



ROLE AND CHALLENGES IN ADOPTING TECHNOLOGIES IN INDIAN AGRICULTURE

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Abstract

The next generation of farmers desires high productivity from new technologies. AI tops the list because it provides a win-win ecosystem. This technology can help farmers with everything from land preparation to seed selection and fertilisation. Technology can help them choose seasonal plantings. Farmers can predict market analysis and consumer desire to increase yields. AI-based agriculture increases production and yields, increasing farmers' profits. A consumer-oriented market improves quality and lowers prices. Technology-driven agriculture will attract the next generation to farming. Forecasts help farmers understand market demand. The 'agrocomputer' of tomorrow is adapting to AI.

Keywords: Agriculture, AI, Agro-technology, Agro-marketing

INTRODUCTION

Agriculture provides 70–75% of our GDP. It is hard to imagine that in a country like ours, agricultural processes and markets are below basic needs. Agriculture is not regulated. Farmers do not have market research or scientific farming practises. Producers will never learn about new farming methods or markets. Israel uses modern farming methods to produce large crops. Indian Agricultural Research Institutes do not develop agricultural technologies. Let's look at how AI and expert systems can help the country's agriculture. The human intellect is a complex system. Intelligence is learning and reasoning. Artificial intelligence has various applications (Vinod and Anand, 2020). He learns to intelligently programme computers. It involves the use of computers to study human intelligence. How can

people use artificial intelligence? Today, AI is useful. Although it is difficult to explain, artificial intelligence affects everyone in society and is essential to modern life. Agriculture will thrive with high-tech equipment, smart transportation, and robust field analytics for farmers and insurers. Digital farming requires high efficiency. Precise positioning methodologies and high-quality agronomic information illuminate, predict, and change farm-growing challenges.

Agriculture needs science and technology to end extreme poverty and hunger. Since 2018, Microsoft has served 175 farmers in Andhra Pradesh, India, as part of a study (Gurumurthy and Bharthur, 2019). Microsoft has developed an AI seeding application with ICRISAT using machine learning and business intelligence from the Microsoft Cortana Intelligence

Suite. It provides farmers with powerful cloud-based predictive analytics to reduce crop failure, increase productivity, reduce stress, and increase income (Diksha, 2020). Land preparation, seeding, climate change, fertilisers, software, organic fertilisers, and plant nutrients The yield per hectare is 30% higher than last year. Based on climate data, historical conditions, market conditions, personal information, etc., predictive analytics can help farmers sow, fertilise, harvest, etc. on time. Digital technologies may have conquered agriculture with full consent. However, AI is making its way into Indian agriculture without much preparation. Farmers and markets will suffer. Farmers and their dependents Secondly, the agricultural market and its workers will suffer. Insecure market connectivity, fluctuating commodity prices, low income, and over-indebtedness make farming risky. Machines replaced workers throughout the industrial revolution of the 19th century. In the 21st century, agriculture requires modern methods and technologies.

OBJECTIVES

The paper made an attempt to focus on the technologies in agriculture and challenges in adopting technologies in agriculture in India.

DISCUSSION

1. Technologies in agriculture

In India, AI farms and microgrids that enable remote access via the Internet of Things are slowly but surely taking off. Farmers in India can access money for agricultural development through Indian government run organizations such as C-DAC. Due to the ever-increasing demand for agricultural products, it is necessary to develop and implement new technologies. As a result of advances in information technology that have led to the creation of

seeds for use in agricultural operations, crop yields have gradually increased over time. The production of heavy crops in the 20th century was greatly facilitated by the use of computers of varying power. There is no doubt that machine learning and other forms of artificial intelligence will play an important role in the next few decades. It is well known that advances in artificial intelligence can help increase farmers' incomes, increase agricultural productivity, and even reduce waste. As a result of the significant contribution of artificial intelligence to each of these areas, agriculture as a service is no longer in danger of becoming a vulnerable market category. The application of cognition can be divided into eight main categories. This will benefit India's agricultural sector. They have to develop new technologies, in particular artificial intelligence.

- Development is driven by the Internet of Things (IoT).
- Image analysis and data interpretation
- Prepare acceptable combinations for agricultural items.
- Improve the way we monitor plant health.
- Give farmers the tools they need to get the most out of their irrigation.
- Creation of agriculture-oriented technological enterprises that can maintain their own viability.
- Direct the production of value-added goods, as well as the marketing efforts of the company in the appropriate direction.
- Get an idea of the right market trajectory.

Following in the footsteps of COVID-19, the demand for data collection and predictive analytics in the agricultural sector is standard. Precision farming

methods, assisted by artificial intelligence and machine learning systems, are becoming more and more popular among farmers and agricultural business owners. According to a 2020 study by Saxena et al., this framework helps farmers manage their crops and livestock by eliminating guesswork, estimating yields, managing supply chain networks, and assessing risks. The use of blockchain technology enables a more open and fair supply chain in many aspects of agriculture, from seed identification to harvesting. In terms of technical specifications, education, policy and regulatory framework, it will become more and more popular among developers and systems.

2. Challenges in adopting technologies in agriculture

A discussion paper titled "Tanay, 2019" was just published by Niti Aayog, which is part of the Government of India. It provides solutions for critical areas such as agriculture and industrialization that can be achieved through the use of artificial intelligence. In agriculture, technologically advanced machinery with built-in intelligence provides farmers with information about soil quality, the optimal time to sow seeds and apply herbicides, the location of pests, and other important data. If we create an intelligent system, it can advise Indian farmers on various best agricultural practises, and as a result, India can experience a new agricultural revolution. Having said that, the potentially dystopian scenario faces a significant hurdle. The entire supply chain uses elements of capacity development and cost reduction, both of which have the potential to benefit the Indian farming population. According to a 2019 study by Lal Mohan et al., the adoption of smart embedded technologies in the agricultural sector faces a number of barriers, despite the fact that these

technologies provide a number of clear benefits.

- Reliability of both systems and technology
- The reception and security of information are of paramount importance.
- About privacy and data access
- recognition and approval of others.
- Live release, ease of access, and use of reliable information
- Economic efficiency.
- Easy operation and fast learning
- stakeholders with questionable morals.

It is essential that we have a realistic understanding of the agricultural market in India. Due to the fact that agriculture and harvesting depend on many external conditions, which in many cases cannot be guaranteed, agriculture is considered a high-risk activity. Even the market plays a significant role; given that the goods are, for the most part, perishable, they are bound to take whatever the market has to offer. Another reason the market takes advantage of farmers is that they do not have access to sufficient storage space. After a certain amount of time, agricultural products such as milk, eggs, meat, and vegetables will begin to spoil. The implementation of strategies based on artificial intelligence would lead to the provision of optimal solutions for cold storage, transportation, and demand for these products. For example, each community holds its own unique festival. If it were possible to predict the needs of the market at that time, then it would be possible to anticipate supply and demand and take advantage of new market opportunities. At that time, the requirements of the market were different.

Use of technical means. Farmers in India tend to have very little land at their disposal, making it impossible for them to afford seeds and other agricultural

commodities at high prices. Tanha et al. (2020) describe a scenario in which artificial intelligence is used to provide farmers with advice on sustainable practises. It helps farmers manage pests with ecology, multi-crop harvesting robots, demand forecasting, available stocks, exports, local needs, and other such things.

Due to impact issues following COVID 19, the needs of agriculture in every region of the world are growing in importance. The current global lockdown situation is a direct result of technological developments in agriculture and the marketing of agricultural products. These achievements have led to the growth of the international economy. In addition, it caused disruptions in the food supply system, which are determined by several forecasting methodologies.

CONCLUSION

The modern intelligent agricultural system uses artificial intelligence to develop agriculture. Increase the use of artificial intelligence in agricultural research and development to improve yields. Expert guidance, large-scale research, and applied units AI-based hardware assessment Better communication with all supply chain stakeholders Robust, adaptable, and consistent system development enables understanding of how the creative and intelligent methods of the Agricultural University affect agriculture. Explore the

term "agricultural computer" and how artificial intelligence interacts with sub-sectors of agriculture. Integration of multidimensional agricultural research.

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