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A Digital Farmer Marketplace Connecting Rural Farmer and Consumer without Middle Person

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Abstract: ***Accessing dependable and effective market platforms is extremely difficult for farmers in rural locations, which restricts their ability to communicate directly with customers, merchants, and wholesalers. Make sure the platform is user-friendly for both farmers and consumers. The goal of this project is to create an intuitive online marketplace application that will empower farmers by expanding their market reach and facilitating more equitable trading. By offering a simplified, open, and easily navigable digital environment, the platform aims to close the distance between prospective consumers and rural farmers. Direct lines of communication, product listings, real-time price updates, and logistical support to enable smooth transactions are important elements. Convert conventional farming methods into a more structured and efficient system. Farmers may improve their control over product distribution and pricing by utilizing this platform, which will ultimately help them develop economically and support sustainable farming methods. The urgent need for digital solutions that help rural farmers and build a more just marketplace is addressed by this project. Create a comprehensive application that integrates technology to transform the agriculture supply chain for the benefit of consumers and producers alike.***

Keywords: Online platform, Rural farmers, User-Friendly, Real time price update, Direct Communication.

I. INTRODUCTION

With so many people relying on farming as their primary source of income, agriculture continues to be the foundation of many rural economies. However, finding trustworthy marketplaces is a major obstacle for farmers in remote areas. Due to their heavy reliance on middlemen, traditional selling methods result in poor price realization, inefficiencies, and a lack of transparency, all of which eventually lower farmers' profitability and increase product waste.

There is an increasing chance to modernize agricultural trade as a result of the growth of digital technology and smartphone usage. By facilitating safe transactions, real-time pricing, improved inventory control, and direct contact, a specialized online marketplace can close the gap between manufacturers and customers. These platforms provide farmers more authority over their produce and facilitate its effective distribution to a larger market.

Models such as India's National Agriculture Market (eNAM) demonstrate how e-commerce in agriculture seeks to provide fair pricing and do away with middlemen. Widespread acceptance is still difficult, though, because of things like limited digital literacy, inadequate infrastructure, ignorance, and storage space. For instance, just 10.9% of farmers in the Thrissur area of Kerala knew everything there was to know about e-commerce.

The Farmer Marketplace program was created with usability, simplicity, and inclusion in mind to address these issues. For farmers with different levels of digital proficiency, it offers offline support and an intuitive, multilingual interface. Through an emphasis on openness, ease of use, and farmer empowerment, the platform seeks to establish a more efficient and equitable agricultural supply chain.

II. LITERATURE REVIEW

[1] According to Huang and Cai, integrating digital technologies into the agricultural supply chain can significantly enhance market efficiency and promote the inclusion of smallholder farmers. This insight supports the objective of the Farmer Marketplace platform, which aims to digitally connect rural farmers with consumers and reduce dependency on intermediaries by improving transparency, logistics, and direct access to markets.

[2] The study titled Impact of Rural E-Commerce on Farmers' Income and Income Gap emphasizes that digital platforms significantly improve farmers' income levels by providing direct access to broader markets and reducing income disparities. This finding reinforces the aim of the Farmer Marketplace initiative, which seeks to empower rural farmers economically by eliminating middlemen and enhancing pricing transparency through a digital trading system.

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[3] The study *Smart Farming:* Bridging Farmers and Consumers through Machine Learning Enabled E-commerce Platforms highlights how intelligent digital solutions can facilitate direct interaction between farmers and consumers, enhancing trust, efficiency, and profitability. This aligns with the goals of the *Farmer Marketplace* platform, which aims to leverage digital tools to simplify agricultural trade and provide rural farmers with improved market connectivity.

[4] Kumar explore how users make purchasing decisions on e-commerce websites, emphasizing the importance of interface design, product visibility, and ease of navigation. These factors are highly relevant to the *Farmer Marketplace* platform, which aims to offer a user-friendly digital environment that simplifies product listing and ordering for farmers, thereby encouraging their participation in online trade. [5] Fitriyani and Nasir [5] emphasize that AI-enabled digital platforms can significantly improve market access for farmers in remote areas by simplifying trade processes and increasing transparency. This aligns with the vision of the *Farmer Marketplace* platform, which seeks to empower rural farmers through accessible digital tools that enhance connectivity, efficiency, and direct trade opportunities.

III. METHODOLOGY

The goal of this project's methodology is to create a transparent, effective, and user-friendly online platform called Farmer Marketplace that links rural farmers with wholesalers, merchants, and consumers directly. The Farmer Module, Customer Module, and System Module are the three main parts of the system's architecture. In order to guarantee smooth transactions, efficient product delivery, and seamless communication, each module has a distinct function.

Farmers may register on the platform using the Farmer Module by entering their basic information and having it validated by an OTP. They may log in, change their profile, and begin adding items after the verification process is complete. Specific information including the product's name, price, quantity, and availability status must be included into each listing. Additionally, farmers can change these facts as necessary. The farmer is notified in real time when a consumer puts an order, and they have the option to accept or reject it. If approved, the farmer follows the chosen logistical plan to prepare the order and monitor distribution.

The purpose of the Customer Module is to give customers, merchants, and wholesalers a straightforward and easy-to-use experience. Customers can browse the various products posted by farmers by logging in after successfully registering and having their information verified by the system. They can view comprehensive product details, such as quantity, price, and availability, thanks to the system. Users can confirm their order and add the goods to their basket if it is available. The system creates a bill after the order is placed, and the consumer can use the linked payment gateway to safely complete the payment. Customers can also choose to post evaluations and comments after purchasing the goods, which encourages openness and fosters confidence between consumers and farmers. As the platform's backbone, the System Module guarantees security, effectiveness, and automation of key operations. It manages order tracking, billing procedures, payment connection, and OTP-based user verification. By automatically creating order bills and updating both parties on transaction statuses, this module makes sure that the farmer and customer modules work together seamlessly. Additionally, it facilitates record-keeping and real-time communication to improve openness and accountability. This architecture's modular design makes the Farmer Marketplace platform suitable for the rural agricultural ecosystem by guaranteeing that it will continue to be scalable, secure, and user-friendly—even in places with poor connectivity.

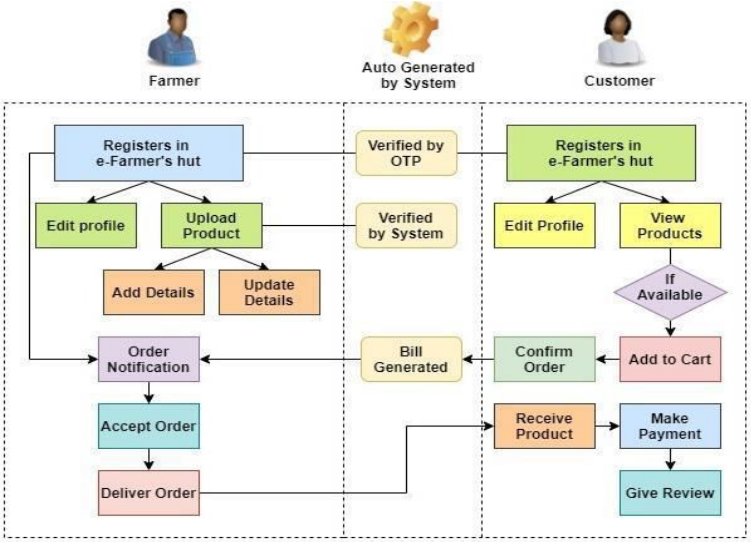


Fig:1 Architecture canva

In the same way, the Customer Module begins with login and registration. Consumers are able to browse the marketplace, check the items that are offered, and verify their information. A product can be added to the cart if it is available. The system immediately creates a bill when the customers confirm the order. Following verification, the client uses integrated payment channels to make a safe purchase. Following a successful purchase, the consumer may assess the farmer and offer feedback after receiving the product, which promotes trust and honesty.

By overseeing OTP authentication, profile validation, billing, order status updates, and data integrity, the System Module plays a crucial part in the backend. The system records orders till distribution is finished, automatically creates invoices, and verifies payment status. At each significant step—registration, order placing, confirmation, delivery, and review submission—it also guarantees that farmers and consumers receive timely messages. Platform durability is increased and human error is decreased by these automated procedures.

Last but not least, the diagrams' representation of the overall design demonstrates a logical flow of processes, from product uploading to consumer purchases and comments. It facilitates effective order processing, provides real-time communication and updates, and has an emphasis on accessibility for users who are not familiar with digital technology. The system seeks to empower farmers, enhance their market access, and create an open and equitable agricultural trade environment by adhering to this standardized process.

IV. IMPLEMENTATION

Initial market research aimed at comprehending the practical difficulties encountered by rural farmers preceded the launch of the Farmer platform web platform. This involved figuring out where there were gaps in digital literacy, market access, and infrastructure like device usage and network coverage. To make sure the platform is useful and farmer-friendly, the design choices were informed by the study.

The development of the system placed a high priority on accessibility as well as simplicity of use. In order to accommodate people with low technological skills, a mobile-responsive interface that is multilingual was developed. Product listings, pricing updates, safe payments, order monitoring, and direct farmer-to-buyer communication are among the essential features.

A lightweight and scalable application was ensured by utilizing technologies like PHP with MySQL for the backend and HTML, CSS, and JavaScript for the front end. The technology offers real-time alerts for farmers and consumers, secure transaction processing, auto-generated invoices, and an OTP-based login.

To evaluate functionality and user experience, a small sample of farmers participated in a trial phase. Based on actual use, the feedback received during this phase assisted in improving the platform's responsiveness, fixing issues, and refining the user experience.

Training sessions, basic video tutorials, and local farmer champions were used to facilitate adoption by assisting new users in comprehending the system. The implementation is now inclusive, feasible, and prepared for further distribution in rural areas thanks to this combination of digital technologies and local assistance.

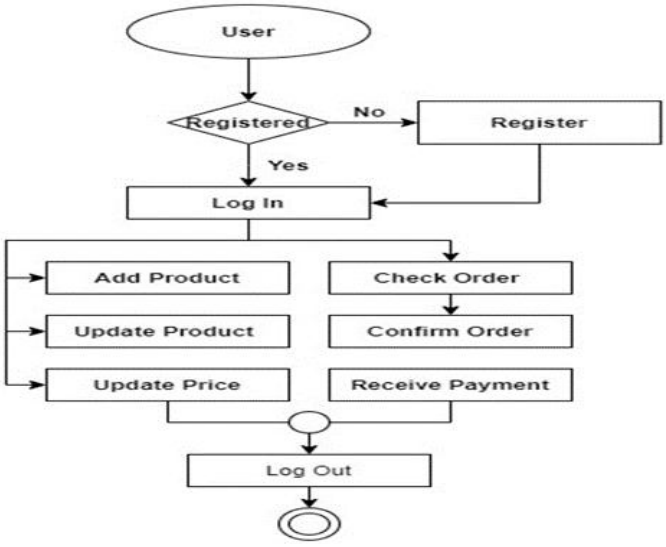


Fig2: Farmer site

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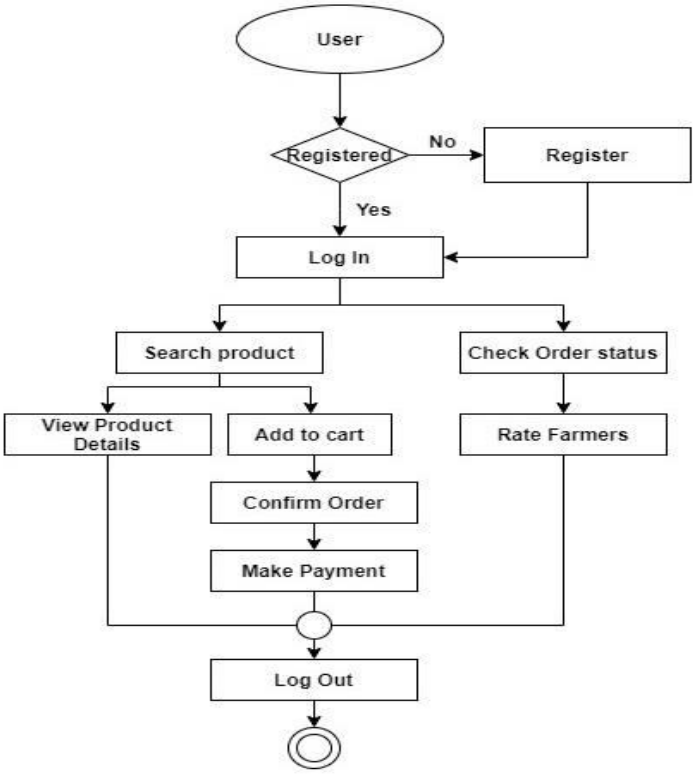


Fig3: Customer site

A user-friendly, modular architecture that facilitates communication between farmers and consumers via a digital platform is at the heart of the Farmer Marketplace system's execution. The development started by determining the practical requirements of rural farmers, such as their reliance on middlemen, poor digital literacy, and erratic internet connectivity. Through a step-by-step user interface, the platform was then created to streamline essential agricultural transactions for both farmers and consumers, including product listing, browsing, ordering, and payment.

Farmers first register with the system using OTP verification in the farmer module. After being validated, they can post product details such name, price, quantity, and availability, as well as change their profile and log in. This information can be changed at any time and is kept in a centralized database. Farmers receive real-time order notifications when a consumer places an order, and they have the option to accept or reject the request. Farmers are in charge of delivering the goods, either directly or with the help of integrated logistics, after accepted orders are processed by the platform.

The customer module is made to be just as simple. To access services, new users must first register on the site and then log in. They can peruse the marketplace, examine product descriptions, and add products to their cart after logging in. The technology automatically generates a bill after the order has been confirmed, and users may safely pay online. Customers can assess the farmer and provide comments when the product is delivered, which increases platform transparency and fosters system confidence.

The system module serves as a link between the actions of farmers and customers. It manages crucial backend functions like order tracking, billing, payment processing, and OTP-based verification. Real-time updates and transparent transactions are made possible by this module, which makes sure that data moves between users securely and effectively. Additionally, it facilitates automated procedures like payment confirmation, progress updates, and review gathering, all of which enhance the platform's overall dependability.

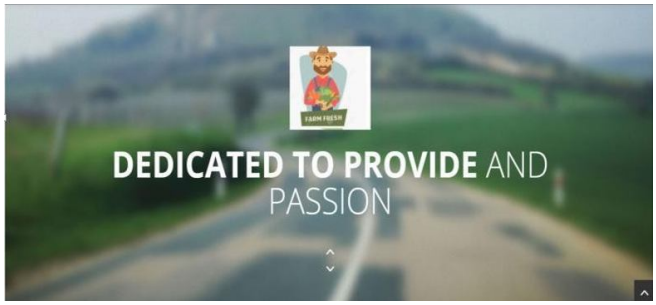
All things considered, the Farmer Marketplace's deployment guarantees a seamless and productive online space where rural farmers may run their operations with no technical difficulty. By providing an inclusive, multilingual, mobile-responsive interface that facilitates both online and offline participation, the platform tackles actual obstacles in agricultural marketing. This methodical approach supports fair trade and rural economic development in addition to assisting farmers in reaching a wider audience.

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V. RESULT AND DISCUSSION

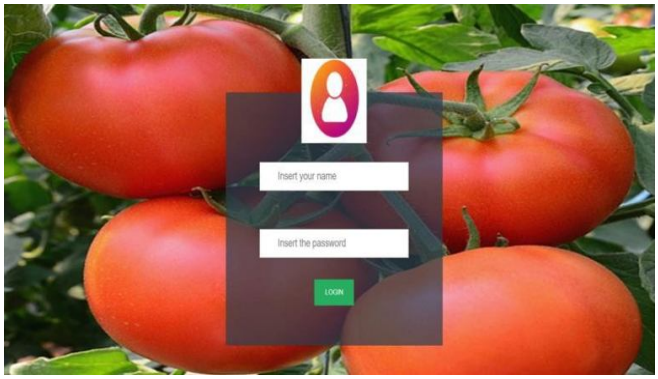
A. Home Page

A digital platform created to put rural farmers in direct contact with customers, merchants, and people looking for services. By doing away with the need for middlemen, we hope to guarantee that farmers get paid fairly for their goods and services. Our platform provides a straightforward, transparent, and easy-to-use experience for all users, whether they are farmers wishing to list their produce or consumers looking for dependable, fresh agricultural products.



B. Login Page

The supervisor dashboard has important tools for managing the marketplace. On essential components like product categories, service listings, and employee profiles, moderators can easily carry out CRUD (Create, Read, Update, and Delete) activities. The platform offers end users an easy method to browse products and access a variety of services. With a clear and simple user interface, we hope to improve the customer journey.



C. Product Showing Page

Browse a large selection of our farmers' fresh, premium products. To assist you in making wise judgments, each product on this list includes crucial information including price, quantity, and farmer details. Whether you're searching for dairy, grains, veggies, or other agricultural products, our platform makes it simple to browse and buy with a few clicks.



D. Order Page

Just one more step will complete your transaction! Verify the amount and total cost of the products in your order, then check out. Your order information will be securely processed and sent straight to the farmer or service provider thanks to our secure system. We appreciate your support of regional farmers!



E. Payment Page

You're nearly finished! To complete your order, please select your preferred payment option and finish the transaction. Your information is secure, and all payments are safe. Your order will be verified and shared with the appropriate farmer or service provider as soon as the payment is successful.



VI. CONCLUSION

Many of the problems faced by rural farmers, especially those related to fair and transparent marketplaces, may be solved creatively and practically with the help of the Farmer Marketplace platform. The platform removes middlemen by facilitating direct communication between farmers and buyers, which improves price, eliminates exploitation, and minimizes losses after harvest.

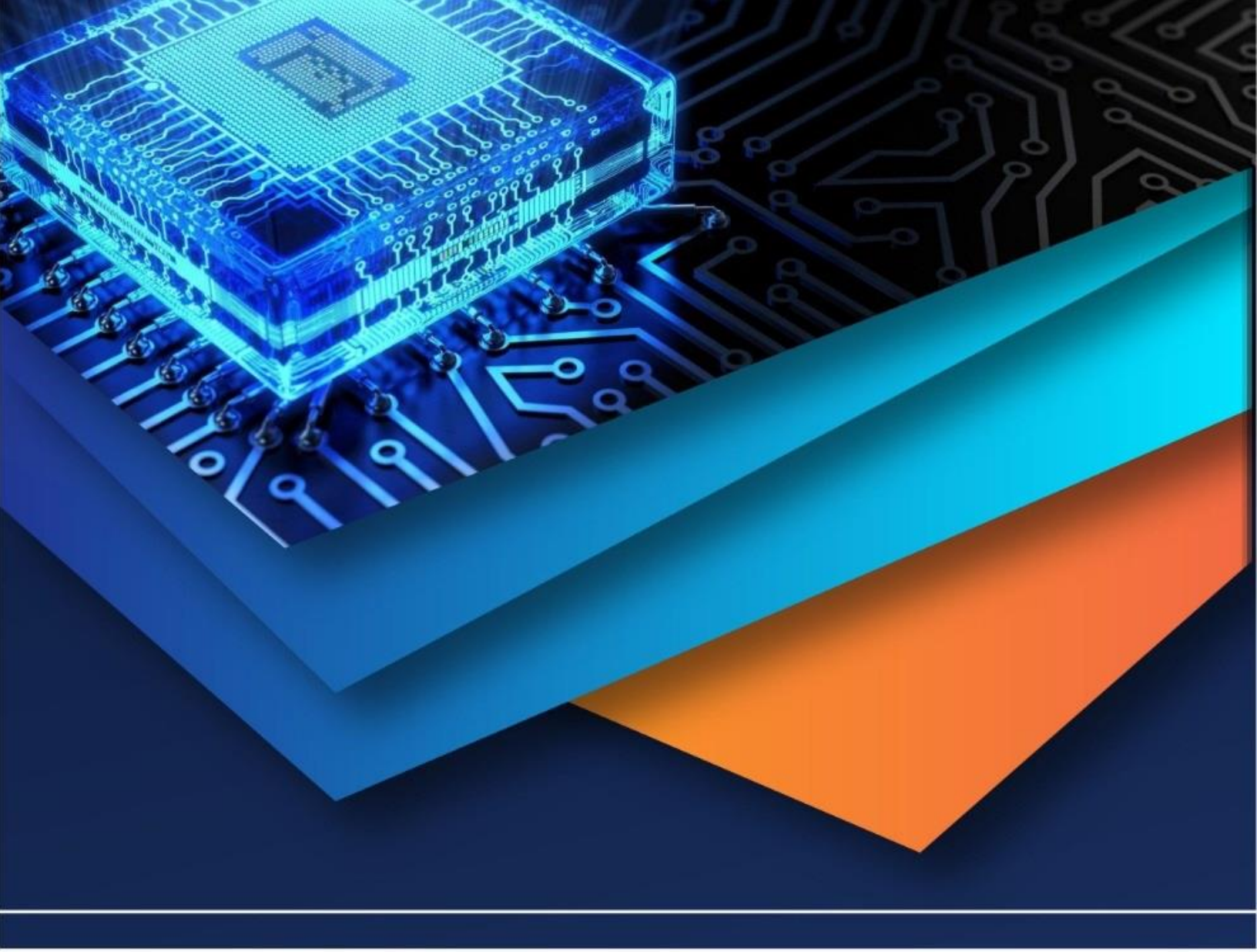
Even farmers with little internet or digital literacy may use the system thanks to important features like secure payments, bilingual interfaces, real-time pricing discovery, and offline assistance. In addition to enhancing usability, these elements build adoption in remote areas and build confidence. The platform must continue to be flexible enough to accommodate regional farming methods and market dynamics in order to guarantee long-term effect and scalability. Collaborations with government organizations, NGOs, and cooperatives can improve communication and assistance even more. All things considered, the Farmer Marketplace is a significant step in building a more sustainable, open, and inclusive agricultural ecosystem that empowers farmers and boosts rural economies.

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