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Drone Agriculture: Use of Drone Technology for Better Farming

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In many areas, the use of drones has already proven to be an essential part of large-scale precision farming operations. Farmers can use data collected by drone footage of their crops to plan their planting and treatment plans for optimal harvests. Some reports suggest that using precision farming techniques could result in up to 5% higher yields.

Drone technology has gained popularity in the agriculture industry in recent years. Drones provide farmers with a number of advantages, such as higher yields & lower costs. But there are worries that farmers would be hesitant to use drone technology because they

don't know enough about it or are afraid of losing their jobs. We may examine the advantages of drone technology for the agricultural industry as well as any



obstacles that might be preventing farmers from implementing it. Drone footage of fields collects data that farmers may use to plan their planting and treatment strategies for maximum harvests. As much as 5% more yields may be obtained

by implementing precision farming methods, according to some reports. This is a significant boost in an industry where profit margins are usually thin. Drones are utilized in the agricultural industry for a wide range of applications, such as mapping, crop

monitoring, fertilizer spraying, land inspection, crop damage or field mapping etc. Different kinds of drones are being studied to see which has the most potential for farming, agriculture, and gardening. Drones with many rotors, such as quad copters, are the most ideal for fertilizing crop.

Introduction

India is mainly based on agrarian economy. Mainly in rural areas the main source of income comes from agriculture. We can say that India's whole population and its economy depends on the agriculture commodities. From the very beginning agriculture followed the traditional methods, and still most of the farmers use it. In this era of technology, the agriculture sector is still way behind in technology. Our agricultural industry is still not fully utilizing technology. Farmers now a days still rely on the climate for the production of crops, they continue to employ outdated, customary techniques despite the new technologies and leading to agricultural failure often because of the state of the climate. However, these issues may be handled with the aid of technology; crop failure can be identified beforehand, allowing us to take the appropriate action.

Drones in Indian Agricultural Industry

Drones are flying vehicles employed in a variety of agricultural operations, as well as for tracking or analyzing crop growth and its creation. Drones have so far been utilized by distinct businesses with their own objectives. However, recently, drone technology has also being used in agriculture. Even so, the technology is still relatively new in India and has not seen significant use thus far. The various agriculture businesses are currently making efforts so that it can be

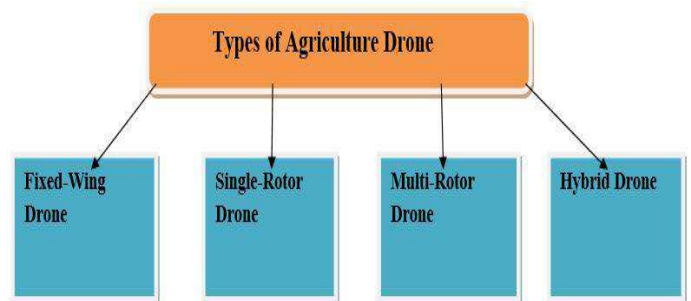
farmers' easy access, and so that it can be efficiently employed to improve agricultural output.

The Use of Agricultural Drones Currently

India is currently implementing drone-based agriculture projects:

1. On 26th January 2022, certification scheme were given by the Indian government. According to the scheme it is now allow to carry a payload which do not contain the pesticide and liquids which are used in spraying drones.
2. On 23rd January 2022, for agricultural purposes to enhance and promote the use of drones which minimizes the labour burden of farmers. The Indian government offered recently, the amount of 10 lakhs or a 100% subsidy, whichever is less, which is up to March 2023 to ICAR institutes, Krishi vigyan Kendra's & State agriculture universities. And also, with that the total budget of amount Rs 6000 per hectare would be made for hiring drones from the special hiring facilities i.e custom hiring centres (CHC). These subsidies and funds proven to be advantageous for the farmers as these are the wide technologies at an affordable price.
3. The International crops research institute for semi-arid tropics (ICRISAT) is approved by the Indian government on 16th November 2020 for using of drones for the research of agricultural purpose.

Different Types of Drones Used in Agriculture



There are several different types of drones that are commonly used in agriculture. Each type has its own specific capabilities and features that make them suitable for different tasks.

1. Fixed-Wing Drone: Fixed-wing drones are commonly used in agriculture for mapping fields, monitoring crops, and identifying potential issues such as pests or irrigation problems. They are also used for surveying, mapping, and aerial photography.

2. Single-Rotor Drone: Single-rotor drones, also known as helicopter drones, are unmanned aerial vehicles (UAVs) used in agriculture to capture high-quality images and data for crop mapping and analysis. They are also equipped with advanced sensors and cameras to collect data on crop health, soil conditions, and other environmental factors.

3. Multi-Rotor Drone: Multi-rotor drones are a popular type of drone used in agriculture, consisting of multiple rotors mounted on the body of the drone. They can also be equipped with advanced sensors such as thermal cameras to detect temperature variations in crops, helping farmers to detect stress in plants and adjust irrigation and fertilization accordingly.

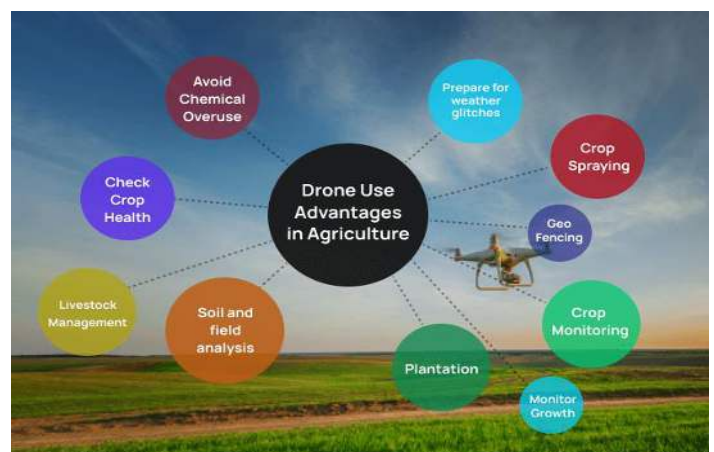
4. Hybrid Drone: Hybrid drones in agriculture combine the advantages of both multirotor and fixed-wing drones. These drones have both vertical take-off and landing (VTOL) capabilities, similar to multirotor drones. They can capture high-resolution images and generate detailed maps of farmland, providing farmers with valuable insights into the health and condition of their crops.



Advantages of Drones in Agriculture

According to current studies and research, the global drone industry would grow at a 35.9% CAGR in the agriculture sector and reach \$5.7 billion by the year 2022.

Drones will be used in agriculture more and more on a daily basis because this technology is so beneficial to the farmers since it requires less time than usual conventional techniques and also results in the effective yield and productivity of the crop without any negative impact. Due to the industries' maturity, only the Drone usage is predicted to increase, so prior knowledge of this technology is recommended.



- ❖ **Soil and Field Analysis:** Drones used in agriculture are used to analyze fields and soil in order to plan fields effectively. The sensors assess and scrutinize soil moisture content, soil characteristics, nutrients, soil's texture, structure, and color, and the soil's fertility.
- ❖ **Plantation:** The growing of plants and crops was done by labours only but now due to the drone technology this also can be done by the drone which saves a lot of labour cost and time. Drones will be taken at the place of tractor which will also save environment from pollution.
- ❖ **Crop Monitoring:** Crop monitoring is the process of keeping an eye on a crop's development and performance beginning with the period of seed sowing and ending with harvest. In this we can monitor the pest infestation in crops, also the weather condition and we can also analyse the right time when to put fertilizers without any wastage of it.
- ❖ **Crop Spraying:** This apparatus features reservoirs to hold insecticides and fertilizers, which are then sprayed into the field. It conserves so a long time.
- ❖ **Check Crop Health:** Drones can check the health of the crops and soil over acres of land in very less time by constant surveys and monitoring of field. It gathers all the information related to soil and crops.

Benefits of Agriculture Drones

1. **High Efficiency:** Drones operate constantly at twice the speed of human labor, without interruption or rest.
2. **Security:** There is full security of drones as they are been operated by the trained drone pilots.

3. **Water Saving:** With the help of drones a very little water is (ULV) for spraying in crops which is sufficient for the crops.
4. **Low Cost & Easy Maintenance:** The drones are low at cost and also do not require much maintenance.

Limitations of Agricultural Drones

- ❖ **Weather-Dependent:** Drones rely heavily on the weather; they function best in favorable conditions. It needs to be bright, calm, and dry, days to function correctly; if not, it cannot function correctly.
- ❖ **Issues in Connectivity:** In rural areas there is no proper network connection, there is no availability of network which is an important source of drone. Many of the farmers cannot afford this expense.
- ❖ **Knowledge and Skill:** Using new technology is a welcoming change but using it daily requires the right skill set and adequate knowledge

Kisan Drone Scheme

‘Kisan Drone Scheme’ was launched by the Union Agriculture Minister of India Narendra Tomar. Kisan Drone Scheme was launched in February 2022. In this Scheme, 100 drones are provided by the government to the Indian farmer. If drones are used only for demonstration purposes FPOs would be eligible to receive a subsidy of 75% of the cost of the drone.

Conclusion

In conclusion, drone technology will impact the agriculture industry in the future. Drones, which can benefit farmers and provide job opportunities for the younger generation, are attracting the interest and investment of many businesses and entrepreneurs. Additionally, it may aid in boosting farmers'

knowledge of drone technology, which may be advantageous to them. Drones can be valuable to farmers in a variety of ways, but before purchasing pricey equipment, it is crucial to understand their capabilities and limitations. For the greatest outcomes,

Drone Deploy, a provider of agricultural drones and a drone programming firm, advises starting small and integrating drone data into your organization gradually.

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