AI POWERED DRONE FOR DIGITALIZING AGRICULTURE IN INDIA

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ABSTRACT

The agriculture system in India has been so important to the lives of its 1.4 billion people, but unfortunately, it is now facing serious challenges. Climate variation disrupts our agricultural system and unsustainable farming practices execrable climate change. In recent years AI powered technologies used in agriculture helps to increase crop yield. Digitalization in agriculture permits real time analysis that benefits in land management, pesticide management, water management and even land investigation. AI- powered drones can also be used to analyze the crops nutrient status by digit soil mapping, detect pests, diseases, weeds and spray pesticides at precise locations after analyzing data by an AI an algorithm. The usage of drones in more or less every sector of the economy is increasing fast. The AI-powered drones uses in Agriculture is booming. The government of India is energetically promoting drones for agriculture sector. The AI- powered drones are help to reduce time and rise efficiency of the farmers. The data gathered using drones on farm is used for superior agronomic conclusions is referred as "precision agriculture". This assessment finds that the administration is aggressively pursuing a free up policy to encourage AI powered drones and also financial help to institutions, individual farmers as well as entrepreneurship to procure and use or manufacture of drones. AI powered drones offer unprecedented capabilities. The can screen large parts, identify doubtful activities, resource utilization with specific precision information which can leads to enlarged productivity and enhance input usage efficacy to Indian farmers at field level.

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***Keywords:** AI- Powered, Drones, Management and Agriculture.*

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Introduction

Agricultural is a main sector of the Indian economy. It provides around 58 per cent livelihoods of the country's populations; mainly for rural areas. The Indian agricultural sector contributes 18 per cent to India's GDP. It similarly occupies a protuberant position in the global economy and contributes 11.9 per cent of the gross value added in global agriculture, second only to China. The drones' technology has develop a serious in driving all main economics onward including agriculture.

The initial outline of drones was into military uses, but gradually it has used in agriculture applications. Agricultural drones are discusses in Unmanned Aerial vehicles (UAVs) measured as aircraft deprived of a human pilot. The Kisan Drones are being mostly used in agriculture sector and which are enabled with AI used in agriculture to bring change though accurate weather forecast, precise crop analysis. Imaging and multi-spectral features of AI drones can help in crop stress observing, assessment of crop growth phase, yield estimate that help in supplying of fertilizers, water herbicides. Drones too help to measure crop health, weed annoyance, pests and diseases infections level and judicious use of chemical to management of these concerns. Hence, AI Powered drones can help to increase the effectiveness and stability of crop management besides making it cost actual. There has been significant development in the norm of AI drones in agriculture.

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Fig.: Insecticide Sprayed by Agricultural Drone

Review of Literature

Maddikunta Reddy P.K. *et al* (2021) carried out a comparative study of unmanned aerial vehicles (UAVs). They studied different category of UAV *viz*., fixed wing, single rotor and hybrid vertical landing, multi rotor and take-off. They conclude that fixed wing is suitable for more flying and long distance operations. They also reconnoitered various types of sensors such as temp., locations and optical sensor. Their study find that drone technology is play a important role for precision farming.

Rahman M.F.F *et al* (2021) carried out a study on uses of drone in agriculture and stated that drone is more useful for pesticide spraying, field mapping, irrigation, aerial mapping and livestock farming. Pesticide spraying reduces health risk as associated with manual pesticide spraying. However, drones for agriculture uses have a few limits like exact data interpretation, initially high cost, lack of knowledge and regulatory barrier.

Rana V. and Mahima (2020) have reviewed drone technology and different uses of drones in agriculture. They listed different applications of drones are:

- Crop heath monitoring and surveillances.
- Field soil analysis.
- Crop damage assessment.
- Planting of trees on large scale.

Mogili U.M.R. and Deepak B.B.V.L. (2018) carried out a study on applications of drone technology in Precision farming. They mention that drones are used to application of the pesticides to circumvent the health hazards as manually spray. Drones can work in areas where it may be tough for human beings to work. The drones mounted with a multispectral imaging camera, on one flight this camera capture the picture and on the basis of analysis of these images easy to find the area where to application of pesticides. The drone's auto navigates with GPS system to spray the insecticides and weedicides in areas where no vegetation found indicated by the normal difference vegetation index (NDVI). They conclude that drone technology can enhance the efficiency of crop management and reduce the man power, making it a cost effective practice.

FAO (2018) studies 10 case in different nations on using drones in agriculture sector. Based on this report, drones have enormous potential in agriculture to planning and in 3-D data collection. Drones are increasingly used in agriculture in crop production, crop monitoring, soil, weather and field analysis crop spraying and plantation. The multi spectral imaging feature of drone use in crop stress monitoring, growth stage estimate and yield expectation by calculating indexes such as NDVI (Normalized Difference Vegetation Index), LAI (Leaf Area Index) or PRI (Photochemical Reflectance Index).

The explosion also identifies that problems related to safety and security to operation of drone technologies. Some contests in using drone technology have been listed are, high initial cost, weather dependent, internet connectivity issues, safety concerns and skill dependency.

Recent Government Support to Promote Drones Use in Agriculture

The union ministry of agriculture and farmers welfare of India, to create drones reasonable to the farmers and various stake holders and promote this sector, has declared a number of subsidies on the buying of drones. The government of India granting up to 100 per cent of the cost of agriculture

drone or ten lakh rupees whichever is less, as grant for the buying of drones to the Farm Machinery Training and Testing Institutes, ICAR (Indian Council of Agricultural Research), KVK (Krishi Vigyan Kendra) and SAUs (State Agricultural Universities) for protests of this technology on the farmer fields.

The Farmers Producers Organizations (FPO) would be qualified to receive grants up to 75 per cent of the cost of agricultural drones for its demonstration on the farmer fields. Eventuality expenditure of 6000 rupees per hectare would be delivered to implementing agencies that don't purchase drones but they will demonstrate hire drones. The government also providing as financial assistance to custom contracting centers which are setup through cooperative society of farmers' Farmers Producer Organizations, rural entrepreneurs to provide drones application service, 40% of total cost of drone or 4 lakh, whichever is less. Agriculture graduates starting custom contracting centers are suitable to receive 50 per cent of basic cost of drones and its attachment or 5 lakh in grant support for drones purchase.

For small and marginal scheduled cast or scheduled tribe and woman for individual purchase of drone providing financial assistance at the rate of 50 per cent of cost or highest of Rs 5 lakh and other farmers at the rate of 40% or maximum up to 4 lakhs. The subsidized purchase of AI power drones through custom hiring centers, farmers Producer organizations, cooperative society of farmer, rural entrepreneurs, Krishi Vigyan Kendra, hi-tech hubs and individual farmers will create the technology inexpensive resulting in their prevalent adoption. This will create drones are more manageable for a common main of India and encourage considerably domestic AI power drones production.

Drone Technology and Applications in Indian Agriculture

In recent years, in India drones are creature popular in the agriculture sector. AI power drones technology has become necessary part of large scale precision farming. The information collected form drones support the field plan to farmers by their treatments and planting to accomplish the best potential yield. The AI power drones technology features can support in growth stage assessment, crop stress monitoring and yield prediction. The drones technology in increase the efficacy and consistency of crop managements that leads precision farming. The applications of drones are given below:

- **Monitoring Crop Health**

AI power drones with special imaging apparatus known as NDVI (Normalized Difference Vegetation Index) practice detailed color information to specify crop heath. A drone with the help of infrared mapping is proficient of accurate image site in the millimeter. This helps in direction of crop growth from the seed sown to harvest. The pests, disease and weeds problems can be detected and treated right time.

- **Spray Application**

Drones have reservoirs that can be occupied with pesticides and fertilizers for application the crops in considerably less time, as compared to old-style methods. Drones sprayer deliver very fine spray droplet size with targeted specific areas to maximize efficiency for precision agriculture.

- **Planting and Seeding**

Automated drones planter and seeders helps in plating trees and crops. This technology will save labor and fuel and helps safeguarded to environment.

- **Soil, Weather and Field Analysis**

Agriculture AI powered drones may be used for efficient field planning soil and field analysis, weather forecast, fertility and nutrient content of the soil. Agriculture AI powered drones can detect any external damages with help of thermal cameras. Drones also provide accurate field mapping and elevation that helps to farmers determining drainage system for more efficient watering techniques.

- **Judicious Uses of Chemicals**

AI powered drones detect pests attacks and diseases, providing accurate data of the damages, there by precise use of pesticides, Insecticides and other chemicals.

Challenges in using AI Powered Drones

Implementation of drone technology in agriculture system has paved the way of precision farming. Drones offers a wide range of welfares to Indian growers in the agriculture sector by increasing efficacy, reduced costs and enhanced yields.

The implementation of drone technology in pastoral India is static in its early stage. The initial cost of agriculture drones is about 10 lakhs which is high for Indian farmers. The agriculture drones are

equipped with sensors, software, hardware and different other tools. For smooth functioning of drones, require good connectivity of internet. A drone functioning is dependent on weather, so drones can only work during good weather conditions. Requirement of skilled manpower to maintain or work of drones and preventive policies of government boundary the application of the technology in our nation.

Conclusion

Drones offer a wide range of benefits in agriculture sector to Indian farmers, by increased yields and reduced cost with improved efficacy. Initially these drones were used in military for defense but now the applications have spread to different areas like agriculture and animal husbandry management. AI Powered drones are thriving like any other farmhouse equipment which appears to be an integrated inventive technology in Indian agriculture sector.

The multi spectral imaging feature of drones can assistance in identification and control of weeds, soil fertility analysis, animal health monitoring, pests and disease identification and management. Drones are being used efficiently for spraying purpose in agricultural operations but adhering challenges are limiting its adoption. First and foremost constraint is initial high cost along with its operational and maintenance costs, low flight time, weather, frequent replacement of battery and legislation procedures in use drones are some of the major barriers to be scaled up to find their better place in agriculture. AI Powered technology can be extensively implemented with advantages such as location specific precision facts on spatial variation of various management rehearses which can lead to enlarged productivity and enhance input use effectiveness at farm level.

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