, and challenges in verifying the origin and quality of produce. This project aims to leverage blockchain technology to create a decentralized and verifiable system that enhances traceability and transparency, ensuring that every product's journey is recorded and accessible to all stakeholders. Market accessibility is improved as a secondary benefit.

## **2. Problem Statement & Justification**

### **Problem Statement**

The agricultural market suffers from:

* Lack of Traceability: Inability to verify the origin, quality, and journey of agricultural products.
* Lack of Transparency: Farmers and buyers cannot access reliable information about product authenticity or pricing.
* Limited Market Access: Small-scale farmers lack direct access to high-value buyers.

### **Justification**

Our blockchain-based solution addresses these issues by:

* Ensuring Traceability: Providing a verifiable record of product origins and journeys.
* Enhancing Transparency: Making all transactions and product information publicly visible on the blockchain.
* Improving Market Accessibility: Allowing farmers to connect with buyers more easily .

## **3. Commercial Viability & Revenue Model**

### **Revenue Model**

* **Transaction-based Commission:** 2% fee per transaction for verified produce sales.
* **Subscription Fees:** AI-powered pricing insights and analytics as a premium service.
* **Advertising Revenue:** Targeted ads for agricultural suppliers and logistics companies.

### **Target Customers**

* Farmers seeking fair pricing and reliable payments.
* Buyers looking for high-quality, verified produce.
* Distributors and retailers seeking transparent supply chain tracking.

### **Competitive Advantage**

* **Blockchain-enabled transparency**, ensuring verifiable transactions.
* **AI-powered pricing analytics**, providing fair market rates.
* **Seamless mobile experience**, making market access easy for all users.

## **4. Go-To-Market Strategy**

### **Marketing Approach**

* **SEO & Digital Marketing:** social media, influencer collaborations, and paid ads.
* **Partnerships with Farmer Cooperatives:** Onboarding agricultural groups and cooperatives.

### **User Acquisition Strategy**

* **Free pilot testing** with select farmers and distributors.
* **Incentives for early adopters**, including discounts on transaction fees.

### **Customer Support Mechanisms**

* **24/7 AI-powered chatbot** for instant issue resolution.
* **Community forums** for knowledge sharing and support.

## **5. Resources Required**

* **Human Resources:** Blockchain developers, AI engineers, UX designers, and market analysts.
* **Technology Stack:**
  + **Blockchain:** Ethereum, Hyperledger Fabric, Polygon Layer 2
  + **Frontend:** React.js (web), Flutter/React Native (mobile)
  + **Backend:** Node.js (Express.js) / Python (Django, Flask)
  + **Storage:** IPFS for decentralized data storage
  + **Hosting:** AWS, Google Cloud, Firebase

## **6. Development Methodology**

### **Agile Development Approach (Scrum)**

* **Phase 1:** Requirements gathering and blockchain setup.
* **Phase 2:** MVP development, including smart contracts and UI implementation.
* **Phase 3:** User testing, security audits, and performance optimizations.
* **Phase 4:** Full-scale deployment and scaling.

## **7. Functional & Non-Functional Requirements**

### **Functional Requirements**

* **User Authentication & Authorization:** Secure login with role-based access.
* **Produce Registration & Tracking:** Unique batch IDs for traceability.
* **Smart Contracts Execution:** Automated payments and escrow services.
* **Blockchain-Based Ledger:** Immutable transaction records.
* **QR Code Integration:** Instant verification of produce authenticity.
* **AI-Powered Pricing Analytics:** Fair pricing suggestions.
* **Transparency Portal**: Public-facing dashboard for tracking product journeys.

### **Non-Functional Requirements**

* **Scalability:** Support for increasing transactions and users.
* **Security:** End-to-end encryption for all transactions.
* **Performance:** Transactions processed in less than 5 seconds.
* **Availability:** 99.9% uptime with cloud redundancy.
* **Compliance:** Adherence to financial and data protection regulations.

## **7. Impact & Conclusion**

Our blockchain-based transparency solution will:

* Enhance Traceability: Consumers can verify product origins and journeys.
* Improve Transparency: All stakeholders can access reliable information about product authenticity.
* Increase Market Accessibility: Farmers can connect with buyers more easily .

By leveraging blockchain, AI, and mobile accessibility, our platform ensures an equitable and efficient supply chain, benefiting all stakeholders while aligning with Kenya’s digitization goals.