USE OF DRONES IN AGRICULTURE

AN EYE IN THE SKY

Introduction:

Till 2050 world population will rise to 9 billion (approx) and we have to increase our production to 50% to feed the population. Right now more than 815 million peoples are hungry in world and more than half of them are in the Asia continent. Consequently in coming years food production requires boost up nearly of 70 to 80%. Use of drones is the latest technology which has been introduced and can help in achieving the aim. Drones also known as unmanned aerial vehicles (UAV) are generally remote controlled aircraft with no pilots on board. They fly over the fields at low altitude and capture whole data. They are the rapidly evolving & replacing satellites and aircrafts. They can capture high quality images at cheap prices which satellites cannot do. They generally run on battery or fuel. They are being used in various fields including military, agriculture, film industry, humanitarian relief etc. Drones have initiated a technological revolution in agriculture sector. They can gather large amount of spatial data. The use of drones in agriculture is rising in crop production, early warning, forestry, fisheries etc. They are so efficient that they can gather whole soil data without even touching the soil. Drones these days are equipped with modern technologies like navigation, controls, imaging, sensing etc. They are also being used for spraying of fertilizers and pesticides. However, with the advancement of technology they are also being used in whole production process from land preparation to harvesting. The market for agricultural drones is rising vastly and many companies have entered in this business. By 2050 market of UAV will rise upto $32.4billion. Parrot, Precision hawk, AGEagle, and Trimble are some of the major industries in this sector

Types of drones on basis of platform:

Generally two types of drones are available on platform basis:

1. Fixed wing
2. Rotatory wing

- Fixed wings are generally similar to airplanes and are used in spraying and photography purpose. They are greater in size than rotator winged.
- Rotary winged are classified further into helicopter and multi rotors. Helicopters UAV are used mostly in agriculture wheras multi rotors are used in extremely precisetasks, suchas pollen–moisturedistribution and precision control.

Utility of drones in agriculture:

1. Irrigation equipment monitoring:

Maintaining and survillencing irrigation pivots in large fields is a tedious task and requires large amount of labour. Mid season inspection of nozzles and sprinklers of equipments can be done by easily.

2. Forestry:

Drones are used to capture large numbers of images which are used to prepare orthomaps these maps are further used for analysis planning and management. These are also used in monitoring of illegalactivitiesandencroachment,treecanopyanalysis, conservation features, tracking native species, conducting an inventory of small forest areas.

3. Weed Eradication:

Drones using NDVI and multispectral imaging technology are used to gather data on the spread of weeds and their intensity in fields. Using spectral signatures of weeds common to that area are made available and are used to read drone images. These data are further sent to variable rate herbicide applicators.

4. Crop spraying and spot spraying:

We are well aware that crop require fertilization to maintain high yields. This process earlier was done by aeroplanes or manually which is very costly and labour intensive task. These days drones are equipped with reservoirs in which fertilizers, herbicides, pesticide are filled using drones for spraying is cost effective and is safer. Earlier if there is problem in certain piece of land entire acreage had to be sprayed which is costly and waste of time & resources also. Drones can be used effectively for the routes and areas which need to be sprayed.

5. Crop Mapping and Surveying:

One of the biggest advantages of using drone technology is the ease and effectiveness of large scale crop and acreage monitoring. With near infrared (NIR) drone sensors you can actually determine plant health based upon light absorption, giving you a birds-eye view of the overall farm health. You'll be able to collect information like:

* The overall crop and plant health
* Land distribution based on crop type
* Current crop life cycle
* Detailed GPS maps of current crop area

6. Real-Time Livestock Monitoring:

Drones equipped with thermal imaging sensors pilot can be use in management and monitoring of livestock. Pilots can easily see their herds if they are injured or missing and which are giving birth to new ones. Plus, thermal imaging will also help to keep an eye out for any livestock predators, which can be a huge advantage for the farm owners.

7. Seed planting:

Planting seed with the help of drone is the newer technology. In this context a company named as Droneseed is using UAV to deliver 57 pounds of pay load involving herbicide, seeds etc. Once this technology will get launched in market it will change whole scenario of agriculture.

Advantages of Agriculture Drones:

a. Drones equipped with thermal cameras which help in identifying wet and dry land patches which further helps in avoiding of wastage of food.

b. Drones come back to nhome just by presin g button.

c. Drones are equipped with geographic information system. It helps further in analyzing all types of spatial data which helps in mapping and increase yields.

d. Latest agriculture drones help in collecting data which helps in improving crop health.

Disadvantages of Agriculture Drones:

*Basic knowledge and technical skills are required to drive them.
*Drones are much costly to afford for small and marginal farmers.
*Most of drones available are having less fly time and other ones with high fly time are very costly and technical to drive.
*Other aircrafts may disturb them.
*Clearance certificate from government is required in driving of drones.
*In harsh environment condition it becomes difficult to fly them.

Career as an Agriculture Drone Pilot:

After becoming agriculture drone pilot one will be in front line for capturing farm, livestock & other valuable data and transferring this data into actionable form for farm production. One needs to get certified after learning how to fly drones and how to handle data from government recognized institute.
Once you get drone license one can earn money through following ways:

- One can work as consultant, can offer data on basis of land evaluation and can also guide about actions that farmer can take on basis of maps based on thermal and advanced imaging techniques.
- Providing drone system to farms for planting, spraying and regular crop management activities.
- One can also take contracts from farm ownerss for spraying or monitoring their farms to.
- One can also work as drone pilot for farms requiring drone pilot.
- One can create turf and outdoor maps for companies.

It is concluded that In future drones will be very helpful in nearly every agriculture work or process starting from seed planting, irrigation management to spraying of herbicides & pesticides to providing the data till harvesting of the crop. Scope of drones is very vast in agriculture sector. They are costly today but in long run they are very useful and with their increased use there are chances that Government may also provide some subsidy to farmers for buying them. After getting license to drive agriculture drones they may also help farmers in future in getting an additional source of income.

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