



Drones and the Indian Agriculture Industry

(*Bhavna Singh Rathore)

Ph.D. Scholar, Department of Agronomy, SKRAU, Bikaner-334006, Rajasthan

* bhavnasingh0409@gmail.com

Drones are uncrewed aerial vehicles (also known as UAVs), which are used for surveillance in various industries. Till now, they were primarily used by companies working in industrial sectors such as mining and construction, army etc. But now, drone technology is increasingly available for use in various sectors of agriculture as well. Though the technology is still nascent in India, many companies are trying so that it is easily available to Indian farmers and ready to be used to increase efficiency in agricultural production.

The Use of Agri-Drones is on the Rise

A lot of drone-based agricultural projects are undergoing in India. Consider the following real-life scenarios:

- On 26th January 2022, the Government of India has also released a certification scheme for agricultural drones, which can now carry a payload that does not include chemicals or other liquids used in spraying drones. Such liquids may be sprayed by following applicable rules and regulations.
- On 23rd January 2022, to promote the use of drones for agricultural purposes and reduce the labour burden on the farmers, the government of India has recently offered, a 100% subsidy or 10 lakhs, whichever is less, up to March 2023 to the Farm Machinery Training and Testing Institutes, ICAR Institutes, Krishi Vigyan Kendras & State Agriculture Universities. Additionally, a contingency fund of Rs.6000/hectare will also be set up for hiring Drones from Custom Hiring Centres (CHC). The subsidy and the contingency funds will help the farmers access and adopt this extensive technology at an inexpensive price.
- On 16th November 2020, the Indian government granted the International Crops Research Institute (ICRISAT), to use of drones for agricultural research activities. With this move, the government hopes to encourage budding researchers and entrepreneurs to look at budget-friendly drone solutions for more than 6.6 lakh Indian villages. Though the usage will be conditional, yet it is a revolutionary step.

Advantages of Using Drones in Agriculture



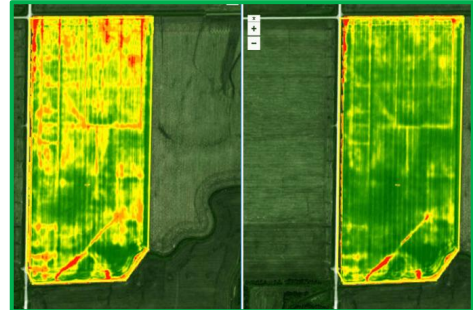
Soil and field analysis

For efficient field planning, agricultural drones can be used for soil and field analysis. They can be used to mount sensors to evaluate moisture content in the soil, terrain conditions, soil conditions, soil erosion, nutrients content, and fertility of the soil.

Crop monitoring

Crop surveillance is the supervision of crop progress from the time seeds are sown to the time for harvest. This includes providing fertilizers at the right time, checking for pest attack, and monitoring the effect of weather conditions. Crop surveillance is the only way that a farmer can ensure a timely harvest, especially when dealing with seasonal crops.

Any errors at this stage can result in crop failure. Crop surveillance helps in understanding and planning for the next farming season. Drones can help in effective crop surveillance by inspecting the field with infrared cameras and based on their real-time information, farmers can take active measures to improve the condition of plants in the field.



Plantation

Drones can help in planting trees and crops, which was done by farmers before. This technology will not only save labour but also help in saving fuels. Soon, it is expected that budget-friendly drones will be used instead of huge tractors, as they emit harmful gases and pollute the environment in the process.

Livestock management

Drones can be used to monitor and manage huge livestock as their sensors have high-resolution infrared cameras, which can detect a sick animal and swiftly take actions accordingly. So, the impact of drones on precision dairy farming is soon to become a new normal.



Crop spraying

Agri-drones can be used to spray chemicals as they have reservoirs, which can be filled with fertilizers and pesticides for spraying on crops in very little time, as compared to traditional methods. Thus, drone technology can usher in a new era for precision agriculture.



Check crop health

Farming is a large-scale activity that takes place over acres of land. Constant surveys are necessary to monitor the health of the soil and the crop that has been planted. Manually, this may take days, and even then, there is space for human error. Drones can do the same job in a matter of hours. With infrared mapping, drones can gather information about both the health of the soil and the crop.

Avoid overuse of chemicals

Drones can prove to be especially effective in reducing the overuse of pesticides, insecticides, and other chemicals. These chemicals indeed help to protect the crop. But, their overuse can prove to be detrimental. Drones can detect minute signs of pest attacks, and provide accurate

data regarding the degree and range of the attack. This can help farmers calculate the required amount of chemicals to be used that would only protect the crops rather than harming them.

Prepare for weather glitches

Weather conditions can prove to be a farmer's best friend and worst enemy. Since these cannot be accurately predicted, it becomes extremely difficult to prepare for any shift in patterns. Drones can be used to detect upcoming weather conditions. Storm drones are already being used to make better predictions. And this information can be used by farmers to be better prepared. Advance notice of storms or lack of rain can be used to plan the crop to be planted that would be best suited to the season, and how to take care of planted crops at a later stage



Monitor growth

Even when everything is going according to plan, crops need to be surveyed and monitored to ensure that the right amount of yield will be available at the time of harvest. It is also important for future planning, whether it is about determining the right price for the open market, or harvesting cyclical crops. Drones can provide accurate data about every stage of crop growth, and report any variations before they become a



crisis. Multispectral images can also provide accurate information about subtle differences between healthy and unhealthy crops that may be missed by the naked eye. For example, stressed crops will reflect less near-infrared light as compared to healthy crops. This difference cannot be detected by the human eye always. But drones can provide this information in the early stages

Geofencing

The thermal cameras installed over drones can easily detect animals or human beings. So, drones can guard the fields from external damage caused by animals, especially at night.

Benefits of agri-drones

- **Security:** The drones are operated by trained drone pilots. So, there are no chances of their misuse.
- **High efficiency:** Drones do not have any operational delays and can work double the speed of human labor.
- **Water-saving:** In comparison to traditional spraying methods, agricultural drones use ultra-low volume (ULV) spraying technology, thus saving more water.
- **Low cost and easy to maintain:** Agri drones are sturdy, low in cost, and require minimum maintenance. Some of the key features include a detachable container, low-cost frame, precise spraying of pesticides.

Limitations of agri drones

- **Connectivity issue:** Often, online coverage is unavailable in rural areas. Under such circumstances, a farmer needs to invest in internet connectivity, which can turn into a recurring expense.

- **Weather dependent:** Drones do not have any operational delays and can work double the speed of human labor.
- **Weather dependent:** Drones are heavily dependent on good weather conditions. Under rainy or windy weather conditions, it is not advisable to fly drones.
- **Knowledge and Skill:** Using new technology is a welcoming change but using it daily requires the right skillset and adequate knowledge. An average farmer may struggle to understand drone functions. Either he must acquire the knowledge or remain dependent on an experienced person.