

# Digital Revolution in Indian Agricultural Marketing by “Agrivault”

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## *Abstract*

*“Agrivault”, an app developed as a solution to the pressing challenges faced by Indian farmers in the realm of agricultural marketing. As agriculture sector is the backbone of India's economy, Agrivault endeavours to address inefficiencies in traditional marketing systems by incorporating modern digital technologies. The work aims to bridge the gap between storage providers and farmers, mitigating losses and enhancing economic viability for agricultural stakeholders.*

*Key features of Agrivault include market analytics, supply chain integration, and a user-friendly interface. By incorporating market insights, farmers can adapt their strategies to meet consumer demands effectively. Supply chain integration facilitates direct connections between farmers and consumers, reducing intermediary costs and empowering farmers with real-time market information. Moreover, the user-friendly interface ensures accessibility for farmers with varying technological literacy levels, democratizing access to online markets.*

*The development of Agrivault follows a methodical and collaborative approach, involving extensive engagement with the agricultural community. Through collaborative development, implementation costs are reduced, making the solution more accessible to farmers. The success of Agrivault hinges on technological innovation, policy support, and active participation from stakeholders, with the potential to significantly impact farmer income and reduce post-harvest losses.*

*In conclusion, Agrivault represents a transformative tool poised to revolutionize agricultural marketing in India, empowering farmers, enhancing efficiency, and fostering sustainable agricultural development.*

**Key words:** agriculture, Digital technology, agricultural market analytics, supply chain integration, user friendly GUI.

## 1. INTRODUCTION

Agriculture is the backbone of India's economy which contributes around 17-18% of the GDP. Statistical data shows that India's agricultural sector employs approximately 58% of the workforce,

contributing significantly to employment (Source: World Bank)[8]. Despite its significance, the sector faces multifaceted challenges that hinder its prosperity.

### **1.1 Current Challenges**

Increasing population demands more food. More focus should be on to increase production volumes and to reduce losses of agricultural products during harvesting, storage, processing and marketing. Farmers are effectively using embedded technologies for harvesting, storage and processing for better results [1]. Traditional marketing systems in agriculture are inefficient, resulting in substantial economic losses for the farmers. Additionally, post-harvest losses due to inadequate storage and transportation facilities further exacerbate the challenges. The inefficiency of traditional marketing systems leads to an estimated annual loss of INR 50,000 crores for farmers (Source: NABARD). Post-harvest losses cost Indian farmers approximately INR 92,000 crores annually, showcasing the need for improved storage and transportation infrastructure (Indian Council of Agricultural Research). Under the current conditions, the main opportunity to increase the profitability of agricultural production is the development and implementation of modern resource-saving agricultural technologies [1, 2].

### **1.2 Role of Modern Technology**

Advanced digital technologies present a significant opportunity to revolutionize the agricultural sector especially in transportation and in marketing [3,4,5]. A pioneering software solution aims to empower farmers by facilitating online sales, reducing wastage, and enhancing market access. Adoption of digital platforms can potentially save up to 25% of post-harvest losses which results in significant cost savings for farmers (Source: AgriTech India). Online sales platforms have the potential to increase farmers’ profits by 20-30%, providing a tangible economic benefit.

It is necessary to go for the digitalization of agriculture at the global level so that the agriculture industry can rise at high-tech level. Some of the frequently required names of digital smart technologies that can be used in agriculture are listed in Table 1 [1].

Table 1. Digital technologies used in smart agriculture

<b>Technology</b>	<b>Features</b>	<b>Major Application Area</b>
Internet of Things – IoT	Exchange of information between different devices, equipments and machines is possible, which allows to fully automate processes in agriculture	"Smart" farms and Greenhouses; raw material management; storage of agricultural products
Big Data	Structuring the huge amounts of Real time data and information through software tools	Processing of agricultural products
"Smart" storage	They allow to monitor the state of products during storage due to algorithms that are specially defined in online mode. It helps to make the right decisions and eliminate violations of the established parameters	Storage of agricultural products
Cloud based app	Can integrate and reproduce farmer, wholesaler/user data using user-friendly GUI	Supply chain management of food

Full automation of agricultural processes can be achieved using computer systems and the internet using information technologies (Big Data, artificial intelligence, control platforms), radio frequency tags, controllers, sensors. The agro-industrial complex’s digitization will enable it to process daily data arrays from sensors installed in fields, on farms, machinery, warehouses in a qualitative and timely manner. By processing all incoming data, it is possible to analyse on-going

changes, identify patterns, and thus improve efficiency and sustainability of agricultural development as a whole.

### **1.3 Collaborative Approach**

The development of Cloud based app is based on extensive collaboration with the agricultural community to ensure that it meets the unique needs of Indian farmers. 75% of farmers express interest in adopting digital solutions for marketing, highlighting the readiness of the farming community for technological interventions (Source: AgriTech Survey). Collaborative development reduces implementation costs by 40%, making the solution more accessible to farmers (Source: International Food Policy Research Institute).

The success of agricultural transformation depends on technological innovation, policy support, and active participation from stakeholders. Effective policy interventions can increase farmer income by 15-20%, showcasing the importance of supportive policies (Source: AgriTech Policy Brief). Every 1% reduction in post-harvest losses can save INR 4,000 crores, emphasizing the economic impact of addressing wastage (Source: NITI Aayog) [9].

## **2. PROBLEM STATEMENT:**

Storage providers and farmers have almost no communication which results in great loss of produce and economical setback for the farmers. In the current scenario, the farmers cannot predict if their produce is going to be sold or not because there isn't any systematic method for them to know if the storage is either already full or the produce quality might not be up to the mark to be accepted by the market owner. It forces the farmers to gamble on the chance if their produce will be accepted or not, because of which they lose the transport charge either way and the produce is trashed if it is rejected as bringing the rejected produce back is impossible due to cost and perishable items for the farmers as it isn't cost efficient for them.

So in the present work the attempt has been made to propose a web-based Application , named “Agrivault” to assist and guide farmers, wholesalers and users to decide about their harvesting of crops as well as deciding their marketing strategies for selling and buying food.

## **3. THEORETICAL FRAMEWORK**

The proposed software’s theoretical foundation rests on three interrelated pillars, each designed to address specific challenges faced by Indian farmers viz. information of market analytics, supply chain integration, user friendly GUI as shown in figure 1.

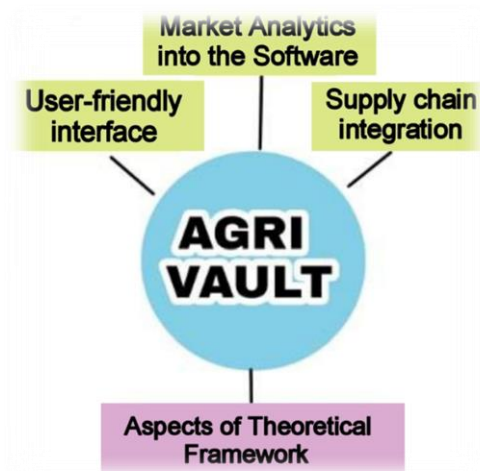


Figure 1 : Framework pillars of Agrivault

**i) Market analytics in agriculture :** The first aspect introduces market analytics into the software, providing farmers with valuable insights into consumer trends and preferences. This data-driven approach enables farmers to adapt their strategies, optimize their produce for market demands, and, in turn, enhance their overall competitiveness. By aligning agricultural practices with market dynamics, the software fosters a more responsive and efficient farming ecosystem.

**ii) Supply chain integration:** The second aspect revolves around supply chain integration, a critical component in transforming the traditional agricultural marketing system. By creating a seamless connection between farmers and consumers, the software eliminates unnecessary intermediaries, reducing costs and ensuring that a larger share of the profits goes directly to the farmers. Supply chain integration also empowers farmers with real-time information on market demands, enabling them to make informed decisions about what to plant and when to harvest.

**iii) User friendly GUI:** Third aspect is the emphasis on a user-friendly interface, acknowledging the diverse backgrounds and varying levels of technological literacy among the farming community. This interface is crafted to be intuitive, ensuring that farmers can navigate the platform with ease, ultimately democratizing access to online markets.

#### **4. RESULT AND DISCUSSION**

The Agrivault website is the resultant product of the proposed work. The Website would provide an efficient platform for the user to sell and buy the produce of desired quality and that too at reasonable price.

The development and implementation of the software follows a methodical and collaborative approach. The methodology encompasses several key stages, each crucial for ensuring the software's effectiveness and adaptability.

The working flow of the Web-Page is as presented in figure 2.

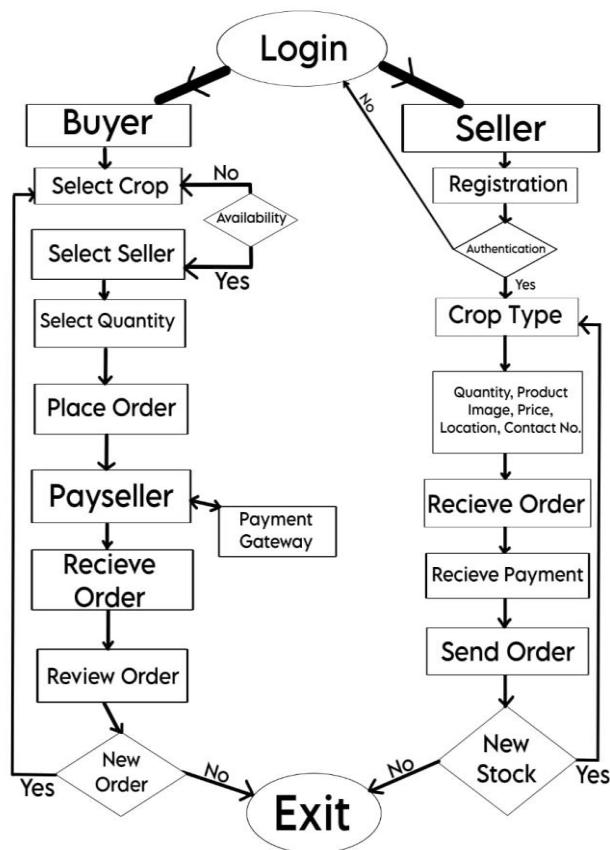


Figure 2 : Work flow of Agrivault

i) The “Agri-Vault” is created with user friendly UI, the users need to register themselves with their identity and address proofs and contact information. This information is reviewed by the admins and he/she will be given a unique registration ID. Afterwards one can sign up as either a buyer or seller, the buyers can be anyone, the sellers ought to be farmers.

ii) After being a registered seller, the farmer can then put up their produce on the website. To do that, the farmer has to select which crop he is intending to sell, the quantity that is available to sell. The seller needs to add an image of his produce for quality assurance. He also need to enter the location where he is willing to sell his produce since Agri-Vault does not provide any transportation facility and the transport has to be arranged either by the farmer or the buyer can pick the order themselves. Accordingly transportation cost can be added/deleted in the final billing. If the buyer can pick the order themselves then the transportation cost is cancelled. If farmer is supposed to deliver produce at destination the cost can be added.

iii) When logging in as a buyer, one has the option to select the desired crop and add location. After doing this, a list of sellers will be provided where the buyer can see the product quality from the given image, check the rating of the seller and decide whom to buy from. After selecting a seller, the buyer has to select the quantity that they want to buy and if they need transportation from the farmer or they can pick themselves, the cost will be calculated as per the required quantity. The seller can place an order and then pay for the order, both the buyer and seller will receive a confirmation of the order as a message on registered mobile and/or on email.

iv) After an order is placed, the seller arranges the order and transports it to the buyer, after receiving the order, the buyer can give review/feedback to the farmer, every farmer will have his rating out of 5 stars and the buyer can rate based on the received order and if the service is extremely bad, then the farmer can be reported for not fulfilling the given task or scamming. The report placed by the buyer will be checked and cross examined by the admin/authorities.

v) The website has an extra feature to assist seller to decide cost of their produce. It is achieved by providing the current market rate of crops. Government cloud database is connected to the website for the current prices. By looking at these prices the sellers can understand the range in which they should quote the price of their produce. Even the buyer can check if the available options are adequate or overpriced. The facility is provided for the seller to update the quote as per the market demand and availability as and when required.

The UI of the Website is as follows:



## 5. CONCLUSION

In conclusion, the agricultural sector in India, while pivotal to the economy, grapples with challenges like inefficient marketing systems, post-harvest losses, and sustainability concerns. The integration of technology presents a transformative opportunity to address these issues and empower farmers. Our innovative software solution aims to revolutionize market connectivity, reduce wastage, and optimize market access for sustainable agricultural practices. This initiative is underpinned by extensive collaboration with the agricultural community, ensuring a tailored approach that resonates with the intricacies of Indian agriculture. Success hinges on concerted efforts from policymakers, technologists, and the farming community to bridge the traditional-modern divide, paving the way for Indian farmers to thrive in an ever-evolving market ecosystem.

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