

# Overview on Application of Drone Systems in Agriculture

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**ABSTRACT:** one of main source of income in of India is agriculture. The production rate of crops in agriculture is based on various parameters like temperature, humidity, rain etc. Drones are unmanned aerial vehicles that are remotely Controlled . The field of agriculture is also depends on some of factors like pests, disease, fertilizers, etc which can be control by giving proper treatment to crops. Pesticides may increase the productivity of crops but it also affects on human health. So the main aim of this paper is to design agriculture drone for spraying pesticides. The use of pesticides in agriculture is very important to agriculture and it will be so easy if will use intelligent machines such as robots using new technologies. This paper gives the idea about various technologies used to reduce human efforts in various operations of agriculture like detection of presence of pests, spraying of UREA, spraying of fertilizers, etc. This paper describes the development of quad copter UAV and the spraying mechanism. In this paper we also discuss integration of sprayer module to quad copter system. The discussed system involves designing a prototype which uses

**KEYWORDS:-** Unmanned Aerial Vehicles, Brushless motors, remote sensing, ESC wires, Li Po Battery charger.

## INTRODUCTION

Agriculture in India constitutes more than 60 % occupation.

It serves to be the backbone of Indian economy.

An agricultural drone is an unmanned aerial vehicle used to help optimize agriculture operations, increase crop production, and monitor crop growth. Sensors and digital imaging capabilities can give farmers a richer picture of their fields. Using an agriculture drone and gathering information from it may prove useful in improving crop yields and farm efficiency.

The aerial view provided by a drone can reveal many issues such as irrigation problems, soil variation, and pest and fungal infestations. Multispectral images show a near-infrared view as well as a visual spectrum view. The combination shows the farmer the differences between healthy and unhealthy plants, a difference not always clearly visible to the human eye. Thus, these views can assist in assessing crop growth and production. Crops can be surveyed at any time using agricultural drones, allowing for rapid identification of problems.

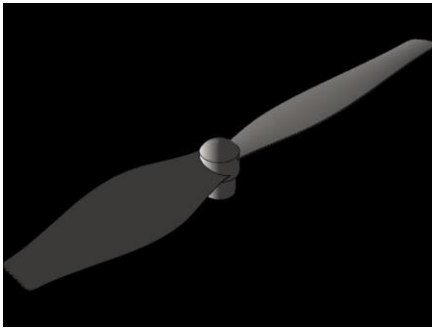
Agriculture is very essential to improve productivity and efficiency of agriculture by providing safe cultivation of the farmer. According to survey conducted to WHO it is estimated that every year about 3 million workers are affected by poisoning of pesticides over large area in short intervals of time compare to conventional spraying by using automatic fertilizer sprayer. This device basically combination of spraying mechanism on a quad copter frame .This model is used to spray the pesticides content to the areas that cannot easily accessible by humans.

## BASIC PRINCIPLE

The 4 propellers of a drone or quadcopter are fixed and vertically orientated. Each propeller has a variable and independent speed which allows a full range of movements. The core components of a drone are as follows:

**Chassis:** The skeleton of the drone which all componentry is fixed to. The chassis design is a trade-off between strength (especially when additional weights such as cameras are attached) and additional weight, which will require longer propellers and stronger motors to lift.

**Propellers:** principally effect load the drone can carry the speed it can fly and the speed it can manoeuvre. The length can be modified; longer propellers can achieve greater lift at a lower rpm but take longer to speed up/slow down. Shorter propellers can change speed quicker and thus are more manoeuvrable; however they require a higher rotational speed to achieve the same power as longer blades. This causes excess motor strain and thus reduces motor life span. A more aggressive pitch will allow quicker movement but reduced hovering efficiency.



**Motors:**

1 per propeller, drone motors are rated in “kV” units which equates to the number of revolutions per minute it can achieve when a voltage of 1 volt is supplied to the motor with no load. A faster motor spin will give more flight power, but requires more power from the battery resulting in a decreased flight time.

**Electronic Speed Controller (ESC):**

provides a controlled current to each motor to produce the correct spin speed and direction.



**Flight Controller:** the onboard computer which interprets incoming signals sent from the pilot and sends corresponding inputs to the ESC to control the quadcopter.

**Radio Receiver:**

receives the control signals from the pilot.

**Battery:**

Generally lithium polymer batteries are used due to high power density and ability to recharge.

Further to this, sensors can be used such as accelerometers, gyroscopes, GPS and barometers for positional measurements. Cameras are also frequently mounted for navigation and aerial photography.

## ADVANTAGES

Unmanned Aerial Vehicle offers less stressful environment, it is used for better decision making, it presents safer environment, and they can fly longer hours as long as the vehicle allows for it (no human fatigue in the plane). There is no need for the qualified pilot to fly it, in the long run,

Unmanned Air Vehicle can stay in the air for up to 30 hours, doing the repetitive tasks, performing the precise, repetitive raster scan of the region, day-after-day, night-after-night in the complete darkness or in the fog and under computer control.

Unmanned Air Vehicle performs the geological survey, it performs the visual or thermal imaging of the region, it can measure the cell phone, radio or TV coverage over any terrain, the drone pilots or operators can easily hand off controls of the drone without any operational downtime.

The drones can have more pinpoint accuracy from greater distances.

## APPLICATIONS

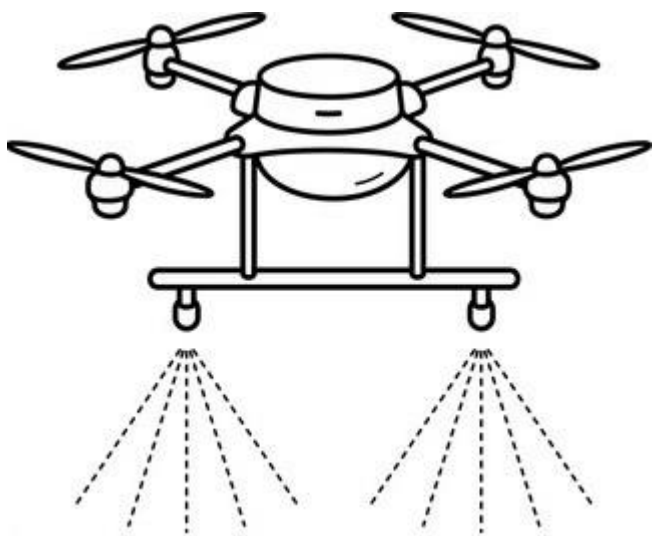
- Drone technology is useful for a variety of applications, such as scouting out new field locations
  - providing quick and easy ways to remotely check small sections of crops, and surveying entire fields.
  - The use of drones can help to increase productivity, permitting for improved agricultural adaptation to the effects of climate change; they can also assist in the reduction of pollution.
  - Drones have revolutionized agriculture by offering farmers major cost savings, enhanced efficiency, and more profitability. By quickly surveying vast stretches of farmland, drones can map the property, report on crop health, improve spraying accuracy, monitor livestock and irrigation systems, and more.
  - Drones are used in situations where manned flight is considered too risky or difficult. They provide troops with a 24-hour "eye in the sky", seven days a week.
  - Farmers and agriculturists are always looking for cheap and effective methods to regularly monitor their crops. The infrared sensors in drones can be tuned to detect crop health, enabling farmers to react and improve crop conditions locally, with inputs of fertilizer or insecticides. It also improves management and effectuates better yield of the crops. In the next few years, nearly 80% of the agricultural market will comprise of drones.
- Power and pipeline inspection: Many systems such as power lines, wind turbines, and pipelines can be checked by drones

## CONCLUSION

- The agricultural sector is of vital importance for the region. It is undergoing a process of transition to a market economy, with substantial changes in the social, legal, structural, productive and supply set-ups, as is the case with all other sectors of the economy.
- With drone technology, farmers can get aerial views of their crop fields, or even hone-in on a specific area, to collect data almost instantly about field conditions. ... Drones collect precise data that help farmers make long-term decisions about replanting, ground mapping, damage control and more.



Picture of Drone



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