



# **NEW AGE OF ARTIFICIAL INTELLIGENCE (AI) IN AGRO-HORTICULTURAL SECTORS**

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# INTRODUCTION:

In 1955, John McCarthy coined the term "Artificial Intelligence" and suggested carrying out research based on the idea that "every aspect of learning or any other feature of intelligence may in principle be so precisely described that a machine can be made to imitate it." These days, artificial intelligence (AI), one of the main fields of computer science, has spread to many industries, including manufacturing, education, healthcare, agriculture, and finance. This is because AI is intended to address issues that humans are not very good at resolving.



# RELEVANCE OF AI IN AGRICULTURE:

- ❁ Weather predictions, monitoring agricultural sustainability, and identifying diseases, pests and undernourished plants are done by artificial intelligence-enabled systems with the help of satellites and drones, as well as data such as temperature, precipitation, wind speed, and sun radiation.
- ❁ Farmers who have Wi-Fi connectivity can use AI apps to get a continually tailored plan for their farms, they can also benefit from a constant AI-based support system. By utilizing data from IoT and AI-driven technologies, farmers will be able to meet the increased demand for food in a responsible manner without depleting priceless natural resources. There are several variables associated with climate, including heat, precipitation, wind, and solar radiation.

# ADVANTAGES OF AI IN HORTICULTURAL SECTOR

- ❁ Aside from enhancing production, harvesting, and selling essential crops with AI, AI also checks for defective crops and enhances agro-based businesses' efficiency.
- ❁ It also strengthens agro-based businesses' ability to operate more efficiently through automated machine

adjustments utilizing automated machine adjustments to forecast the weather, identify diseases and pests, improve crop management practices, resolve climate-related challenges faced by farmers, pest infestations and weed infestations that reduce yield, and it would not eliminate jobs for farmers; instead, it will make their processes more efficient.





# INDIAN GOVERNMENT AND ICAR INITIATIVES ON AI AND JOB OPPORTUNITIES-

1. The Indian government is working persistently to make a strong growth ecosystem that ensures a fit development of AI in India and its applications in several sectors. Some of the ambitious initiatives are given as
2. NITI Aayog and IBM (International Business Machines Corporation) have contracted together for precision agriculture using AI technology. They are evolving prediction models with inbuilt AI to provide real-time consulting to the farmers. This includes data for improving crop productivity, soil yield, regulation of agricultural inputs, accurate weather forecasts, and early warning systems to prevent pest/disease outbreaks. This pilot project is being accomplished in ten aspirational districts of the states like Assam, Bihar, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.
3. Another collaboration has been done between Microsoft and United Phosphorus Limited (UPL), one of the largest producers of agrochemicals, in developing the Pest Risk Prediction App, which relies on AI and machine learning to stipulate the pest attack incidence that is presently used in states like Andhra Pradesh, Karnataka, Telangana, Maharashtra, and Madhya Pradesh.
4. Microsoft has also partnered with ICRISAT, under the Bhoochetna Project, and developed an AI-based Sowing app that utilizes machine learning and business intelligence. It has been used in Andhra Pradesh to calculate the crop sowing period by analyzing the historic climate data of 30 years. Through this app, farmers get to know information about the sowing time even in their regional languages like Kannada and Telugu.
5. Government of Andhra Pradesh has established a pilot study, known as HARITA PRIYA (precision Technology for Agriculture) to admit cutting-edge sensor based technologies for real time accession of the micro-climate data of the farmer's field. The key institutions that are involved in this study are- Centre for Development of Advanced Computing (C-DAC), Hyderabad, Central Institute for Dryland Agriculture (CRIDA), International Crop Research Institute for Semi- Arid Tropics and ANGRAU.



# ICAR INITIATIVES-

## **Established a Model Using Machine Learning/ Soft Computing Techniques-**

ICAR in collaboration with IASRI has come up with various techniques like artificial neural networks (ANN), Genetic algorithms, Fuzzy systems, Support vector machines (SVM), and Rough sets etc. The neural networks uses weather parameters and forecasts a data for rice yield.

## **IoT, Expert Systems and Knowledge Management-**

ICAR- CTCRI, Thiruvananthapuram has come up together to develop an electronic crop (E-crop) solution based on IoT. Along with this, they have also developed Sree Visakham Cassava Expert System.

AgriDaksh, an ontology based expert system tool has been developed by ICAR- IASRI for the crops like Maize, Rapeseed- Mustard, Tobacco and other Solanaceous crops. ICAR- IRRI has established rice expert system for the regulation of insects- pests and diseases in rice crop.

## **Use of AI in Bioinformatics-**

The database and prediction server that utilizes the genome/proteome sequences using machine learning algorithm has been developed by Centre for Agriculture Bioinformatics (Cabin) at ICAR- IASRI, New Delhi. The various SSR developed includes- BuffSat for Buffalo, PipeMicroDB for Pigeon pea, TomSatDB for tomato, SBMDB for Sugarbeet etc.



# AI STARTUPS IN INDIA-

Startups using artificial intelligence (AI) to solve regionally specific agricultural problems have becoming more prevalent in India. Here are a few prominent Indian AI agriculture startups:

- ❁ **AgNext:** AgNext creates AI-driven products for agricultural traceability and quality evaluation. Their technology helps farmers and food processors maintain the quality and safety of their products through assessing the quality of agricultural commodities including grains, fruits, and vegetables using spectroscopic and machine learning.
- ❁ **AgriBazaar:** AgriBazaar is an AI-powered agricultural marketplace that links farmers with agricultural commodities buyers and sellers. Their platform helps farmers access better markets and pricing for their goods by facilitating transparent and efficient trading via the use of data analytics and machine learning.
- ❁ **CropIn:** CropIn offers a digital farming platform powered by AI and data analytics. Their platform provides farmers with insights into crop planning, monitoring, and management, using satellite imagery, weather data, and field-level observations. CropIn's technology helps farmers optimize resource usage and improve productivity.

- ❁ **RML AgTech:** RML AgTech offers farm management and precision agricultural solutions powered by AI. Their platform uses AI algorithms to deliver farmers and agribusinesses individualized advice. Services including weather forecasting, crop advise, and soil testing are available.

- ❁ **Fasal:** Fasal provides farmers with an AI-powered platform for crop monitoring and advice. Their technology helps farmers make data-driven decisions and maximize yields by providing real-time insights into crop health, water stress, and pest infestations using sensors and weather data.



## CONCLUSION

AI has been regarded as one of the most feasible solution to those problems and has been developed and improved for years by scientists worldwide prospect in this field. Agriculture is undergoing an evolution because of the use of AI. It is enabling more intelligent and effective farming techniques, which are crucial for tackling the issues of the 21st century.