

Bridging the Agricultural Market Gap: Design and Development of ShetkariMitra Web Application

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Abstract— Market access is a major challenge that farmers face, as they often rely on middlemen. This dependency usually leads to lower revenues and unfair pricing. To address this challenge, we have the "ShetkariMitra" which is a novel web application to enable farmers and buyers (consumers and retailers) interaction on a direct basis. ShetkariMitra will enable farmers to post their products, negotiate prices, and carry out transactions without intermediaries on a new user-friendly platform. With plans to broaden the horizons of farmers by connecting them directly with buyers, ShetkariMitra not only seeks to amplify earning potential for growers in all regions but also pushes forward with the mission to establish fair pricing and revolutionize market access across agriculture.

Index Terms— Web Application for Farmers, Fair Pricing, Buyer-Farmer Connectivity, Price Negotiation, Product Listings.

I. INTRODUCTION

India's GDP is 14% by agriculture, which is also a major source of income for nearly half of the people in India [1]. The sector is critical — for the Indian economy itself, and also for millions of smallholder and marginal farmers who form its backbone, and rural communities. India is the world's second most populous country. Agriculture accounts for 70% of rural Indian households' income. 82% of farmers in India are small and marginal [2]. While this is an important one but there are many barriers faced by the Indian farmers on their way to success. They struggle with a lack of access to fair markets, over-dependence on middlemen, and prices that are all too volatile. Moreover, the lack of infrastructure limits its ability to interact directly with consumers. This is because they earn less income and lose control over how their produce is sold or where it goes.

It is possible to imagine a future in which farmers do well. We can empower these essential members of our economy by improving market access and establishing direct links between farmers and buyers. This change not only assures higher incomes and stable prices for farmers but also sustainable development of rural areas for a more viable future of agriculture. Digital technology presents a golden opportunity to enhance agricultural marketing through digital means is an online-based advertisement of business with different marketing strategies and platforms, which are relatively accessible. Well, digital technologies are not limited to traditional industries, and agriculture is no exception [3]. Digital technologies are used in not just traditional industries, but also in fields like agriculture [4]. While there are tremendous initiatives underway to deliver similar systems for small to medium-sized farms, little is known about what the needs and barriers are for those growers or their current practices around data collection [5].

Farmers, who have been cultivating soybeans for decades, are aware of the factors that determine prices — unseasonal or patchy rainfall destroys the crop and affects its quality which leads to lower returns; when soybean is priced high in a particular year, farmers tend to shift more area under soybean in the next season thereby decreasing price realizations during that year; good harvests of major soybean producing countries like Brazil causes emergence of a global surplus by January (when Brazilian soybean arrives in markets); higher USD-Indian rupee rate also means better prices; and so on. This awareness of macro trends does not, however, translate easily how much possibility to expect in the cost[6].

Farming is seen as the foundation of a country, and big changes in farming are happening at the same time as big changes in industry[7]. With the progress in technology, researchers are increasingly looking at how computer models or software can help assess economic life and feasibility. This topic is becoming very popular in other countries[8]. New tools now allow farmers to connect directly with customers. While these tools could help farmers access markets, understand prices, and manage supplies, many rural and small farmers still don't benefit from them. A study from Sri Lanka shows that 90% of farmers depend on middlemen or shop owners to sell their products[9]. To address this issue, this paper introduces "ShetkariMitra," a web app designed to help farmers sell their products directly to buyers, giving them fair and clear market options.

ShetkariMitra helps farmers to publish their products online without any middlemen. Consumer or business buyers can search, negotiate prices, and purchase directly from the farmers. The platform centers around fair interactions, transparency in pricing, secure transactions where middlemen are cut out, and a simple interface for those farmers who may not be particularly tech-savvy.

With fair interaction at the heart of its core, the platform offers upfront pricing, secure transactions, and a user-friendly design for farmers with limited experience using technology. ShetkariMitra enables farmers to upload images of their products, enter delivery prices for those products, and set their availability. Customers can view products and talk directly to the sellers. This means that by eliminating middlemen, ShetkariMitra can earn farmers more money, drive down prices for consumers, and allow a healthier, sustainable agricultural supply chain.

II. LITERATURE SURVEY

According to the data, digital platforms that connect farmers directly with consumers and retailers – bypassing those who tend to take an undeserved cut of the profits – are becoming increasingly in demand. They encourage farmers to record product offerings, negotiate prices, and secure better income stability which is the ideal fairer market fiction. Secondly, direct market access makes farmers more aware of market trends and customer preferences, information which is valuable when they think ahead to what crops to plant next. Strengthening social and knowledge-sharing features on these platforms, for example, discussion forums, enables farmers to share information about best practices, crop management, and disease prevention which supports the development of an inclusive agricultural ecosystem. This locally focused model enhances the agricultural ecosystem while solving many of the struggles faced by farmers operating in more traditional supply chains, contributing to a more fair and sustainable marketplace.

Direct market access has been shown to have a major impact through platforms like Hello Tractor (Kenya), FarmCrowdy (Nigeria), and eNAM (India's National Agriculture Market). For example, FarmCrowdy has increased revenue and decreased post-harvest losses by connecting farmers with investors and end-buyers, while eNAM has demonstrated a 10–20% increase in farmer incomes because of a decreased reliance on middlemen. To assist the farmers and other stakeholders in Bangladesh make better decisions about the future feasibility and economics of combine harvesters, a web-based application has been created. Additionally, the app can give the farmers and business owners recommendations for combine harvesters in case they wish to purchase or replace one. Before purchasing or while using combine harvesters, business owners can assess their future feasibility [8]. Digital marketing plans might include things like traffic to a website, user engagement, rate of conversion, customer behavior, and buying patterns can be a part of digital marketing strategies. Agri-food businesses can learn a lot about customer choices, trends in the market, and the impact of their various campaigns by examining these metrics [3].

The demand for a digitally enabled agricultural ecosystem has come into greater focus with the increasing awareness that conventional supply chains tend to disfigure smallholder farmers. Through facilitating direct engagement between farmers and buyers, digital platforms are transforming the agricultural economy into a more inclusive, efficient, and transparent one. Beyond removing inefficiencies by cutting out unnecessary intermediaries, digital platforms also offer farmers instruments that help them better understand market trends, crop demand, and price volatility.

The increasing popularity of farmer-centric apps also shows that when farmers are also allowed to control pricing and sales, their revenue increases and so does their incentive to grow better quality harvests. Moreover, functionalities such as digital payment gateways, order tracking, and customer reviews also foster trust in online commerce for a population used to relying on face-to-face trade.

In rural economies, digital platforms are emerging as transformative means, providing solutions that solve long-time problems like market inefficiency, price manipulation, and inadequate access to trustworthy buyer networks.

TABLE I: PREVIOUS EXISTING APPLICATIONS WITH ITS FEATURES

Mobile Apps	Features
DeHaat	1. Crop advisory services 2. Quality inputs (seeds and fertilizers).
AgroStar: Kisan Agridoctor	1. Agri products 2. Farmer community
Kisaan Helpline India	1. Insights pest management 2. Soil health

III. METHODOLOGY

Farmers of agri-commodities have a big disadvantage in most traditional agricultural markets — limited access to buyers, inability to set their own prices, and dependence on middlemen who take a large cut of farmer's profits. As a result, farmers frequently are underpaid for their labor, on the verge of financial ruin, and exposed to higher economic threats. Plus, there are few good platforms for farmers to readily engage with consumers and retailers that pay fair prices for their products. Similarly, without access to credible information and tools, they are also constrained in their ability to be productive and create impact with better decision-making.

These are some of the issues that if tackled would help propel farmers towards financial independence and marketplace flexibility. This project aims to change the paradigm with which farmers communicate with the market by offering them a platform that allows them to get in touch with their buyers or providing an optional language for every potential communicant. We enable farmers to retain more of their profits by enabling honest transactions. Through direct connections to buyers and a strong support network, we want to improve farmer livelihoods in a better-priced, more transparent, and ethical agricultural marketplace. Let us come together for a new way forward to sustain the livelihoods of our farms in this ever-changing landscape.

Ease of Use:

- User-friendly Design: A clean and simple design aids buyers in smoothly browsing through product categories, viewing farmer profiles view more information about each item.
- Search and Filter Tools: Buyers should be able to quickly search for specific fruits and vegetables or filter options by price and availability so they can find what they want after not too much searching.
- Detailed Product Information: Find descriptions, pictures, product details, and price per unit of each product to make informed buying decisions. This allows buyers or farmers to message each other directly for any questions, bulk order discounts, price points, etc.
- Discussion Forum Transparent Pricing: Buyers get transparent prices from farmers without intermediaries they can see the price fixed by farmers on a real-time basis.
- Order Processing and Payment: Order placement, order history tracking, and payment handling from buyers are made easier in the app, with secure payment options for safety.

The proposed system contains the following:

A. Pre-processing

When coming to building our web application for farmers to access the market directly, preprocessing of data makes sure that it works smoothly and is convenient for both farmers & buyers i.e. When we take into account different types of data inputs that exist —user registration information, product listings and images, language preferences and forum postings. Regardless, creating something like ShetkariMitra is a lot of moving parts in the technical world and the social one as well and requires an experienced team. The model of the proposed web app is illustrated in Fig. 1.

The proposed model is a simple system that allows farmers to sell their products directly to buyers, including customers and stores. It starts with farmers and buyers signing up, so farmers can show what they have for sale and buyers can see those products. Buyers can talk to farmers about prices, and if they agree, they can confirm the order and make a payment. The model also lets buyers track their orders during delivery. After the delivery is

done, buyers can leave feedback and ratings. There's also a discussion forum for users to share ideas and engage with each other, helping to build a community on the platform.

II. SYSTEM ARCHITECTURE

The architecture enables farmers, customers, and experts to log in and access features like product listings, search, a discussion forum, and online payments. Data is managed centrally in a database, with notifications keeping users informed on relevant updates. Fig. 2 depicts an overview of system architecture.

III. USE CASE

Imagine a warm and welcoming space where farmers and customers (including retailers) can easily connect and shop directly. Farmers can quickly sign up or log in to showcase their products for sale and join a discussion forum to chat with customers and gather helpful advice. Customers can browse a variety of available products, add their favourites to the cart, make purchases, and set up delivery—all with just a few clicks! Notifications keep everyone informed about what's going on, and we encourage customers to leave feedback to share their experiences, helping to build a trusting community. All the information—like product listings, transactions, and user profiles—is organized in a central database, making it easy for everyone to access and enjoy. Fig. 3. depicts the use case for the system.

IV. WORKING

Our platform is a direct marketplace that connects farmers with buyers, including customers and retailers, without needing middlemen. Farmers and buyers start by registering on the site, where farmers can list their products with descriptions, images, and prices. Buyers can browse available products, check details, and negotiate prices directly with farmers. Once they agree on a price, buyers confirm the order and make payments through the platform, allowing both parties to track the delivery process.

After successful delivery, buyers can leave feedback and ratings, helping to build trust within the marketplace. Additionally, the platform features a discussion forum where users can talk about agricultural practices, share advice, and engage with each other. To ensure ease of use, the platform offers a multi-language interface, making it accessible to users from diverse backgrounds.

IV. RESULTS AND DISCUSSIONS

The web application is designed from a user point of view such that UI is simple and understandable. The user need not require any additional effort to understand the functionality and navigation of the application. The following are the main pages (screens) in the UI of this application:

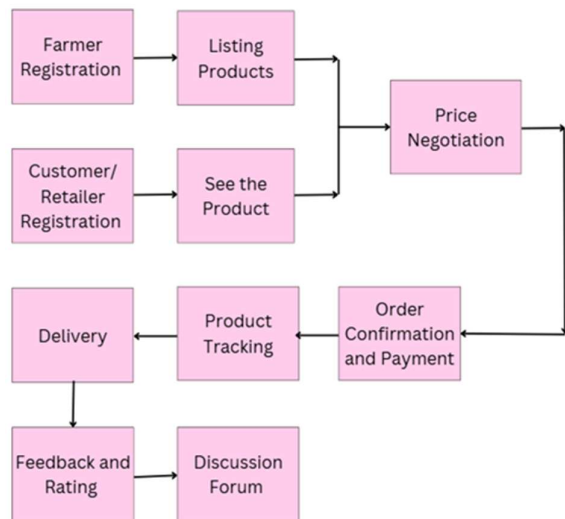


Fig. 1 Proposed Direct Market Access Model

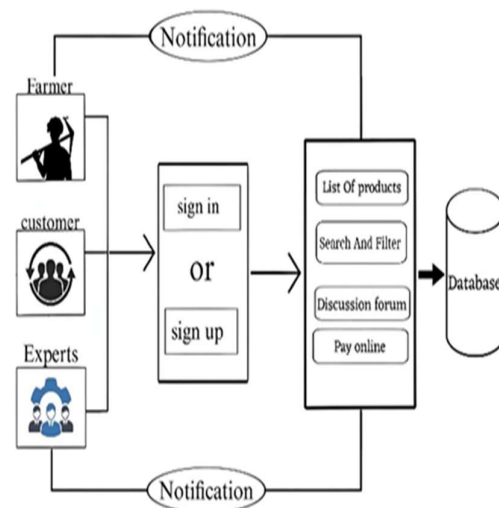


Fig. 2 Overview of System Architecture

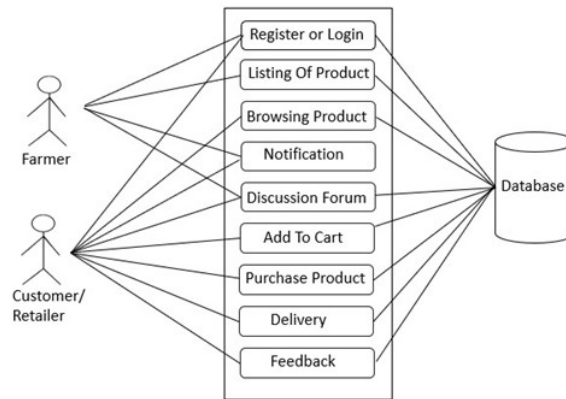


Fig. 3 Use Case

- Welcome page
- Login page
- Farmer/Buyer Dashboard
- Farmer Post
- Cart section
- Discussion Forum

Welcome page: The welcome page is the starting page of the application and contains three sections home, about us, and contact us.



Fig. 4 Welcome Page

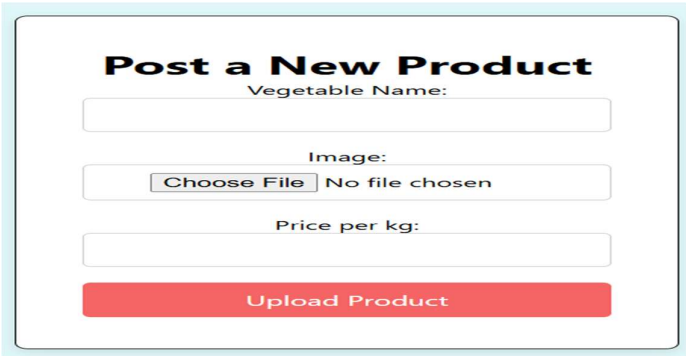
Register and login page: The register page requires basic details to be filled in such as name, password, address, and role: Farmer, Buyer, Experts.

Fig. 5 Register page

Fig.6 Login page

Farmer and Buyer Dashboard: The dashboard is shown in the figure with some sections in the navbar such as post product, discussion forum, see products, log out, and cart.

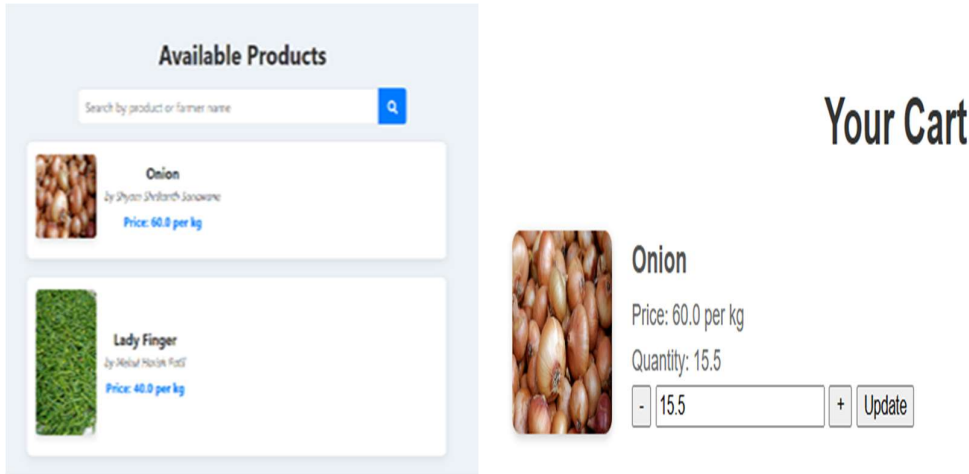
Farmer Post: A post section contains a form in which farmer can post their products including images.



The screenshot shows a form titled "Post a New Product". It contains three input fields: "Vegetable Name:", "Image:" (with a "Choose File" button and "No file chosen" text), and "Price per kg:". At the bottom is a red "Upload Product" button.

Fig. 7 Upload Product

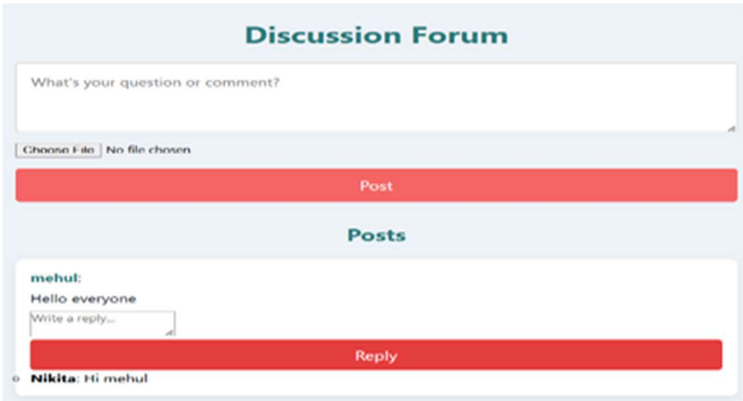
Available Products and Cart: This section displays products that are available and allows you to search by name. The cart section is used to display the newly added item.



The screenshot displays two sections. On the left, "Available Products" features a search bar and two product cards: "Onion" (by Shyam Shankar Sankar) priced at 60.0 per kg, and "Lady Finger" (by Mehul Nandan Patel) priced at 40.0 per kg. On the right, "Your Cart" shows an "Onion" item with a price of 60.0 per kg and a quantity of 15.5. It includes a quantity input field with minus and plus buttons, and an "Update" button.

Fig. 8 Listing Products and Cart

Discussion Forum: All the farmers, buyers, and experts can communicate and answer each other's questions in the discussion forum.



The screenshot shows a "Discussion Forum" interface. It has a text input field for "What's your question or comment?", a "Choose File" button, and a red "Post" button. Below this is a "Posts" section showing a post by "mehul" with the text "Hello everyone". There is a "Write a reply..." input field and a red "Reply" button. A partial reply by "Nikita" is visible at the bottom.

Fig.9 Discussion Forum

IV. CONCLUSION

A Direct Market Access platform to Farmers assists farmers in selling their goods directly to consumers. Farmers can post their goods for sale, and customers can easily search, interact with, and add products to their shopping cart. Additionally, a discussion forum where users can interact and exchange knowledge, by creating community. Python, Flask, HTML, CSS, JavaScript, and SQLite are among the user-friendly technologies used in the building of the platform. By eliminating out middlemen, it helps to increase farmer's income and give them greater control over pricing and sales. All things considered, this project helps farmers attain more financial stability. Also a user-friendly platform helps farmer to easily understand all the things which include a language based flexibility. This way a successful implementation of system can be done.

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