

AGRICULTURE FORUM FOR TECHNICAL EDUCATION OF FARMING SOCIETY

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Artificial Intelligence in Agricultural Marketing

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INTRODUCTION

Agricultural marketing refers to all the processes involved in moving agricultural products from the farm to the consumer. It covers services related to collection and grading, storage, transport, processing, pricing, and marketing of agricultural products. The traditional agricultural marketing are generally riddled with issues like price instability, paucity of market information, exploitation by middlemen, wastage of produce after harvest and supply chain inefficiencies. Artificial Intelligence (AI) is reshaping agricultural marketing with data-driven insights, predictive analytics, automation, and intelligent decision-making. AI enables farmers, traders, agribusiness companies, and policy makers to make better informed marketing decisions and improve market efficiency and profitability.

What is Artificial Intelligence

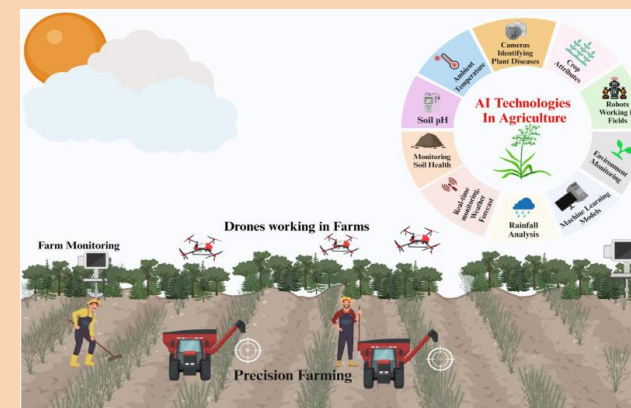
Artificial Intelligence is the simulation of human intelligence on machines which gets the ability to learn from the data, identify patterns, take decision, and solve problems with little or no human interference.

AI technologies commonly used in agricultural marketing include:

The main AI technologies being applied in agricultural marketing are Machine Learning (ML) and Deep Learning, Natural Language Processing (NLP), Computer Vision, Big Data Analytics, Predictive Analytics, and Chatbots & Virtual Assistants that contribute in processing market data, estimating price and demand, evaluating product quality and delivering real-time market information to help in making marketing decisions.

Objectives of AI in Agricultural Marketing

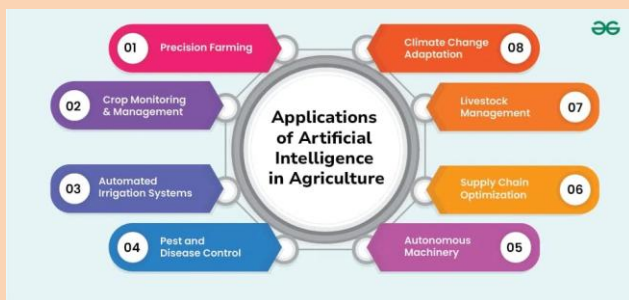
- Enhance the Transparency of the Market
- Offer real-time information on the markets
- Forecast prices of commodities
- Supply chain optimization
- Post-harvest loss management
- Better farmer income
- Enable direct marketing opportunities



Applications of Ai in agricultural marketing

- **Price Forecasting:** Utilizes historical and market data to forecast future commodity prices.
- **Market Intelligence:** Monitoring of market trends, prices and preferences of consumers.
- **Demand Forecasting:** Projects prospective demand for farm commodities.
- **Risk Identification:** Detects sources of market risk and uncertainty.
- **Decision Support:** Provides farmers with the information they need to make better marketing decisions.
- **Market Management:** Facilitates production, storage and sale related planning.

- Enhance profit through improved marketing.
- **Risk Reduction:** Minimizes losses through proactive risk management.



Ai in supply chain and logistics management

AI improves the management of the agricultural supply chain and logistics through efficient transportation routing, inventory management, demand prediction, and scheduling management, leading to cost reduction, delivery acceleration, and post-harvest loss minimization. Warehouse management using AI-based warehouse system can track storage condition, temperature, humidity, stock level etc to increase the storage effectiveness and decrease the storage loss. In cold chain, AI enables monitoring of cold storage, equipment failure prediction and perishable goods transportation under optimal conditions, to enhance quality and shelf life. Furthermore, AI combined with blockchain technology can provide an end to end traceability for tracking farm origin, production methods, transportation, and processing records of agricultural products, leading to food safety, market transparency and consumer confidence.

Ai-based digital marketing in agriculture

AI is transforming the digital agricultural marketing with the help of e-marketing platforms, customized

marketing, chatbots, and social media analytics. With the power of AI-enhanced online marketplaces, farmers are able to sell directly to buyers, cutting out middlemen and increasing price realization and market access. Based on the analysis of customer preference and purchase behavior, AI enables customized advertisement, targeted promotion, and recommendation for products, which makes revenue and customer engagement. AI-enabled chatbots and virtual assistants offer live market data, price quotes and marketing tips - all of which help ensure fast communication and support. In this line, AI also processes data from social media to measure consumer sentiment, to identify market trends, and to gauge product popularity, which can assist companies in designing better marketing strategies and increasing consumer satisfaction.



Benefits and challenges of Ai in agricultural marketing

Utilizing AI in agri marketing is profitable from the social, environmental, and economic perspectives, as well as in terms of operation. Surge in income: increased farmer income due to better price realization

and reduction in cost of marketing, resulting in enhanced profitability. AI has enabled the supply chains to become more efficient, decisions made quicker, wastage lower and inventory better managed. In addition, it enhances market transparency, farmers are empowered with real-time information, market access is expanded and consumer trust is reinforced. With its ability to analyze patterns in the supply chain, AI can also help reduce food waste and fuel usage, and facilitate sustainable resource management.

Challenges

Despite its benefits, the use of AI in crop marketing is hindered by high upfront costs, a lack of access to dependable data, poor digital literacy among farmers, weak internet infrastructure in rural areas, and data privacy and security concerns. Furthermore, smallholder farmers tend to have limited financial and technical resources, which makes it difficult for them to adopt sophisticated AI-based solutions.

Future prospects, government initiatives

Decision support systems based on AI, smart market forecasting, autonomous supply chain management, blockchain traceability, precision marketing and real-time market intelligence are the tools predicted to shape the future of agricultural marketing. The adoption of new technologies, including Internet of Things (IoT), Big Data Analytics, Cloud Computing, Robotics, and Blockchain, is anticipated to bring further improvements in effectiveness and sustainability in the agricultural marketing system. In India, various government schemes like e-NAM, the Digital Agriculture Mission, AgriStack, PM-KISAN digital platform and multiple AI-for-Agriculture solutions are fostering digital transformation and

driving rapid adoption of AI-based solutions in agricultural marketing.

CONCLUSION

Artificial Intelligence is transforming agricultural marketing, including market intelligence, price prediction, supply chain management, and digital marketing. Timely information is available to farmers, uncertainty is reduced, transparency is increased, and the farmers' profitability is improved through the use of AI. While challenges including infrastructure constraints, availability of data and digital literacy remain, technological advancements and supportive policies are anticipated to drive further adoption of AI. The use of AI in conjunction with contemporary agricultural marketing system is an advancement in the direction of sustainable, efficient and farmer centric agriculture.