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Drones: An Aerial Vehicle for Green Agriculture

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The article elaborates the usage of drones in both production and protection practices of Agriculture. Drones are automated devices used for various activities, and it is also gaining more importance in the recent practices of Agriculture. It can be used for monitoring of crop growth, crop health, livestock management, weather conditions and also geo-fencing. Due to effective resource management and precision in application it is more useful than the traditional methods. It cuts down the cost of production to the greater extent and the personnel involved in the agricultural operations can also be reduced. It also paves the way for precision and climate smart agriculture.

Key words: Drones, Monitoring, farmers.

Introduction

India is the land of agriculture and more than 60 per cent of the people are engaged in agricultural activities. Due to rapid increase in population over billions there is a need for increase in food production. Proper or good crop production has become difficult in the recent era due to many reasons like difficulties in crop protection practices, nutrient management and also labor availability and wages. Despite of highly important sector contributing to the growth of economy, it is way behind in adoption of new technologies. Fortunately, there is high scope for invention and adoption of modern techniques in agriculture in the 21st century. Technologies like robotics, AI and drones are gaining paramount importance in agriculture because of their wide adaptability and usage in different aspects of agriculture.

What are Drones ?

Drones are the unmanned aerial vehicles (UAV), their ability to drive independently and remotely makes them special. Earlier drones were used in military, however it is now commonly used in other sectors also due to its wide spread application.

Aeronautics and robotics are combined in Drone system. They are equipped with infrared and high-definition cameras, GPS and radar control.

How do Drones work?

The engine is turned on it starts up and the pilot operates with the remote from the ground.

The propellers on the top enable flight. Most of the propellers are double-bladed and to maintain stability of the vehicle in the air 2 propellers are rotated in one direction and other 2 in the opposite direction. The central flight controller in drone helps to keep it stable. This gadget functions similar to a compass and measures the magnetic fields strength and direction. The drone position is

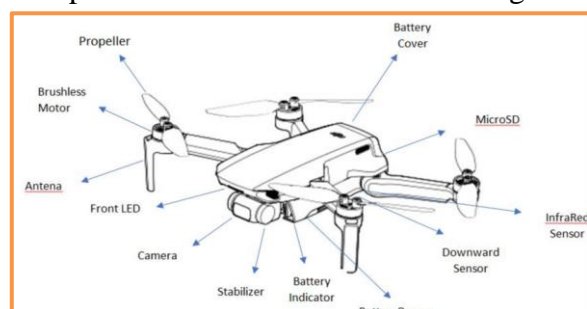


Fig. 1: Parts of Drone

determined by the controller using GPS, then information is received by electronic speed control allowing the motor to turn at the appropriate speed to ensure a safe and stable flight.

Usage in Agriculture

Soil and field analysis : Used to analyse moisture content, nutrient content and also to know the soil conditions based on this data grower can take up proper measures for correcting the problems in the field. It also gives information on elevations in the field so that irregularities in the field can be noticed.

Monitoring plant health: Plant health is indicated by detailed color information using the Normalized Difference Vegetation Index (NDVI), a special imaging tool fitted to drones. It provides accurate images with the millimeter range. This allows the growers to detect problems early and to take timely control measures.

Seeding and planting: Automatic planting drones are used mainly in forestry, unreachable area can be planted without endangering workers.

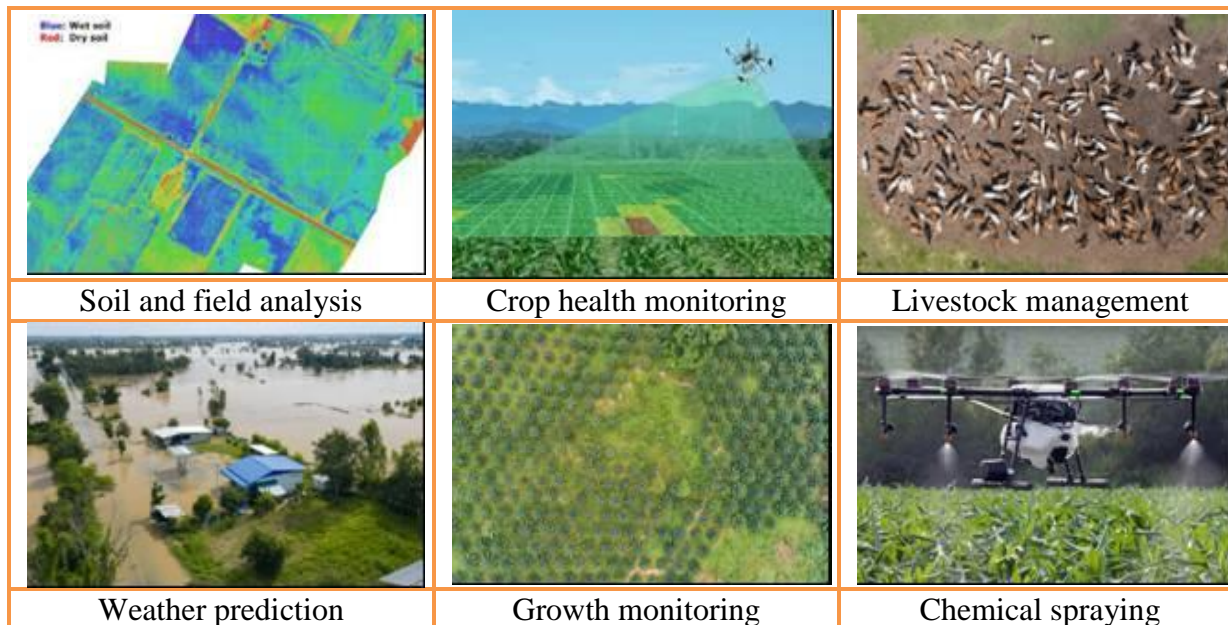
Livestock management: Used to monitor large group of animals through high resolution cameras. It detects animal movement and also the sick animals so that action can be taken immediately.

Crop spraying: Very fine sized pesticide particles can be effectively delivered using drones. Precise application of chemicals can be done by using drones which limits the contact of human being with the harmful chemical usage. It also reduces the heavy pesticide usage.

Prepare for weather glitches: Storm drones are used for weather predictions. Advance notice on rain or storm can be used for better planning of cropping systems.

Geo-fencing: The thermal cameras equipped in drones helps in identifying humans and animals, so this helps in protection of crop especially during night.

Monitoring growth: It provides accurate information on growth rate at every stage of the crop. Mutispectral images provides information on healthy and unhealthy plants so, useful in early correction of abiotic stresses.



Advantages of Drones

- Highly efficient
- Cost effective and easy maintenance
- Security
- Saving of resources
- Safety in operation
- Quick actions

Conclusion

Drone technology can be regarded to revolutionize Indian agricultural community. It can transform agriculture from traditional practices into efficient and high productive farming practices. It is cost effective and can be used efficiently and reduces labor requirement. Rather than wastage of chemicals and other resources need based and site specific resource management can be practiced for increasing agricultural productivity. Their ability to analyze data quickly and support in decision making helps farmers to take up actions quickly. Furthermore, drones can help ensure resilience and sustainability in farming practices by tracking and mitigating the effects of climate change on agriculture.

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