

ARTICLE ID: 73

## Role of Drones in Agriculture

**Ramagiri Mamatha****Department of Agriculture Economics, Assam Agriculture  
University, Jorhat****Corresponding Author: [ramagiri.mamatha.amj20@aau.ac.in](mailto:ramagiri.mamatha.amj20@aau.ac.in)**

### Introduction

The term drone, sometimes referred to as **unmanned aerial vehicles (UAVs)** refers to any aerial vehicle that receives remote commands from a pilot or relies on software for autonomous flight. Many drones display features like cameras for collecting visual data and propellers for stabilizing their flight patterns.

Technology in farming is constantly evolving. Collecting accurate and reliable data based on GPS coordinates and automated steering systems, along with the use of remote sensing (drones), is an essential part of precision farming which can optimize both farm productivity and profitability.

Drones can help farmers to optimize the use of inputs (seed, fertilizers, water), to react more quickly to threats (weeds, pests, fungi), to save time crop scouting (validate treatment/actions taken), to improve variable-rate prescriptions in real time and estimate yield from a field.

Drones fly around 50 - 100m high. Above 50m high, a special authorization is required. Currently, flying agricultural drones depends on national laws. Nonetheless training is normally required. A drone can fly under any weather condition. Drones are water resistant, but image quality can be damaged if pictures are taken during rainy weather.



It depends on the drone capability and size. Fixed wings drones have longer flight time and can cover more fields in one flight. For instance, 50 min flight time will cover up to 12km<sup>2</sup>.

Drones can assist in precision agriculture by performing variety of agricultural tasks including soil health monitoring, seed planting, fertilizer application, crop stress management, irrigation schedule planning, weed management, crop yield management, and weather analysis.

### What are the challenges in the agriculture sector?

Food security challenges are compounded by nutritional security, self-sufficiency, ecological problems, climate change and sharp inflation.

The farm sector faces challenges, including-

- Fragmented landholdings
- Inefficient usage of agricultural inputs
- Poor availability of credit and financial inclusion
- Lack of market access
- Poor post-harvest infrastructure

**Applications-** There is multiple uses for drones, including-

- Pesticide and nutrient application
- Mapping water spread area
- Sampling water
- Mapping macrophyte infestation
- Aquaculture management practices

**Cost of application** - As per WEF, drone usage could reduce the cost of application by 20% and mitigate health hazards of manual work.



**Precision agriculture** - It is also useful in promoting precision agriculture, thereby optimising input use.

**Productivity** - Precision agriculture know-how and farm advisory services based on data sources can enable 15% increase in productivity.

**Evidence-based planning** - Drones enable data collection and resource-efficient nutrient application which facilitates crop production forecast, and evidence-based planning.

**Emerging technologies** - Drones can be an effective enabler for mainstreaming emerging technologies such as yield estimation or insurance.

**Aid in government initiatives** - With drones, government initiatives like Per Drop More Crop will improve and water use inefficiency in irrigation will decline.

Drones' data integrated with GIS and Google Earth satellite images will streamline schemes like PMFBY by aiding crop cutting experiments, crop-loss estimation, insurance determination and dispute resolution.

**Agri-research** - With drones, agri-research will become highly customized and localized.

**Better pricing** - Since drones can capture backward and forward linkages, food processing industries will procure from farmers at better prices.

### What steps were taken by the government to promote the use of drones?

- The agriculture ministry had released standard operating procedures (SOPs) for using drones in pesticide and nutrient application.
- Agriculture Ministry provides grant upto Rs. 10 lakhs to agricultural institutes for purchase of drones.
- Union Finance Minister has announced in the Budget 2022-23 that the Centre will promote 'Kisan Drones' to help farmers assess crops, digitise land records, spray insecticides and nutrients.



- The government has notified the [Drone Rules 2021](#) which is expected to make drone operations simpler for civilian drone operators.
- New Delhi has eased drone policies with mechanisms such as the Production Linked Incentive scheme and import bans paving the way for the domestic manufacturing sector.

## References

H. Aasen, A. Burkart, A. Bolten, G. Bareth, Generating 3D hyperspectral information with lightweight UAV snapshot cameras for vegetation monitoring: from camera calibration to quality assurance, ISPRS J. Photogramm. Remote Sens., 108 (2015), pp. 245-259,

T. Adão, J. Hruška, L. Pádua, J. Bessa, E. Peres, R. Morais, J.J. Sousa, Hyperspectral imaging: a review on UAV-based sensors, data processing and applications for agriculture and forestry. Remote Sensing, 9 (11) (2017), [10.3390/rs9111110](#)

S.H. Alsamhi, F. Afghah, R. Sahal, A. Hawbani, M.A.A. Al-qaness, B. Lee, M. Guizani, Green internet of things using UAVs in B5G networks: A review of applications and strategies. Ad. Hoc. Netw., 117 (2021), Article 102505, [10.1016/j.adhoc.2021.102505](#)

N. Al-Thani, A. Albuainain, F. Alnaimi, N. Zorba, Drones for Sheep Livestock Monitoring, 20th IEEE Mediterranean Electrotechnical,Conference (2020), [10.1109/MELECON48756.2020.9140588](#)

