

A Study on Farmer–Market Link System

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Abstract: *In the agricultural sector, farmers often face challenges in selling their crops at fair prices due to the involvement of middlemen, lack of direct market access, and limited transparency in pricing. Buyers and local markets, on the other hand, struggle to identify reliable farmers and access fresh produce efficiently. The Farmer–Market Link System is proposed as a centralized, role-based web platform that directly connects farmers with buyers through a digital interface.*

The system allows farmers to register, add crop listings with quantity, price, and location details, and manage their available produce through a personalized dashboard. Buyers can browse crop listings, filter results, and send purchase requests directly to farmers. The platform is developed using Node.js, Express.js, MySQL, and HTML/CSS/JavaScript, following a RESTful architecture. It supports role-based access for Farmers and Buyers and provides a responsive interface with dark and light theme options.

The Farmer–Market Link System aims to reduce dependency on intermediaries, improve farmer income, ensure fair pricing, and promote digital transformation in agriculture by enabling direct and transparent communication between producers and markets.

Keywords: Farmer–Market Link System, Agriculture Technology, Crop Management System, Direct Market Access, Web Application, Node.js, MySQL

I. INTRODUCTION

Agriculture plays a vital role in the economy, especially in developing countries where a large portion of the population depends on farming for livelihood. Despite their importance, farmers often face difficulties in selling their produce at reasonable prices due to the presence of intermediaries, lack of real-time market information, and limited access to buyers. Traditional market systems rely heavily on physical marketplaces and agents, which can lead to unfair pricing and delayed transactions.

With the growth of digital technologies, web-based platforms have the potential to bridge the communication gap between farmers and buyers. The Farmer–Market Link System is designed to address these issues by providing a centralized digital platform where farmers can list their crops and buyers can directly interact with them. This system ensures transparency, reduces operational inefficiencies, and promotes fair trade practices.

From a technical perspective, the system is implemented using modern web technologies including Node.js for backend services, MySQL for data storage, and HTML/CSS/JavaScript for frontend development. The platform follows REST API principles and supports a responsive, user-friendly interface with multiple themes.

A. Existing System

In the existing agricultural market system, farmers primarily sell their crops through local mandis, agents, or wholesalers. These intermediaries control pricing and often take significant commissions, reducing farmers' profits. Farmers lack access to real-time demand data and must depend on physical presence in markets to sell their produce.

Buyers and retailers also face challenges in sourcing fresh produce efficiently, as they must rely on local agents or physical visits to markets. There is no unified digital system that allows direct interaction, price comparison, or transparent transactions between farmers and buyers.



Limitations of Existing System:

- Dependence on Middlemen: Farmers receive lower prices due to multiple intermediaries.
- Lack of Transparency: Pricing and demand information is not easily accessible.
- Manual Process: Crop selling and buying involve physical presence and paperwork.
- Limited Market Reach: Farmers can only sell to nearby markets.
- Inefficient Communication: No direct communication channel between farmers and buyers.

B. Proposed System

The proposed Farmer–Market Link System introduces a web-based platform that enables direct interaction between farmers and buyers. Farmers can create accounts, add crop listings with relevant details, and update availability in real time. Buyers can browse available crops, filter by location or price, and send purchase requests directly to farmers. The system is built using a Node.js and Express.js backend with a MySQL relational database and a responsive HTML/CSS/JavaScript frontend. Role-based access ensures secure and personalized dashboards for farmers and buyers. The platform also includes dark and light theme options to enhance user experience.

Benefits of Proposed System:

- Direct Farmer-to-Buyer Interaction: Eliminates middlemen.
- Fair Pricing: Farmers set their own crop prices.
- Real-Time Updates: Crop listings are updated instantly.
- Wider Market Access: Farmers reach more buyers digitally.
- User-Friendly Interface: Simple dashboards and theme support.

II. LITERATURE SURVEY

Several studies and existing platforms highlight the importance of digital solutions in agriculture. Research on e-agriculture platforms demonstrates that direct market access significantly improves farmer income and reduces wastage. Online agricultural marketplaces have shown that transparent pricing mechanisms benefit both farmers and buyers.

Studies on supply chain digitization emphasize the role of web-based systems in improving efficiency, traceability, and communication. Research on REST-based web applications confirms that modular and scalable architectures are suitable for handling multi-user systems with real-time data updates.

Security studies stress the importance of authentication and role-based access in platforms dealing with sensitive user and pricing data. These findings influenced the design and implementation of the Farmer–Market Link System.

III. METHODOLOGY

The development of the Farmer–Market Link System follows a full-stack web application approach with clear separation of frontend, backend, and database layers. The system is designed using a client-server architecture that ensures scalability and maintainability.

A. Backend — REST API (Node.js + Express.js)

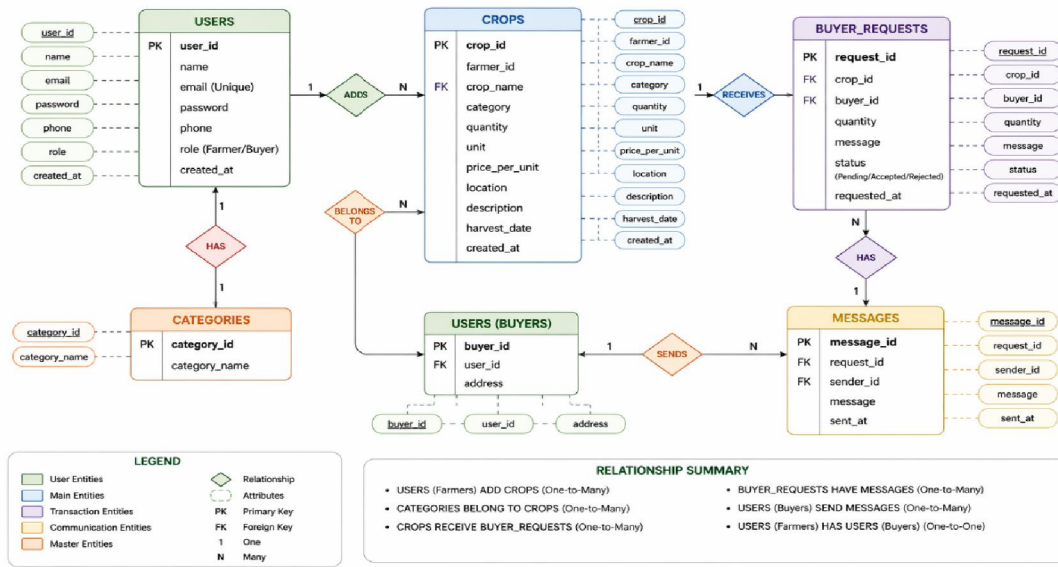
The backend provides RESTful APIs for crop management and data retrieval. It handles requests such as adding crop listings and fetching available crops. Express.js is used to manage routing, and JSON is used for data exchange between frontend and backend.



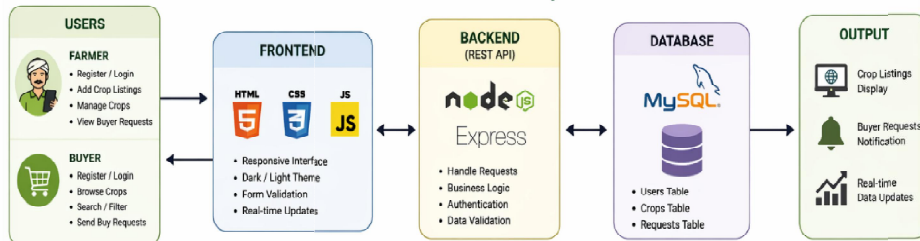
B. Database — MySQL

The MySQL database stores user information and crop details. Tables are designed using a normalized relational schema to ensure data integrity. The crops table stores crop name, quantity, price, farmer name, and location.

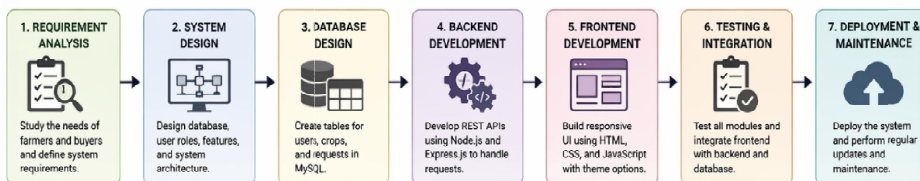
ER DIAGRAM OF DATABASE SCHEMA
Farmer–Market Link System



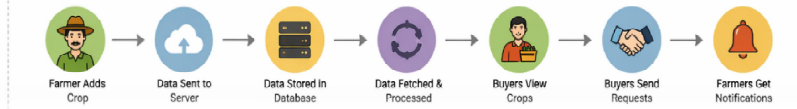
SYSTEM METHODOLOGY
Farmer–Market Link System



METHODOLOGY STEPS



DATA FLOW



C. Frontend — HTML, CSS, JavaScript

The frontend consists of multiple web pages including Home, Farmer Dashboard, and Buyer Dashboard. It features a responsive layout, card-based crop display, and dark/light theme toggle using CSS variables. JavaScript is used to fetch and display data dynamically from the backend.

D. Development Lifecycle

Requirement Analysis: Identified farmer and buyer functionalities.

- Database Design: Created tables for users and crops.
- Backend Development: Implemented REST APIs.
- Frontend Development: Built responsive user interfaces.
- Integration Testing: Verified data flow from farmer to buyer.
- UI Enhancement: Added themes and animations.

IV. RESULTS AND DISCUSSION

The Farmer–Market Link System was tested for functionality and usability. Farmers were able to add crop listings successfully, and buyers could view updated listings in real time. The data entered by farmers appeared instantly on the buyer interface, confirming proper frontend-backend integration.

The dark and light theme toggle worked seamlessly across different pages and devices. The system performed efficiently under normal usage conditions and demonstrated reliable data storage and retrieval using MySQL.

V. ADVANTAGES

- Eliminates Middlemen: Direct farmer-to-buyer connection.
- Increased Farmer Income: Fair and transparent pricing.
- Time Efficiency: Faster buying and selling process.
- Digital Accessibility: Web-based system accessible from anywhere.
- Cost Effective: Built using open-source technologies.
- User-Friendly Design: Simple dashboards with theme support.

VI. FUTURE SCOPE

The Farmer–Market Link System can be enhanced by integrating online payment gateways for secure transactions. A mobile application version can improve accessibility for farmers in rural areas. Additional features such as real-time chat, crop price prediction using AI, and logistics support for transportation can further enhance the system.

Integration with government agricultural schemes and market price APIs can provide farmers with valuable insights and financial benefits.

VII. CONCLUSION

This paper presented the design and implementation of the Farmer–Market Link System, a web-based platform aimed at improving agricultural trade by directly connecting farmers and buyers. Traditional agricultural markets involve multiple intermediaries, leading to reduced farmer profits and inefficiencies.

The proposed system addresses these challenges by offering a transparent, digital solution with real-time crop listings and user-friendly dashboards. Developed using Node.js, Express.js, MySQL, and standard web technologies, the system demonstrates how digital platforms can empower farmers and modernize agricultural markets.

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