



IMPACT OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE WITH SPECIAL REFERENCE TO MADATHUKULAM TALUK

Dr. A. M. Askar Ali Jinna

Assistant Professor, Department of Commerce, VLB Janakiammal College of Arts and Science
(Autonomous), Kovaipudur, Coimbatore, Tamil Nadu

Cite This Article: Dr. A. M. Askar Ali Jinna, "Impact of Artificial Intelligence in Agriculture With Special Reference to Madathukulam Taluk", International Journal of Multidisciplinary Research and Modern Education, Volume 11, Issue 1, January - June, Page Number 34-37, 2025.

Copy Right: © R&D Modern Research Publication, 2025 (All Rights Reserved). This is an Open Access Article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract:

The study of intelligent machines that can perform like human beings is emphasised in the field of computer application known as artificial intelligence (AI). Artificial intelligence research is extremely specialised and technical. The role of Artificial Intelligence is inevitable in all the spheres of Business and technology and it would have a greater impact in the field of Education in the days to come. The Authors Agriculture tows a light on the significance and impact of Artificial intelligence on Agriculture Information research. Artificial intelligence is now being used extensively in the agricultural industry. The Agriculture sector faces various Agriculture teats and challenges and to mention a few, Information on pest control techniques , Yield Maximization, inappropriate Soil treatment , Pest control system , Disease control information, Information on farm technology and innovation etc. In this paper, applications of AI in the agricultural sector are reviewed, with an emphasis on agriculture information.

Key Words: Agriculture Information, Artificial Intelligence, Agriculture Information System, Agriculture Research, Computer Application in Agriculture.

Introduction:

The process of globalization and industrialization has brought significant developments in terms of technology and production. Many inventions in automation, Production systems are the by-products of industrialization. The roles of automatized machines, simulating machines, computerized production processes have brought in drastic changes in the whole manufacturing systems. The human society has started focusing on information handling, processing, storage and dissemination, retrieval of data utilizing microelectronic based technologies. The fields of computers have significantly grown and now computers are capable of simulating human activities likespeaking, reading, drawing observing, analyzing, calculating arithmetic, memorizing, Distinguishing numbers, making decisions and in effective interactive learning. Recent trends in AI involves in discovering AI systems which would simulate intelligent human behaviour which includes reasoning behaviour, human sensory capabilities, knowledge accumulation, and mechanical capabilities of Human beings. Erlangga, Wihardi, Y., and Nugraha, E., (2020)¹⁰ have emphasized the need for developing a mobile learning platform that would use the internet and mobile cloud communications to provide information and interactive communication about agricultural production needed by farmers.putting idea, for better information sharing, communication, and agricultural profitability

The impact of AI would be soon visible in offices, manufacturing organizations, shopping malls, homes, Educational institutions and libraries. (AI) has begun to play a significant role in our daily lives, expanding our perceptions and our ability to modify our surroundings (K. Kundalia, Y. Patel, M. Shah (2020) ¹⁶; M. Gandhi, J. Kamdar, M. Shah (2020) ¹²; Ahir,K., Govani, K., Gajera, R., Shah, M.,(2020) ¹. G. Idoje, T. Dagiuklas, and M. Iqbal (2021) ¹⁵ have expressed their views that IoT is frequently used in the modern technology of intelligent systems known as Smart Farming. Additionally, it provides hardware and software technological solutions to boost agricultural yields. Over the past ten years, it has undergone changes in how it is applied to agricultural land, starting with the use of holes and scissors to cultivate fields and machinery to harvest crops. As a result, smart farming was developed because it offers farmers efficiency by utilising IoT to be applied to all farming techniques and implementation methods.

Review of literature on Artificial Intelligence:

Frey and Osborne (2017)¹¹ estimated that the likelihood of the computerization of library technical staff would be ninety-nine percentage that of assistant librarians would be ninety-five percentage that of clerical workers would be 76%, that of archivists would be 76%, and that of librarians would be 65%.

Wood and Evans (2018) ²⁹ described Artificial intelligence (AI) as referred as the replication of human intellectual procedures by machines, to be particular Robots and computers. In their 2017 study of library staffwho belongs to various fields in USA, the results of the research showed that 56.3% of respondents felt that supercomputers would replace and this means 44% thought there would be less effect of Artificial intelligence on Librarianship."Artificial intelligence will change library services, permanently changing the range of expertise and equipment required to provide our clients," claims Arlitsch and Newell (2017).

Agriculture is one of the world's oldest practices. It is fundamental to the Agriculture tee Fs in our lives: food, fiber and fuel. Over time, the methods farmers have utilized have become more technological. Insights from data and assistance from artificial intelligence (AI) augment a farmer's knowledge and replace guesswork with concrete information, which can lead to increased efficiency and profitability.

AI has already had a profound impact even though its full potential has yet to be realized. AI can provide farmers the tools necessary to meet the future needs of a global food system.

"Digital agriculture promises to help address many of the global challenges facing agriculture," says Ranveer Chandra, managing director for research for industry, and chief technology officer of Agri-Food at Microsoft. "Digitization of the food system, with data and AI, can enable greater efficiency, transparency, profitability and equity. The use of digital technology has seen rapid growth and investment, which has spurred many new innovations in farming."Programs such as FarmBeats for Students, developed as a partnership between National FFA and Microsoft, are also helping bridge the gap by empowering K-12

educators to give their students hands-on experience with this wave of the future.

Chandra highlights the following five areas where AI tools can help farmers be more efficient and sustainable.

Objectives:

- Impact of Artificial Intelligence in Agriculture.

Productivity Improvements:

AI can help farmers get greater yields on the same amount of land. Using multimodal AI, which combines several types of data, farmers can be advised about what to plant, when to plant it, when to fertilize, when to harvest and many other recommendations. For example, with Microsoft's FarmVibes.AI tool, which offers features such as soil and yield maps and what-if analyses, farmers can assess yields on their farm and plan strategies to grow more.

Reductions in Loss:

AI can predict the weather and potential impact of conditions such as wind, rainfall or impending drought. FarmVibes.AI can also help predict crop stress or yield loss stemming from issues such as water stress, pests or disease, which can help a farmer take the right actions to mitigate the loss.

Sustainable Agriculture:

AI can help farmers adopt regenerative agriculture practices, including reduced till, cover cropping and nutrient management, by helping them analyze the impact on soil carbon and financial profitability. The FarmVibes.AI what-if tool helps growers make these decisions. Additionally, AI can indicate where fertilizer is needed (which conserves resources and reduces nitrous oxide emissions) and reduce water use Agriculture tough precision irrigation.

Smart Supply Chains:

Farmers can build on an AI-driven knowledge graph to understand the impact of supply chain disruptions on their inputs. They can plan better and source the inputs from the best locations. AI can also help predict the best places to sell and the sale price and help differentiate farmers' products.

Technology Gap:

The recent advances in generative AI, which is capable of producing text and images in response to prompts, can help bridge the technology gap for farmers. A farmer or a farmworker who cannot read or write - or whose hands are physically in the soil - can interact with technology Agriculture tough natural language and by speaking to their device, even in the middle of the farm.

Intelligent Chemical Spraying Made Possible by AI Saves Money:

Every day, farms produce numerous data points about the weather, land, temperature, usage of water, etc. Artificial intelligence and machine learning models captures the information in real-time to derive practical insights to offer insights on the season for seed, the variety to choose for better yielding etc. AI is used for optimization of spraying pesticides and in the research done by Indu, Anurag Singh Baghel, Arpit Bhardwaj and Wubshet Ibrahim (2022) 14, they have found that in order to ensure that farmers only apply pesticides to the necessary area, the data from pesticides sprayed on crops is processed using a machine learning algorithm, and the area which do not require pesticides sprayed again is centroided. Compared to the exit concept, this idea has paved way for decreasing pesticide repetition by at least 20%.

Agricultural Robotics:

Companies working on artificial intelligence (AI) are manufacturing robots which would carry out a wide range of tasks in farming fields with ease. These robots are taught to manage weeds and harvesting crops faster than human beings may do. Such robots have been customized to pick and pack produce simultaneously to ensure that the quality is good and to eliminate the waste. These Robots play a significant role in removing the hindrances faced by the agriculturists. Robots have the capacity to operate in bulk quantities with excellent speed and accurate standards the traditional farm workers are not these machines. Such robots facilitate the reduction of wastage of crops in the cultivated land.

Land and Plant Fitness Monitoring System:

Nutrition of the soil has a significant impact on the variety of crops grown and the quality of those crops. The assessment of soil quality because of the declining condition of the soil brought on by the increasing rate of deforestation. German technology startup PEAT created Plantix, an AI-based application. It can spot plant pests and diseases as well as nutrient deficiencies in the soil, and farmers can use this knowledge to recommend fertilizer applications that enhance the quality of their harvest. This app is powered by image recognition technology. Farmers can photograph their plants using smart phones. This would enable the farmers to see methods for restoring soil, advice with the aid of video graphs available in the system.

Price Forecasts and Crop Yield Predictions:

The fluctuation in crop prices is a major source of worry for many farmers. Because of fluctuating costs, agriculturist could not decide a specific cultivation pattern. These kinds of issues are very widespread in crops with a short shelf life, such as tomatoes. Businesses utilize climate information along with satellite images to scrutinize crop health in real time and assess crop acreage. The advent of scientific technologies like artificial intelligence businesses would be able to forecast prices, make estimates on the crop yield, cognize possibility of pest infection and disease infection. On potential price trends, consumer demand, the best crop to plant, the use of pesticides, and other issues, they can offer advice to farmers and governments.

Innovative new companies have been utilizing AI technology in agricultural sector. A German agricultural technology start-up developed a multilingual disease and pest diagnosis application which analyses different plant images to identify infectious disease patterns; after an image from a Smartphone is matched with an image from a server, an intelligent spraying technique is used to apply a diagnosis of the disease to the crop. This technology utilizes the technology of artificial intelligence and machine learning for address diseases and infections to crops. More than 7 million farmers have used this app to detect around 385 types of crop infections and diseases in Fruits and vegetables.

Impact of AI in Agriculture Practices:

Modern- day human resources department runs with the backing of huge volumes of data. AI plays a big role in mining and correlating the data for in-depth insights. A study is conducted to find the impact of AI in Agriculture practices among 57

respondents who included Agriculture professionals, managers, entrepreneurs from different industries / sectors / firms.

Data Analysis and Interpretation:

Table 1: Agriculture Practices are Improving with the Inclusion of AI

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	3.51	3.51	3.51
Disagree	2	3.51	3.51	7.02
Neutral	23	40.35	40.35	47.37
Agree	20	35.09	35.09	82.46
Strongly Agree	10	17.54	17.54	100
Total	57	100	100	
Mean	3.5964912			
Std. Deviation	0.4232399			

Table 1 shows that 40.35% respondents are neutral towards the statement that Agriculture practices are improving with the inclusion of AI. The least of 3.51% respondents stand against the statement. This interprets that including AI improves and upgrades Agriculture practices.

Table 2: Your Knowledge Level of AI in Agriculture

	Frequency	Percent	Valid Percent	Cumulative Percent
Very Good	5	8.77	8.77	8.77
Good	11	19.3	19.3	28.07
Average	25	43.86	43.86	71.93
Poor	16	28.07	28.07	100
Total	57	100	100	
Mean	2.9122807			
Std. Deviation	0.3347155			

Table 2 represents that majority of the respondents (43.86%) have average knowledge level about AI and its applications in Agriculture.

Table 3: AI in Agriculture Practices have an impact on Industrial Transformation

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree				
Disagree	3	5.26	5.26	5.3
Neutral	4	7.02	7.02	12.3
Agree	20	35.09	35.09	47.4
Strongly Agree	22	38.6	38.6	86
Total	8	14.04	14.04	100
Mean	57	100	100	
Std. Deviation	3.4912281			
	0.4121874			

Table 3 shows that majority (38.60%) of the respondents accept that inclusion of AI in Agriculture practices will have an impact on Industrial Transformation.

Interpretation:

AI-driven insights provide great advantage on Agriculture dynamics, which enables data-driven decision making for talent management. AI streamlines Agriculture processes, from recruitment Agriculture though on boarding to employee management, enhancing efficiency and administrative burdens which will be a drastic change for industrial transformation.

Table 4: Level of digital transformation / automation taken place in the organization

	Frequency	Percent	Valid Percent	Cumulative Percent
0-25% Automated	7	12.28	12.28	12.28
26%-50% Automated	14	24.56	24.56	36.84
51%-75% Automated	21	36.84	36.84	73.68
76%-100% Automated	15	26.32	26.32	100
Total	57	100	100	
Mean	2.7719298			
Std. Deviation	0.3206257			

Table 4 shows that automation has taken place in industries to an extent. 36.83% (Max) respondents believe that automation has taken place between 51-75% in their organization/institution.

Table 5: Use of AI in Agriculture identify ways to lower benefits cost and increase employee engagement

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	0	0	0	0
Disagree	3	5.26	5.26	5.26
Neutral	11	19.3	19.3	24.56
Agree	30	52.63	52.63	77.19
Strongly Agree	13	22.81	22.81	100
Total	57	100	100	

Mean	3.9298246			
Std. Deviation	0.4615069			

Table 5 indicates that majority (52.63%) of the respondents agree that AI in Agriculture will lower benefits cost and increase employee engagement and a least of 5.26% respondents disagree to the statement.

Table 6: Decision making process is improved using AI in Agriculture

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	0	0	0	0
Disagree	1	1.75	1.75	1.75
Neutral	18	31.58	31.58	33.33
Agree	29	50.88	50.88	84.21
Strongly Agree	9	15.79	15.79	100
Total	57	100	100	
Mean	3.8070175			
Std. Deviation	0.4431344			

Table 6 shows that major respondents agree to the fact that decision making process is improved using AI in Agriculture components.

Table 7: Organization need to invest more on training and development to get ready to face the challenges brought by inclusion of AI

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	4	7.02	7.02	7.02
Disagree	10	17.54	17.54	24.56
Neutral	16	28.07	28.07	52.63
Agree	22	38.6	38.6	91.23
Strongly Agree	5	8.77	8.77	100
Total	57	100	100	
Mean	3.1403509			
Std. Deviation	0.3696721			

Table 7 shows that organization need to invest more on training and development to get ready to face the challenges brought by inclusion of AI. It shows that organizations are aware of the need to train and develop their workforce to cope up with the change in technology for industrial transformation.

Conclusion:

Artificial Intelligence will be powerful tools that can help businesses to administer the problems and complex issues faced in agriculture. It significantly paves ways for the problem of shortage of manpower. Artificial Intelligence techniques will undoubtedly improve farming practices and pose a challenge to current decision-making techniques. Because of these technological advancements, farmers' lives will probably be better in every way, and agricultural practices and yields will probably improve as well. These tools would definitely facilitate the farmers to bring automation and computerization of the processes involved and shifts toward precision resulting excellent quality and desirable yielding at less resource consumption. More practical applications in this area will become available as technology advances, helping the world address issues related to food production for a growing population.

References:

1. Shivani Pandey (2020), Exploring the role of Artificial Intelligence (AI) in transforming agriculture functions: An empirical study in the Indian Context, International journal of Scientific research and engineering development.
2. Pay, V. B. (2018) How AI is reinventing Agriculture.
3. Nicastro D. (2018), 7 ways AI is reinventing Agriculture.
4. Wheeler, A. R., & Buckley, M. R. (2021). The current state of Agriculture with automation, artificial intelligence, and machine learning. In Agriculture without People? (pp.45-67). Emerald Publishing Limited.
5. Sanyaolu, E., & Atsaboghena, R. Role of Artificial Intelligence in Human Resource Management: Overview of its benefits and challenges.
6. Maryam Rafique, Muhammad Asim, Salman Mansoor (2021), Human Resource Management in Industrial Revolution 4.0.
7. Dr. Owais Ahmed (2018), Artificial Intelligence in Agriculture.