DRONE: A BOON FOR INDIAN FARMERS

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INTRODUCTION

The nation's economy is mostly based on agriculture. Around 40-45 % of population depends on agriculture for their livelihood. For most rural households, agriculture continues to be the primary source of income. With 4.18 % average growth rate agriculture contributed 18.2 % in the Indian GDP for the last economical session in which the largest section belongs to crop production. A significant amount of India's exports are agricultural products, which also have a significant impact on the country's economy. We are the 8th largest agricultural products exporter around the globe as per WTO report. As India is the second highest in terms of population across the globe it is the biggest challenge for us to be self-sufficient in food production for such a large population. The rising population in the nation is increasing the demand of food and other products. But even with agriculture's growing significance, the agriculture sector is still lagging behind in terms of technical development. Uncontrolled insect problems and crop loss brought on by unfavourable weather patterns have been the main causes of this situation. Furthermore, Indian farmers continue to rely on the monsoon rains for irrigation and employ traditional techniques for other aspects of farming. Hence, despite farmers' unwavering efforts, there are instances when the quantity and quality of agricultural production are damaged. This directs towards the need of mechanization in agriculture with maintaining the goals of sustainable agriculture. In this context drones become a revolutionary step in current scenario.

Dynamic Remotely Operated Navigation Equipment (DRONE), is a type of Unmanned Aerial Vehicle (UAV) that may be flown autonomously using GPS coordinates and autopilot on a preprogrammed path, or manually using radio signals with the help of a remote control or smartphone app. Drones can identify objects that are beyond of human visual range because to their abundance of sensors. Drones may therefore be used to gather real-time, more precise, dependable and impartial information with less mistakes and more detail. Drones are now employed in a wide range of industries, including disaster relief, law enforcement, military surveillance, cinematography, wedding films, railway track monitoring, wildlife monitoring, small parcel delivery, etc. Therefore, it is impossible to overlook drones' potential to play a significant role in the near future in sustainable agriculture. Farmers are currently dealing with a number of issues, such as the scarcity or high cost of labour, health issues resulting from field application of chemicals (pesticides, fertilizers), animal or bug bites, etc. In this situation, drones can assist farmers in avoiding these issues in addition to the advantages of being an environmentally friendly technology. These days, drones are being more widely used in sustainable agriculture and as a precision agricultural tool.

Applications of Drone in Agriculture:

Drones are being used in agriculture for various purposes some of them are listed below.

1. Agriculture drones can be used to examine the soil and field without going in the field. It can be used to analyze nutrient status, irrigation requirement, soil erosion etc. in larger area and fields at higher altitudes.
2. It is helpful in sowing or planting seed in the field.
3. It is also helpful in detecting insect-pest attack, lack of nutrient content in the crop and applying the pesticides, fungicides, fertilizers etc. precisely in the right amount at the right place where it is required.
4. It can detect weeds in the field and application of herbicide to the required area is more convenient with the help of drones.
5. Irrigation scheduling can be done properly with the help of drones.

Benefits of Drones:

Drones are beneficial for both human kind and the nature, as this is able to perform in a way that reduces the risk of health hazards to farmers as well as the risk of pollution and over consumption of natural sources.

1. Accurate soil and field analysis helps farmers in appropriate planning of the practices required for qualitative and higher crop production.

2. Drones are time and cost saving equipment as they save labour and time for different practices such as application of various chemicals viz., fertilizers, herbicides, pesticides, etc.
3. Drones help in production of good quality yield as it prohibits the overuse of chemicals in field as well as the required practice is done timely.
4. With the help of drones applying different chemicals in field the health hazards for farmers will decrease. The farmer will be less affected due to different toxic hazardous chemicals.
5. Drones applying the adequate amount of water and chemicals in the field increase the water and chemical use efficiency.
6. In lager areas where farmer cannot inspect the entire field drones help in identification of any problem to the crop even in a small patch.

7. As drones increase the efficiency of inputs used in field it directly helps in reducing pollution due to overuse of chemicals and machinery in conventional farming. It helps in sustainable agriculture practices by reducing the higher use of fuel in traditional machinery.

Limitations of Drones in Agriculture:

Drones being the revolutionary machinery in agriculture have various benefits and applications in agriculture. But as all other aspects it also has some limitations that are still to be resolve.

1. Drones being a modern machinery require skills to be operated. As each Indian farmer is not well educated with the use of modern machinery it is a barrier in use of drones for all the landholding.
2. Most of the landholding in India is operated by small and marginal farmers and they could not afford drones as it is a costly machine.
3. Drones are beneficial for analysis of larger field but in India most of the farmers operate small landholding so they do not feel the need of drones.
4. Drones require clear and sunny weather these cannot be used in rainy and windy conditions.
5. Drones need to be operated with remote control or mobile apps but in India still there are some smaller villages that do not have proper internet connections.

Initiatives by GoI:

As we know drones have so many benefits in promoting sustainable agriculture as well as higher yield but there are also some limitations in its applications by the Indian farmer. To deal with the limitations and to promote the use of agricultural drones' government of India has brought many initiatives on various occasions. Some of the initiatives are described below:

1. Government of India provides subsidies under the scheme SMAM (Sub-Mission on Agricultural Mechanization) to purchase drones at different rates to farmers, Custom Hiring Centres (CHCs),

Farmer Producer Organizations (FPOs), ICAR Institutes, State Universities etc. to provide training and availing drone facility to the farmers who solely cannot afford drones.

2. The government conduct different programme frequently to provide demonstration of uses of drones in agriculture for application of fertilizers, herbicides, etc. for the farmers belonging to small areas or villages.
3. To promote application of drones in agriculture the government introduced SVAMITVA Scheme under which all the properties of villages were mapped by drones digitally and for the first time the records of villager's property were given to them digitally.
4. To embrace the role of women in agriculture and promoting the use of agricultural drones Prime Minister Narendra Modi launched Namo Drone Didi Scheme. Under this scheme one member from a women self-help group will be trained to fly agricultural drones and financial supports will be provided to these self-help groups for purchase and maintenance of agricultural drones. These self-help groups will be eligible for providing rental services of agricultural drones to farmers. This scheme work in two aspects making women self-help groups more stronger as well as promoting the use of agricultural drones on rental basis to help the small and marginal farmers.

CONCLUSION

Drone is a boon for Indian farmers as it saves their labour cost and time, enhance precise and adequate use of fertilizers, herbicides, pesticides etc., protecting farmers from the toxic chemicals, as well as enhancing the quality and yield of their produce. Agriculture drones can be the future for Indian agriculture, it can help government in achieving the goals of sustainable development. At present circumstances higher food grain production is the main demand of the nation but for that exploitation of natural resources can not be done. The only way is to focus on sustainable agriculture that includes higher and qualitative production with the protection of natural resources for future generation also. Drones are beneficial in obtaining higher yield under the sustainable conditions although it has some limitations for the Indian agriculture but government's initiatives are not only promoting its uses in agriculture but also helping the rural economy some extra income with different practices.

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