



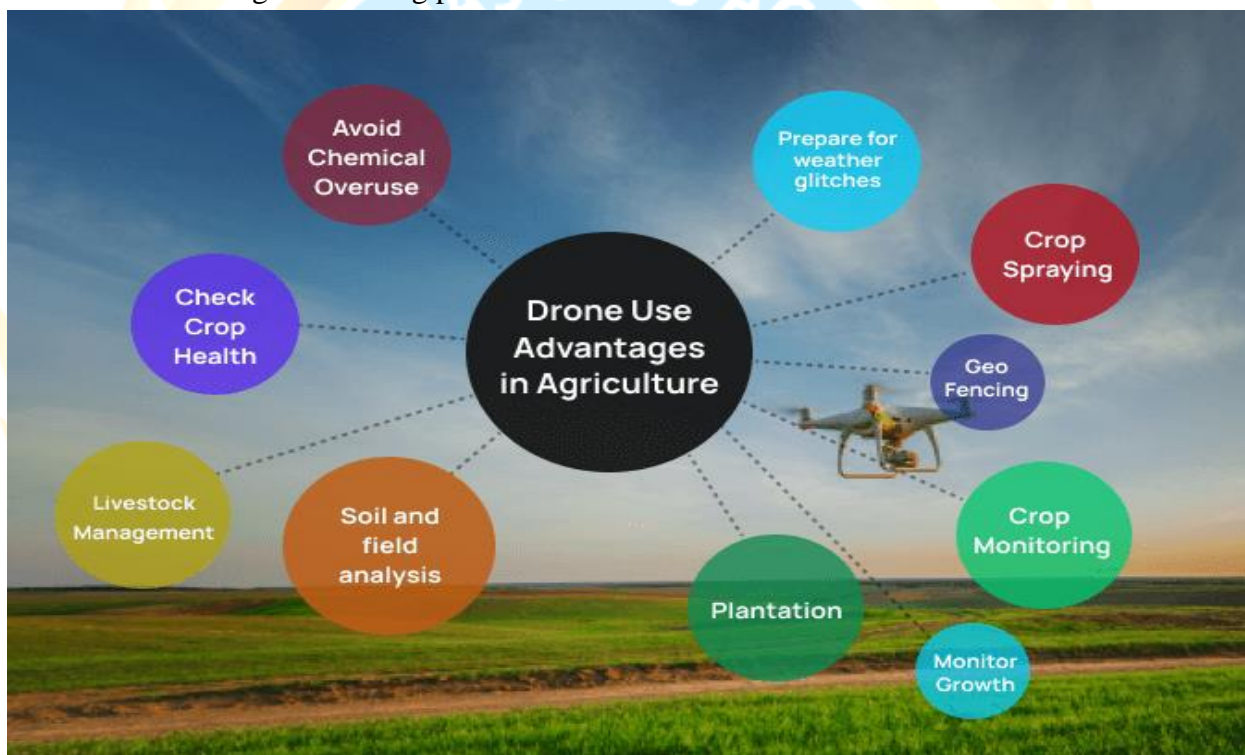
DRONES IN AGRICULTURE - GS III MAINS

Q. The agri-drone technology is proving to be a real breakthrough in modernising and transforming our farming practices. Critically analyse (15 marks, 250 words)

News: *The drone moment of Indian agriculture*

What's in the news?

- The agri-drone technology is proving to be a real breakthrough in modernising and transforming our farming practices.



Significance of Drone Technology in Agriculture Sector:

- Agriculture drones efficiently study external factors like **weather, soil conditions, and temperature** and empowers the farmer to make mindful choices accordingly.
- The gained data **helps regulate crop health, crop treatment, crop scouting, irrigation, and carry out field soil analysis and crop damage assessments.**
- The drone survey helps boost crop yields and minimize time and expenses.



Applications of Drone in Agriculture:

1. Mapping/Surveying:

- The process of using a drone to map or survey crops is a relatively efficient way to gather exact information in a precise manner.
- It can be used for **better land use planning** depending upon the terrain of the area, which will increase productivity and efficiency of agriculture.

2. Crop Dusting/Spraying:

- Use of drones in spraying and dusting crops helps **reduce costs and potential pesticide exposure to workers** who would have needed to spray those crops manually.

3. Irrigation Monitoring:

- Drone survey helps improve water efficiency and disclose potential pooling/leaks in irrigation by providing irrigation monitoring yields.

4. Crop Health Monitoring and Surveillance:

- Agriculture drones can see which plants reflect different amounts of green light and Near-infrared spectroscopy (NIRS) light. This data helps **produce multispectral images to track crop health.**

5. Field Soil Analysis:

- The drone survey allows seizing soil data, field soil analysis, irrigation, and nitrogen-level management which permits farmers to analyse their soil conditions thoroughly.

6. Locusts Attacks:

- The drones can be used for spraying of insecticides in the areas affected by locusts. Recently, the Maharashtra government decided to use drones to spray insecticides on swarms of locusts.

7. Helps in Digitalisation of Land Records:

- It can be used for mapping of farm lands to establish ownership that will **reduce ownership dispute and enable access to credit.**

8. Transportation of food produces:

- Farmers can use drones to transport their produce like **fruits, vegetables and flowers to markets in a minimal time**, hence boosting their income.

9. Aid new-age farming:

- Kisan drones will provide modern farming facilities in the 21st century, and will prove to be a milestone in the development of the drone sector in India.

10. Greater safety of farmers:

- It is safer and more convenient for farmers to use drones to spray pesticides in terrains challenging to reach, infected areas, taller crops, and power lines.



- It also helps farmers prevent spraying the crops, which leads to **less pollution and chemicals in the soil.**

11. Useful for Insurance claims:

- Farmers use the data captured through drones to claim crop insurance in case of any damages. They even calculate risks/losses associated with the land while being insured.
- Agricultural insurance sectors use Agri-drones for efficient and trustworthy data. They capture the damages that have occurred for the right estimation of monetary payback to the farmers.

Challenges:

1. Knowledge and Skill:

- An average farmer cannot analyse drone functioning as it requires specialized skills and knowledge to translate it to any useful information.

2. Flight Time and Range:

- Due to relatively higher payloads, the flight duration of drones used in agriculture is short which results in limited coverage of land.

3. High Cost:

- Mostly, agricultural drones are costlier as it includes the cost of imaging sensors, software, hardware and tools.

4. National Laws:

- Multiple laws governing drone use in India creates ambiguity besides affecting the production and use of drones.
- The requirement of obtaining an unmanned aircraft operator's permit (UAOP) for piloting drones, Permission for each flight through Online Digital Sky platform for No Permission No Take off (NPNT) compliance limits use of drones in agriculture.

5. Connectivity:

- Farmers intending to use drones have to invest in connectivity or buy a drone with local data storing capability in a format that can be transferred and processed later.

6. Weather Dependent:

- Drones are weather dependent. Under windy or rainy conditions, flying drones is not easy, unlike traditional aircrafts.

7. Misuse:

- There is a chance of misuse to infringe the privacy of people and illegal transfer of information.



Government Initiatives:

1. Kisan drones:

- The Union Budget 2022-23 announced a special push for Kisan (farmer) drones.
 - The budget also aimed to create public-private partnerships for high-tech farm services.
2. Government brought out **Drone rules 2021** to regulate the use and operation of Drones in India.
 3. Government issued **Standard Operating Procedure (SOP)** for application of pesticides, and other inputs.
 4. The guidelines of **Sub-Mission on Agricultural Mechanization (SMAM)** have been amended.
 5. To provide a **grant up to 100% of the cost of agriculture drone or Rs.10 lakhs**, whichever is less.
 6. Graduates establishing **Custom Hiring Centre (CHC)** will be eligible for subsidy up to 50% of the cost of drone and associated equipment up to Rs 5 lakhs.
 7. Drone purchase by existing Custom Hiring Centers which are set up by Cooperative Society of Farmers, FPO and Rural entrepreneurs, 40% of the basic cost of drone and its attachments or Rs. 4 lakhs, whichever less would be available as financial assistance.
 8. The **FPOs** would be eligible to receive a subsidy of 75% of the cost of the drone if used only for demonstration purposes.
 9. Government also launched the **PLI scheme** for drone and drone components, which will promote investment in drone manufacturing and creation better drone ecosystem in India.

WAY FORWARD:

- Encourage **Start-ups** to establish local drone manufacturing/assembling units for agriculture use.
- Develop a comprehensive legal and policy framework in the form of **Civil Aviation Requirements (CAR 3.0)** to encourage applications of drones in agriculture.
- Expedite **Digital sky platform** with its revision for pragmatic and practical implementation for enhanced drone usage.
- **Capacity development** for flying drones is required as it is a skill-based operation.
- Develop an enabling ecosystem with a **single-window concept for entrepreneurs**.
- **Encourage Research** in drone applications to study various operating parameters in agriculture.