## **Requirements Documents.**

## **1. Introduction**

The agricultural supply chain in Kenya faces significant inefficiencies, a lack of transparency, and financial losses due to middlemen and fraud. This project aims to leverage blockchain technology to create a decentralized and verifiable system that enhances traceability, reduces fraud, and streamlines operations. By eliminating intermediaries, our blockchain-based agricultural broker ensures that farmers and consumers can transact directly through a secure digital marketplace, accessible via mobile devices.

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

### **Problem Statement**

The agricultural market suffers from significant challenges, including:

* **Lack of Transparency:** Farmers and consumers struggle to verify produce authenticity and origin.
* **Middlemen Exploitation:** Unfair pricing models favor intermediaries over farmers and consumers.
* **Payment Delays & Fraud:** Farmers face non-payments and delayed settlements.
* **Limited Market Access:** Small-scale farmers lack direct access to high-value buyers.

### **Justification**

Our blockchain-based solution addresses these issues by:

* **Creating a decentralized and tamper-proof marketplace** where every transaction is recorded immutably.
* **Automating payments through smart contracts**, ensuring instant and secure settlements.
* **Enabling fair pricing through AI-driven analytics**, reducing reliance on exploitative middlemen.
* **Improving accessibility**, allowing farmers to sell produce without requiring prior connections.

## **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.
* **User Dashboard:** Comprehensive tracking for farmers, buyers, and distributors.

### **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 agricultural broker will:

* **Enhance Efficiency:** Automating transactions and eliminating middlemen.
* **Increase Farmer Incomes:** Ensuring fair pricing and instant payments.
* **Build Trust:** Providing transparency for all supply chain participants.
* **Improve Market Accessibility:** Enabling farmers and buyers to connect without existing networks.

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.