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Kisan Drones: A boon to Agriculture sector

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Kisan Drone is an initiative by the Indian government to utilize drones in the agricultural sector, particularly to benefit farmers. The term "Kisan" means "farmer" in Hindi. Kisan Drone is an innovative agricultural drone designed for precision farming in India. It aims to increase crop yields and reduce costs for farmers.

Source: Drone Didi spraying the fertilizers using drone at KVK-II, Sitapur, U.P.

The main objectives of Kisan Drone are:

- **Crop monitoring and health assessment:** Drones equipped with cameras and sensors capture images and data to analyze crop health, growth stages, and detect issues like pests, diseases, or water stress.

- **Spraying and dispensing:** Drones can spray fertilizers, pesticides, and seeds, reducing labor and increasing efficiency.
- **Soil analysis:** Drones can collect soil samples and analyze them to provide insights on nutrient content, moisture levels, and other parameters.
- **Precision farming:** Kisan Drones enable precise application of inputs, reducing waste and promoting sustainable practices.

Kisan Drone technology in agriculture, also known as precision agriculture, involves using unmanned aerial vehicles (UAVs) to enhance crop management, monitoring, and harvesting. Benefits include:

Figure 1. Benefits of drones in Agriculture

- **Crop monitoring**: Regularly inspecting crops to detect issues like pests, diseases, and nutrient deficiencies.
- **Precision irrigation**: Optimizing water application based on soil moisture levels and crop needs.
- **Fertilizer and pesticide application**: Targeted distribution to reduce waste and environmental impact.
- **Yield prediction**: Analyzing data to estimate crop yields and optimize harvesting.
- **Soil analysis**: Assessing soil health, temperature, and moisture levels.
- **Planting and seeding**: Autonomous planting and seeding systems.
- **Livestock monitoring**: Tracking animal health, behavior, and grazing patterns.
- **Field mapping:** Creating detailed maps for planning and management.

Drones equipped with various sensors and cameras capture data, which is then analyzed to provide insights for informed decision-making.

Types of agricultural drones:

1. Fixed-wing drones: Efficient for large-area coverage.
2. Rotary-wing drones: Suitable for smaller areas and more maneuverable.
3. Hybrid drones: Combine fixed-wing and rotary-wing features.

Kisan Drone offers several advantages to farmers and the agricultural sector:

1. Precision Farming: Enables precise monitoring, spraying, and soil analysis, reducing waste and improving crop yields.
2. Increased Efficiency: Saves time and labor by automating tasks, allowing farmers to focus on other critical aspects of farming.
3. Cost-Effective: Reduces costs associated with traditional farming methods, such as fuel, labor, and inputs.
4. Enhanced Decision-Making: Provides valuable insights through data analysis, enabling informed decisions on crop management.

5. Environmental Benefits: Minimizes chemical usage, reduces water consumption, and promotes sustainable farming practices.
6. Scalability: Suitable for small and large farms, making it an accessible solution for farmers of all scales.
7. Government Support: Eligible for subsidies and support under various government schemes, making it more affordable for farmers.
8. Easy to Operate: User-friendly design and training programs ensure that farmers can operate the drone with ease.
9. Data-Driven Insights: Offers valuable data and insights to improve farming practices, crop selection, and yield optimization.
10. Empowerment: Empowers farmers with technology, improving their livelihoods and contributing to agricultural growth.

Challenges and limitations: Kisan Drone faces challenges and limitations in the agriculture field:

1. **High Initial Cost**: The drone and its accessories can be expensive, making it inaccessible to small-scale farmers.
2. **Training and Technical Expertise:** Farmers may require training to operate and maintain the drone, which can be time-consuming and costly.
3. **Regulatory Framework:** Lack of clear regulations and guidelines for drone usage in agriculture can hinder adoption.
4. **Weather Conditions:** Inclement weather like strong winds, heavy rainfall, or extreme temperatures can affect drone performance.
5. **Limited Battery Life:** Drones require frequent recharging, restricting continuous operation.
6. **Data Interpretation:** Farmers may need expertise to interpret and utilize the data collected by the drone.

7. **Connectivity Issues:** Rural areas with poor internet connectivity can hinder data transfer and analysis.
8. **Maintenance and Repair:** Drone maintenance and repair can be challenging, especially in rural areas.
9. **Scalability:** Limited scalability for large-scale farming operations.
10. **Public Acceptance:** Potential privacy concerns and public acceptance issues.
11. **Integration with Existing Systems:** Integration with existing farming practices and equipment can be challenging.
12. **Data Security:** Ensuring data security and protecting sensitive farm data.

Conclusion: The influence of technology on the Indian agricultural sector has been invariably positive for achieving food security and addressing the farm issues. Drones have proven to be among the most promising technologies and emerged as essential tools for farmers for various applications like monitoring the crops and entire field and also to address multiple challenges in agricultural sector. The drone technology has potential to transform the ways the routine manual activities are carried out in agriculture. It will definitely help in optimizing the inputs and reduce the wastage besides boosting crop yields and minimizing time and expenses. Revolutionizing the farming sector through need based, precise and focused application of crop inputs that will directly enhance the input-use efficiency and farmers' safety whilst simultaneously lowering the overall cost and increasing the income of the farmers. The farmers are facing many problems like unavailability or high cost of labourers, health problems by coming in contact with pesticides while applying them in the field.

References:

Natu, A.S. and Kulkarni, S.C., 2016. Adoption and utilization of drones for advanced precision farming: A review. International Journal on Recent and Innovation Trends in Computing and Communication, 4(5), 563-565.

Sylvester, G. (2018). E-agriculture in action: Drones for agriculture. Published by Food and Agriculture Organization of the United Nations and International Tele-communication Union, Bangkok.

Zhang, C. and Kovacs, J.M., 2012. The application of small unmanned aerial systems for precision agriculture: a review. Precision Agriculture, 13(6), 693-712.
https://www.researchgate.net/publication/363172846_Role_of_Information_and_Communication_Technology_ICT_in_Agriculture