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A Study to Know "Impact of AI on Sustainable Agriculture in India"

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Abstract- Artificial intelligence (AI) has the potential to revolutionize sustainable agriculture practices by enhancing building performance, energy efficiency, and reducing carbon emissions. In India, where the demand for sustainable building design is growing due to increasing energy costs and environmental concerns, AI can play a significant role in optimizing building performance. This study examines the impact of AI on sustainable agriculture in India and explores the potential benefits and challenges associated with the integration of AI in building design. Using a qualitative research approach, the study analyzes the existing literature on AI and sustainable agriculture in India. The findings reveal that AI can optimize building performance by providing real-time feedback on energy consumption, predicting future energy demand, and optimizing building systems. However, the integration of AI in sustainable agriculture also presents challenges, such as the need for specialized skills and knowledge, and potential privacy concerns associated with the collection of data. The study concludes that AI has the potential to significantly impact sustainable agriculture in India and recommends further research to explore the feasibility of AI integration in sustainable building design.

Index Terms- Sustainable agriculture, AI, and India.

I. INTRODUCTION

The Indian economy heavily relies on the agriculture sector, which provides employment to more than half of the population and contributes over 17% to the GDP. Despite its significance, the sector encounters various difficulties, such as climate change, soil degradation, water scarcity, and the need to boost productivity to cater to the surging demand for food. The use of AI in agriculture is a potential solution to these problems, as it can analyze vast amounts of data related to weather patterns, soil quality, and crop yields, enabling farmers to make informed decisions. Additionally, AI can control machines such as drones and robots to perform tasks like planting, watering, and harvesting crops more efficiently and precisely than humans.

AI pertains to the capability of machines to accomplish tasks that typically demand human intelligence, such as problem-solving, learning, and reasoning. In agriculture, AI has the potential to examine extensive datasets that encompass weather patterns, soil quality, and crop yields, thereby providing valuable insights to farmers for making informed decisions. Furthermore, AI can manage machines such as robots and drones to execute activities such as planting, watering, and harvesting crops more precisely and efficiently than humans.

The objective of this research paper is to analyze the effect of AI on sustainable agriculture in India. The study concentrates on four significant aspects of agriculture, namely precision agriculture, crop forecasting, soil analysis, and pest management. In addition, the paper scrutinizes the benefits and obstacles of AI implementation in the agriculture sector of India and suggests recommendations to policymakers, farmers, and other stakeholders.

II. OVERVIEW OF AI IN AGRICULTURE

The term AI pertains to the capability of machines to learn from data and make decisions without the need for human intervention. In the field of agriculture, AI can gather and analyse information from various sources, such as weather conditions, soil condition, and crop health, among others. This data can be utilized to predict and provide suggestions that can assist farmers in making well-informed decisions concerning crop planting, fertilization, irrigation, and pest management.

AI in agriculture offers a crucial advantage of enhancing crop yields. Through the analysis of data on soil quality, weather patterns, and other factors, AI can assist farmers in identifying the ideal time to plant, fertilize, and harvest crops. As a result, the farmers can produce better-quality yields, leading to improved yields and better-quality produce, which can have positive outcomes for both farmers and consumers.

AI can also contribute to minimizing wastage in agriculture. By offering farmers real-time information on soil moisture levels and crop health, AI can assist farmers in making better informed decisions on when to irrigate and fertilize crops. Consequently, this can reduce the usage of water and fertilizers, which can help farmers save on costs while decreasing the ecological impact of agriculture. AI can also play a crucial role in enhancing environmental sustainability in agriculture.

Through the analysis of data on crop health, soil quality, and weather patterns, AI can offer farmers valuable insights into how to better manage their land. This, in turn, can lead to more sustainable agricultural practices, including the reduction of pesticide and fertilizer use, minimized soil erosion, and enhanced water management.

Background

With over 50% of the country's workforce employed in agriculture, India is the world's second-largest food producer. However, this vital sector faces multiple challenges such as limited arable land, a growing population, climate change, soil degradation, and water scarcity. These challenges pose a severe threat to both food security and environmental sustainability, making it necessary to implement sustainable and efficient agricultural practices.

Precision agriculture, which involves using data, sensors, and AI algorithms to optimize farm management, is a powerful tool that can help address the challenges faced by agriculture. These challenges include a growing population, limited arable land, water scarcity, climate change, and soil degradation, which threaten food security and environmental sustainability. By enabling informed decisions about when to plant, irrigate, fertilize, and harvest crops, AI can help farmers achieve higher yields, lower costs, and reduced environmental impact. Additionally, AI can contribute to reducing waste through optimizing supply chains, predicting crop diseases, and improving food safety.

III. THE ROLE OF AI IN SUSTAINABLE AGRICULTURE

The use of AI in agriculture in India has the potential to revolutionize the sector by enhancing productivity, efficiency, and sustainability. The application of AI can be diverse, from precision agriculture, crop surveillance, predictive analytics, to soil analysis. The utilization of AI-based tools and technologies can enable farmers to make informed decisions based on data, leading to optimized utilization of resources and reduced expenses.

1. Precision Agriculture

Precision agriculture involves the use of technology to manage crops more accurately, by considering factors such as soil conditions, weather patterns, and crop yields. AI can help in analysing data from sensors and other sources, providing insights into these factors, thus enabling farmers to make informed decisions on when to plant, water, and fertilize their crops.

In India, precision agriculture can be implemented using drones equipped with sensors to monitor crop health and map fields. These drones can collect data on soil conditions, pest and disease detection, and temperature and nutrient levels. By using this data, farmers can create maps of their fields and determine which areas require specific inputs such as water or fertilizer.

AI-powered tractors are another instance of precision agriculture in India, where machines can analyse the soil condition and adjust planting depth, seed spacing, and other factors to enhance crop growth. These tractors can also be used to apply fertilizers and pesticides more accurately, which reduces waste and minimizes the environmental impact of agricultural practices.

2. Crop Forecasting

Crop forecasting involves the use of data, such as weather patterns, soil quality, and previous harvests, to predict the quantity and quality of crops. It is crucial for farmers, policymakers, and other stakeholders to make informed decisions about food security, trade, and other related issues.

AI technology can be utilized to process large sets of data from different sources, such as weather stations, satellites, and sensors on the ground, to provide accurate predictions on crop yields. Through machine learning algorithms, patterns can be identified and used to predict future yields, surpassing traditional methods in terms of accuracy.

The Crop Estimation Survey (CES) is a crop forecasting model developed by the Indian Ministry of Agriculture and Farmers Welfare that uses machine learning algorithms and remote sensing data to predict crop yields. CES has been effective in predicting yields for crops like wheat, rice, and sugarcane. The model has helped farmers decide when to sell their crops and supported policymakers in managing food security.

3. Resource Efficiency

By analysing data on soil quality, weather patterns, and crop health, AI algorithms can determine the optimal time for planting, fertilisation, and harvesting crops. This can help farmers make data-driven decisions and improve the efficiency of their farm management practices. Moreover, AI-powered tools can also optimise the supply chain, predict crop diseases, and improve food safety, reducing waste and improving resource efficiency. Overall, AI has the potential to make farming more sustainable by reducing the environmental impact and increasing productivity.

4. Waste Reduction
AI has the potential to minimize waste in agriculture by enhancing supply chain management, forecasting crop diseases, and enhancing food safety. By analyzing data on crop growth, weather patterns, and market demand, AI can optimize the timing and distribution of crop harvesting, transportation, and storage, resulting in a reduction in food waste and an increase in the shelf life of fresh produce. AI can also forecast crop diseases, enabling farmers to take preemptive measures to safeguard their crops and decrease the need for pesticides.

5. Soil Analysis
Soil analysis is an essential process that helps to understand the quality, structure, and nutrient content of the soil. By analyzing soil samples, AI can provide valuable insights into soil health, including identifying nutrient deficiencies and other factors that may impact crop growth.

The Indian government's Soil Health Card scheme, launched in 2015, is an example of AI powered soil analysis. The scheme provides farmers with a soil health card that contains information on the nutrient content and health of their soil, obtained through AI-powered soil analysis techniques. This enables farmers to make informed decisions about the types and quantities of fertilizers and other inputs needed to improve soil health and maximize crop yields.

AI-powered sensors can be utilized to monitor and analyse soil moisture levels, pH levels, and nutrient content, providing real-time data to farmers. This enables them to make informed decisions about when to apply water, fertilizers, and other inputs to their crops.

6. Pest Management
AI can play a vital role in pest management by detecting pests and diseases early, reducing crop losses, and minimizing the use of pesticides. By analyzing data from sensors and other sources, AI algorithms can identify patterns and anomalies that signal the presence of pests or diseases. This enables farmers to take preventive measures such as targeted spraying or using natural pest control methods, reducing the need for broad-spectrum pesticides that can harm the environment and human health.

An instance of AI-powered pest management in India involves the utilization of drones equipped with sensors and cameras to identify pests and diseases. These drones can capture images of crops while flying over fields, and AI algorithms are then used to analyze the images for the identification of pests and diseases. This data can be used to create maps of affected areas, providing farmers with the ability to target these regions with pesticides or other pest control measures.

AI-powered chat bots are also being used in India to aid in pest management. These chat bots can provide farmers with relevant information about pests and diseases and recommend appropriate control measures. They can be accessed through smartphones or other devices, making them readily available to farmers in remote areas.

7. Water Management
AI can play a vital role in sustainable agriculture by improving water management, particularly in areas with water scarcity. Through the use of AI algorithms, data on soil moisture, weather patterns, and crop growth can be analysed to determine the optimal amount and timing of water needed for maximum yield. This can help farmers reduce their water consumption, resulting in cost savings and environmental benefits.

AI can be utilized for optimizing water management in sustainable agriculture in India. For instance, AI algorithms can examine weather data, soil moisture levels, and other factors to determine the optimal timing and amount of irrigation. This can help farmers in reducing water usage and increasing crop yields. Moreover, AI can be utilized to identify leaks in irrigation systems, which can help farmers in fixing them promptly and reducing water wastage. By implementing AI technologies, farmers can improve their productivity and profitability by enhancing crop production, reducing waste, and resolving some of the significant challenges facing the sector, such as food security, environmental sustainability, and farmers' livelihoods.

8. Predictive Analytics
With the help of predictive analytics, farmers can use historical data and machine learning algorithms to predict crop yields and market demand. This data can be used to develop effective crop production and marketing strategies, ultimately leading to increased profitability for farmers.

9. Challenges and Opportunities
Although the application of AI in Indian agriculture has immense potential, there are several obstacles that need to be overcome. One such challenge is the lack of awareness and technical expertise among farmers. Since many farmers in India may not be familiar with AI, they may require education and assistance to adopt it.

The high cost of AI technology is another challenge in the adoption of AI in agriculture in India. This issue is particularly relevant for small farmers who may not have the financial resources to invest in expensive AI-powered tools and devices. There is a need for initiatives from the government and private sector to make AI technology more affordable and accessible to farmers.

Although the adoption of AI in agriculture in India is not without its challenges, there are numerous opportunities associated with it as well. By leveraging AI, farmers can potentially increase their crop yields, reduce their

environmental footprint, and enhance their overall livelihoods. Moreover, the adoption of AI in agriculture can generate new employment and business opportunities in both the agriculture and AI sectors.

IV. RESEARCH GAP

Despite the increasing focus and investment in the use of AI for sustainable agriculture in India, there is a lack of comprehensive studies that examine the socio-economic and environmental effects of AI in the industry. Although some research indicates potential advantages, such as increased efficiency and productivity, there is insufficient knowledge of how these technologies impact small farmers, rural communities, and the broader ecosystem in India. Additionally, there is limited research on the ethical and regulatory implications of AI in agriculture, including concerns about data ownership, privacy, and accountability. Therefore, there is a research gap in comprehending the social, economic, environmental, and ethical ramifications of AI in sustainable agriculture in India.

The two most popular methods of wireless power transfer are far field and near field. Magnetic fields are used in near field, also known as non-radiative techniques, to transmit energy over small distances. When two metal electrodes interact capacitively, an inductive field is produced between the coils. Radiative or far field technologies include those like power beaming [9] that use highly concentrated beams of electromagnetic radiation.

V. LITERATURE REVIEW

1. B. Priya, F. Naz, M. Robert (2 (M. Surender, 2021)022), stated in the research paper entitled as “Artificial intelligence solutions enabling sustainable agriculture: A bibliometric analysis”. In This review author examined the use of automated flying vehicle (UAV) advancements to direct accuracy horticulture (Dad) rehearses inside smallholder ranches.

Utilizing Biblioshiny and VOSviewer, 23 friend evaluated articles from Scopus and Web of Science were investigated to obtain a more noteworthy point of view. UAVs have been used for checking crop development and improvement, directing compost the executives, and trim planning, and can work with other Dad rehearses. Future uses of UAVs and related advances should be explored to illuminate strategy, arranging, and functional direction.

2. M. Surender, M. Sonu, P. Dharmendra (2021), stated in (T.Tanha, 2020) (B. Harshit, 2021) (M. Afshar, 2020) (DR. Chaudhary, 2004) (S. Anurag, 2020) (X. Anitha.Mary, 2020) (S. Amit, 2022) (W. Anupong, 2022) (G. Amrita, 2020) (S. Priyamvada, 2020) (K Ragazou, 2022) (VK bharti, 2019) (R. Sana, 2022)the research paper entitled as “Artificial intelligence and carbon footprints: Roadmap for Indian agriculture”. In this review author examines the use of automated flying vehicle (UAV) advances to direct accuracy horticulture (Dad) rehearses inside smallholder ranches.

Digitalization has affected rural and food creation frameworks and makes use of innovations and high-level information handling strategies in horticultural field. Computerized twin in horticulture is a virtual portrayal of a ranch with extraordinary potential for upgrading efficiency and effectiveness while declining energy utilization and misfortunes. It can uphold ranchers as an up-and-coming age of digitalization worldview by consistent and ongoing observing of actual world (homestead) and refreshing the condition of virtual world.

3. T. Tanha, S. Dhara, P. Nivedita, Y. Hiteshri, S. Manan (2020), stated in the research paper entitled as Implementation of “artificial intelligence in agriculture for optimisation of irrigation and application of pesticides and herbicides”. This survey will help scientists and ranchers pick the best water system observing and control procedure to further develop water system planning for open field rural frameworks. It is argued that joining soil-based, plant, and climate based observing techniques in a demonstrating climate with model prescient control can increase water use productivity.

4. B. Harshit, T. Pradeep, S. Aditi, S.Uttam (2021), stated in the research paper entitled as “Artificial Intelligence and Its Applications in Agriculture With the Future of Smart Agriculture Techniques”. The author has described about man-made intelligence that is being used to develop better yields, oversee bothers, screen soil and developing circumstances, dissect information for ranchers, and improve other administration exercises of the food inventory network.

5. M. Afshar, A. Abdul, Z. Sherin, T. Gautami (2020), stated in the research paper entitled as “A NEOTERIC SMART AND SUSTAINABLE FARMING ENVIRONMENT IN CORPORATING BLOCKCHAIN-BASED ARTIFICIAL INTELLIGENCE APPROACH”. The author has talked about the feasibility of economical farming with expansion in transmission to obstruction or motion toward clamor proportion (SIR/SNR) is examined in a remote block chain based network. The general correspondence throughput (OCT), power parting transferring (PSR), time exchanging handing-off (TSR) and transmission achievement rate (TRS) are inferred. The exactness of the hypothetical qualities is approved by mathematical reproductions.

6. DR. Chaudhary, SC. Bhandari, LM. Shukla (2004), stated in the research paper entitled as “Role of vermicompost in sustainable agriculture–A review”. In this review the author has talked about Vermicomposting that is a cycle by which worms

change natural build-ups into fertilizer that can be utilized as a substrate for plant development. This meta examination found that it achieved normal increments of 26% in business yield, 13% in absolute biomass, 78% in shoot biomass, and 57% in root biomass. The best unique material to be utilized for vermicompost creation was cows' fertilizer. Spices (particularly Cucurbitaceae and Asteraceae) and vegetables displayed the biggest biomass expansion. The impact was more grounded when no compost was added, and lower when the standard Metro-Blend 360 base suggested by certain creators was utilized as a developing medium in nursery or climatic loads.

7. S. Anurag, S.Dipankar, S. Truptimayee (2020), stated in the research paper entitled as "Application of Artificial Intelligence in Indian Agriculture" . This review is about how computerized reasoning innovation is increasing in rural area and can decrease fossil fuel by products from agrarian exercises and revive the entire business. However, the organization of man-made intelligence innovation in Indian horticulture is difficult due to the idiosyncrasies of little size ranches, conventional cultivating techniques, lack of credit, storage spaces, and leader's gamble. Simulated intelligence arrangements should be conveyed close to home in their nearby language, with appropriate preparation, input help, and in an aggregate/agreeable way to acknowledge supportable and green agribusiness.

8. X. Anitha. Mary, P. Vladimir, R. Kumudha, I. Johnson, S.J. Vijay (2022), stated in the research paper entitled as "Scope and Recent Trends of Artificial Intelligence in Indian Agriculture". This review focuses on how AI helps in increasing the socioeconomic and environmental sustainability in the Indian agricultural sector. Also, it highlights the AI practices in India incorporated by farmers having small and medium-size agricultural lands.

9. S. Amit, B. Amit, S. Rajendra (2022), stated in the research paper entitled as "Towards sustainable agriculture: key determinants of adopting artificial intelligence in agriculture". This paper recognizes key determinants impacting reception of artificial intelligence in farming through a survey of writing and a structure proposed considering Data Frameworks. The distinguished elements were ordered into five classifications and the creators show need for engaging facilitators for expanding reception rate and building trust among ranchers for utilizing new applications. The discoveries of this paper will advance the comprehension of analysts, man-made intelligence arrangement engineers and specialist co-ops to tweak the arrangement and devise correspondence techniques for expanding reachability to work on its reception.

10. W. Anupong, S. Surendra, A. Mohammad, S. Ulaganthan, M. Jagdish, K. Ravi (2022), stated in the research paper entitled as" Artificial intelligence - enabled soft sensor and internet of things for sustainable agriculture using ensemble deep learning architecture".

This research proposes novel techniques in AI technique based soft sensor integrated with remote sensing model using deep learning architectures. The input has been pre-processed to recognize the missing value, data cleaning and noise removal from the image which is collected from the agricultural land.

11. G. Amrita, S. Ritu, S. Parmindar, R.Suman (2020), stated in the research paper entitled as "Role of artificial intelligence in advancement of agriculture". This review has shown that man-made reasoning and advanced mechanics can be useful for social necessities horticulture and expanding farming creation and efficiency. Man-made consciousness can propose proficient and common-sense answers for the issue and difficulties of agribusiness such as expanding work costs, raising expense of development and harvest disappointments due to sicknesses, capricious precipitation, climatic changes, and corruption of soil fruitfulness. Utilizing computerized reasoning stages, IoT (Web of Things) and application of man-made consciousness, one can gather immense measure of information and data from government and public sites or ongoing observing of enormous information.

12. S. Priyamvada, W. Nicholas, S. Sandra, J. Ole (2020), stated in the research paper entitled as "Artificial Intelligence Driven Crop Protection Optimization for Sustainable Agriculture". This paper presents advanced cultivating arrangements presented by xarvio™ that help ranchers apply crop assurance more productively by utilizing late progressions in Computerized reasoning. The modules introduced in this paper, Splash Clock, Zone Shower, Cradle Zones and Item Suggestion, have resulted in a 30% decrease in fungicide use on field preliminary grain crops and a 72% reduction in tank extras decreasing natural contamination. These arrangements take care of the UN Economical Improvement Objectives of zero craving and mindful utilization and creation.

13. K Ragazou, A Garefalakis, E Zafeiriou, I Passas (2022), stated in the research paper entitled as "Agriculture 5.0: A New Strategic Management Mode for a Cut Cost and an Energy Efficient Agriculture Sector". This study looks at the commitment of Agribusiness 5.0 to the success of ranchers in the post-pandemic time and the steady progress to an energy-brilliant homestead. A bibliometric approach was used to break down the information for an exhaustive outline of the pattern, topical concentration, and logical creation in the field of Horticulture 5.0 and energy-savvy cultivating. Emerging advancements such as environmentally friendly power energy sources can give financially savvy admittance to fund, weather conditions refresh, remotely checking, and future energy answers for the foundation of brilliant homesteads.

14. VK Bharti, B. Suraj (2019), stated in the research paper entitled as "Impact of artificial intelligence for agricultural sustainability". This research talks about the new rural innovation technique, man-made consciousness, incorporated telematics, information the board frameworks and auto-direction arrangements, can make cultivating mudhore useful and beneficial. Computerized horticulture, where advancements like Man-made brainpower (man-made intelligence) Cloud Machine Leaming Satellite symbolism and progressed examination are enabling little holder ranchers to expand their pay through higher harvest yield and more prominent cost control. The main restriction in the development of computerized reasoning in agribusiness market is the significant expense of get-together exact Seld information.

15. R. Sana, B. Raghupati, Q. Faizan, T. Mary, A. Faizan, A. Wani (2022), stated in the research paper entitled as "Role of Artificial Intelligence in Agriculture Sustainability, an Example from India". This review investigates the current Fake Clever advancements in horticulture and united fields to recognize the best and agreeable artificial intelligence rehearses, which can help cultivators with expanding creation and working on quality.

VI. RESEARCH METHODOLOGY

Research methodology is a way of explaining how a researcher intends to carry out their research. It's a logical, systematic plan to resolve a research problem. A methodology details a researcher's approach to the research to ensure reliable, valid results that address their aims and objectives. It encompasses what data they're going to collect and where from, as well as how it's being collected and analysed.

1. Qualitative Research

Qualitative research involves collecting and analysing non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences. It can be used to gather in-depth insights into a problem or generate new ideas for research.

2. In Depth Interview

We have a conduct a depth interview with one farmer name Kalpesh Talpade who leaves in Lonavala, Maharashtra, so in this interview we ask him few questions which are given below.

How has AI technology impacted your farming practices?

- It helps to find me a real-time information on crop growth and health, So I can make informed decisions about inputs such as fertilizers and water use.
- It helps me to predict crop yields and production to plan the planting and harvesting activities and improve crop management.
- Detecting and diagnosing crop diseases and pests
- Optimizing resource use, such as water and energy, reducing waste and improving efficiency.

What are some benefits of using AI in agriculture, and how have you seen these benefits in your farm?

- Improved crop yields and quality
- Reduced input costs.
- Better management of natural resources
- Reduced environmental impact.
- Improved decision-making based on data-driven insights.

What are some challenges or concerns you have faced while using AI in agriculture, and how have you addressed them?

- High cost of technology
- Limited access to technology and technical expertise
- Data privacy and security concerns
- Resistance to change and adoption of new technologies.

How do you see the use of AI evolving in agriculture in India in the future?

- Increased adoption of precision agriculture technologies
- Greater use of satellite and remote sensing technologies
- Expansion of AI-powered crop forecasting and management systems
- Development of new AI-powered tools for disease and pest detection and control
- Integration of AI with other emerging technologies such as block chain and the Internet of Things (IoT) for improved data sharing and transparency

VII. CONCLUSION

Overall, the impact of AI in sustainable agriculture in India has the potential to be significant, improving crop yields, resource management, labour productivity, and market access. However, there are also several challenges and limitations that need to be addressed to fully realize the potential of AI in agriculture. Further research and development in this field is needed.

REFERENCES

1. B. Harshit, T. P. (2021). Artificial Intelligence and its applications in agriculture with the future of smart agricuture techniques.
2. B. Priya, F. N. (2022). Artificial Inteligence solutions enabling sustainable agriculture.
3. DR. Chaudhary, S. B. (2004). Role of vermicompost in sustainable agriculture.

4. G. Amrita, S. S. (2020). Role of artificial intelligence in advancement of agriculture.
5. K Ragazou, A. G. (2022). Agriculture 5.0: A New Strategic management mode for a cut cost and an energy efficient agricuture sector.
6. M. Afshar, A. A. (2020). A neoteric smart and sustainable farming environment incorporating blockchain based artifical intelligence approach.
7. M. Surender, M. P. (2021). Artificial Intelligence and carbon footprint:Roadmap for indian agriculture.
8. R. Sana, B. R. (2022). Role of artificial intelligence in agriculture sustainability, an example from india.
9. S. Amit, B. A. (2022). Towards sustainable agriculture: Key determinants of adopting artificial intelligence in agriculture.
10. S. Anurag, S. D. (2020). Application of artificial intelligence in indian agriculture.
11. S. Priyamvada, W. N. (2020). Artificial intelligence driven crop protection optimization for sustainable agricuture.
12. T.Tanha, S. P. (2020). Artificial Intelligence in agriculture for optimisation of irrigation and application of pesticides and herbicides.
13. VK bharti, B. S. (2019). Impact of artificial intelligence for agricutural sustainablity.
14. W. Anupong, S. A. (2022). Artificial intelligence-enabled soft sensor and internet of things for sustainable agricuture using ensemble deep learning architecture.
15. X. Anitha.Mary, P. V. (2020). Scope and Recent trends of artificial intelligence in indian agriculture.