

# AI-Based Smart Farmer Product System

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## **ABSTRACT:**

Agriculture is a critical sector in developing countries, yet farmers often face challenges such as price fluctuations, limited market access, and dependency on intermediaries. This paper presents an AI-based smart agricultural product tracking and marketplace system that connects farmers and distributors on a unified digital platform. The proposed system enables farmers to securely register, manage product details, and share information with distributors. It also allows real-time tracking of products and feedback exchange to improve product quality and transparency. A key feature of the system is the use of QR codes, which store complete product information and enable quick access, ensuring traceability throughout the supply chain. In addition, the system integrates machine learning algorithms for crop price prediction and recommendation mechanisms to help farmers make data-driven decisions and select optimal markets. The application is implemented as an Android-based platform to ensure accessibility and real-time usability. Overall, the system enhances communication, reduces manual effort, improves transparency, and increases profitability for farmers by combining tracking, marketplace, and intelligent prediction features.

**Keywords:** Android-based Application

Supply Chain Management

Farmer–Distributor Communication

QR Code Tracking

Product Traceability

Real-time Tracking System

Crop Distribution System

Product Status Monitoring

Feedback System

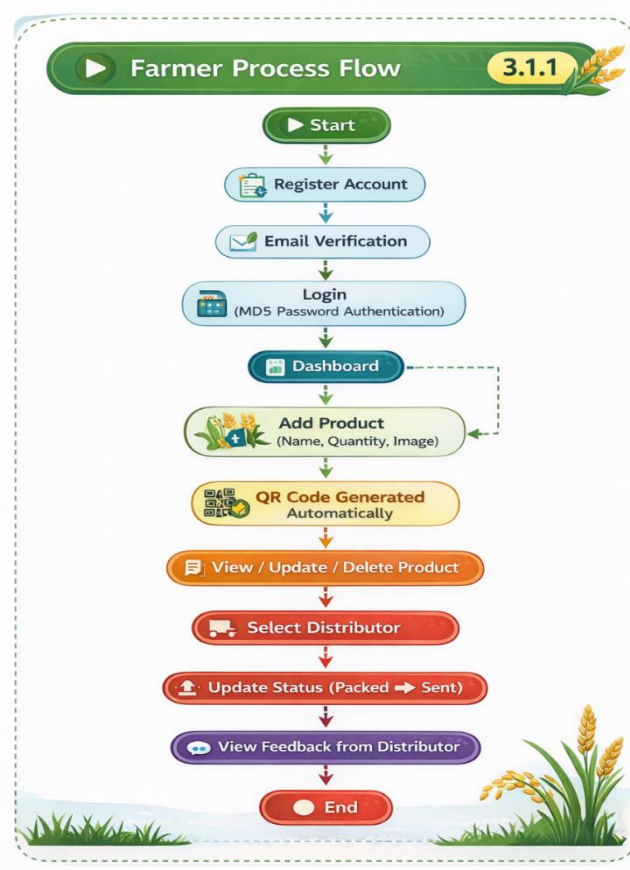
Data Management System

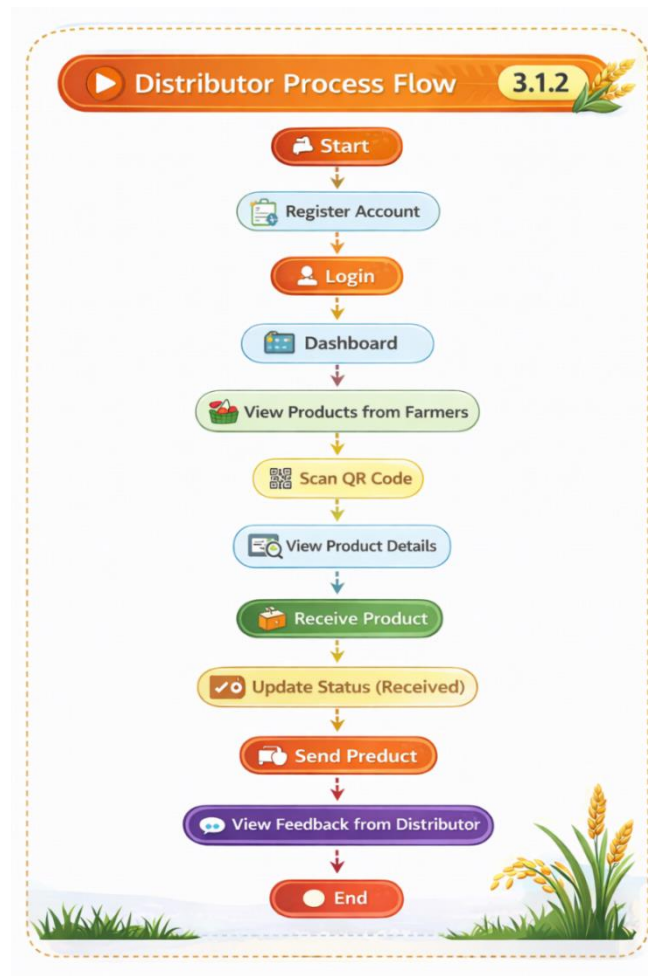
## 1. INTRODUCTION

Agriculture plays a vital role in the economy, particularly in countries like India. Agriculture is one of the most significant sectors in developing countries like India, contributing extensively to economic growth, employment generation, and food security. A large portion of the population depends directly or indirectly on agriculture for their livelihood. Despite its importance, the agricultural sector still faces several challenges due to traditional and unorganized practices followed in the supply chain. These challenges include lack of transparency, inefficient communication between stakeholders, dependency on intermediaries, absence of real-time tracking systems, and improper management of product information.

The Agricultural Product Tracking System is designed as an Android-based application to address these issues. The system provides a unified platform where farmers and distributors can interact directly without the involvement of intermediaries. Farmers can register, log in securely, and manage their agricultural products by adding details such as product name, quantity, images, and description. They can also update product status during different stages of distribution such as “Packed” and “Sent”.

Overall, the Agricultural Product Tracking System aims to digitize and streamline the agricultural distribution process. It minimizes manual work, reduces dependency on intermediaries, improves real-time tracking, and enhances communication between stakeholders. The system has the potential to bring transparency, efficiency, and technological advancement to the agricultural sector, making it more reliable and sustainable for future development.





## 2. LITERATURE SURVEY

Existing research highlights the effectiveness of predictive models in agriculture, but lacks integrated solutions. The literature review provides a detailed study of existing systems, technologies, and research work related to agricultural supply chain management and product tracking systems. It helps in identifying the limitations of current approaches and highlights the need for an efficient and transparent solution. In traditional agricultural distribution systems, farmers largely depend on middlemen or local agents for selling and distributing their products. This creates a communication gap between farmers and distributors, leading to reduced profit margins, lack of transparency, and inefficient coordination. Most of these systems rely on manual record-keeping or basic communication methods such as phone calls and messaging applications, which are not reliable for managing and tracking product movement in real time.

With advancements in technology, several modern solutions have been introduced to improve agricultural practices. Web-based agricultural systems provide centralized access to product and user data. However, these systems require continuous internet connectivity and are often not user-friendly for rural users.

IoT-based agricultural systems have been developed to monitor real-time environmental conditions such as soil moisture, temperature, and humidity. These systems enhance productivity and provide accurate

data for decision-making. However, they require additional hardware components, making them expensive and less practical for small-scale farmers.

Blockchain-based agricultural supply chain systems focus on improving transparency and security. They ensure that data is securely stored and cannot be altered, thereby increasing trust among stakeholders. Despite their advantages, these systems are complex to implement and require high computational resources.

QR code-based tracking systems are widely used in logistics and retail industries for product identification and traceability. Each product is assigned a unique QR code containing detailed information, which can be accessed by scanning. This approach reduces manual errors and improves efficiency. However, such systems are rarely implemented at the farmer level in agricultural distribution.

Mobile-based agricultural applications have gained popularity due to the increasing use of smartphones. These applications provide features such as product listing, communication, and information sharing. However, most existing applications focus on limited functionalities and do not provide a complete solution for tracking and managing product distribution between farmers and distributors.

Cloud-based systems are also used for storing and managing agricultural data. They offer centralized storage, scalability, and easy data access. However, they depend on reliable internet connectivity and may raise concerns regarding data security.

From the study of existing systems, it is observed that most solutions address only specific parts of the agricultural supply chain. They lack integration of features such as real-time tracking, direct communication, product management, and feedback mechanisms in a single platform.

The proposed Agricultural Product Tracking System overcomes these limitations by providing an Android-based application developed using Android Studio. It integrates multiple features such as secure user authentication, product management, QR code generation, real-time status tracking, and feedback exchange. The system enables direct communication between farmers and distributors without the involvement of intermediaries, thereby improving transparency, efficiency, and reliability in the agricultural supply chain.

Thus, the proposed system offers a practical, cost-effective, and user-friendly solution that bridges the gap between existing technologies and real-world agricultural requirements.

### 3. PROPOSED METHODOLOGY

The methodology of the Agricultural Product Tracking System describes the systematic approach used for designing, developing, and implementing the application. The system is developed as an Android-based mobile application to ensure accessibility, usability, and real-time interaction between farmers and distributors.

The development process begins with requirement analysis, where the problems in the existing agricultural supply chain are identified. These problems include lack of transparency, inefficient

communication, absence of real-time tracking, and dependency on manual processes. Based on these issues, system requirements are defined to ensure a user-friendly, secure, and efficient solution.

The system follows a modular approach consisting of different functional components such as user authentication, product management, QR code generation, product tracking, and feedback management. Each module is designed and implemented separately to ensure better maintainability and scalability.

The first module is user registration and authentication. Farmers and distributors register themselves using valid details such as email and mobile number. The system uses email verification and encrypted password mechanisms (MD5 hashing) to ensure secure login and prevent unauthorized access.

The second module is product management. After successful login, farmers can add agricultural products by entering details such as product name, category, quantity, description, and images. The system allows farmers to update or delete product information as required. All product data is stored in the database for future reference.

The third module is QR code generation. For every product added by the farmer, the system automatically generates a unique QR code that contains encoded product information. This QR code acts as a digital identity of the product and helps in easy tracking and quick access to product details.

The fourth module is product tracking and status management. Farmers can select distributors and send product details along with status updates such as “Added,” “Packed,” and “Sent.” Distributors can view assigned products, scan QR codes to access product information, and update the status to “Received” after delivery. This ensures real-time tracking of the product throughout the distribution process.

The fifth module is feedback management. After receiving the product, distributors can provide feedback regarding product quality and delivery. This feedback is stored in the system and can be viewed by farmers, enabling continuous improvement and better communication.

The system architecture follows a three-tier model consisting of presentation layer (Android user interface), application layer (business logic), and data layer (database management). Technologies such as Android Studio, Java/Kotlin, SQLite or Firebase, and QR code libraries are used for development and implementation.

Overall, the methodology ensures a structured and efficient approach for developing the Agricultural Product Tracking System. It integrates modern mobile technologies with agricultural practices to provide a reliable, transparent, and user-friendly solution for product tracking and distribution.

## 4. CONCLUSION

The Agricultural Product Tracking System was successfully designed and implemented as an Android-based application to address the challenges present in the traditional agricultural supply chain. The system effectively provides a digital platform that connects farmers and distributors, enabling direct communication and reducing dependency on intermediaries.

The proposed system integrates multiple functionalities such as secure user authentication, product management, QR code generation, real-time tracking, and feedback mechanisms. These features work together to improve transparency, efficiency, and reliability in the distribution of agricultural products. The use of QR code technology ensures easy identification and traceability of products, while real-time status updates allow users to monitor the movement of goods throughout the supply chain.

The system demonstrated effective performance during testing, with all modules functioning accurately and efficiently. Farmers were able to manage product details and track their distribution, while distributors could access product information, update delivery status, and provide feedback. This two-way interaction enhances communication and builds trust between stakeholders.

Overall, the Agricultural Product Tracking System reduces manual effort, minimizes errors, and ensures proper data management. It provides a cost-effective and user-friendly solution suitable for real-world agricultural applications. The system has strong potential for future enhancements such as integration with payment systems, GPS-based tracking, and support for multiple languages.

In conclusion, the proposed system contributes to the digital transformation of agriculture by improving supply chain management and ensuring a more transparent and efficient product tracking process.

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