

AGRICULTURE FORUM FOR TECHNICAL EDUCATION OF FARMING SOCIETY

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Precision Horticulture for Higher Productivity

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INTRODUCTION

Precision horticulture is an advanced crop management approach that uses modern technologies such as sensors, GPS, drones, remote sensing, and artificial intelligence to monitor and manage horticultural crops precisely. The objective is to supply the right input (water, nutrients, pesticides) at the right place, time, and quantity to maximize crop productivity and resource-use efficiency.

Horticultural crops such as fruits, vegetables, and flowers require intensive management and high-value inputs. Precision horticulture helps farmers monitor crop conditions in real time and take timely decisions to improve yield, quality, and sustainability.



2. Key Components of Precision Horticulture

a) Remote Sensing and Drones

Drones and satellite imagery are used to monitor crop growth, plant health, and stress conditions in orchards. Multispectral cameras can detect nutrient deficiencies, pest infestations, and water stress before symptoms appear. This allows early intervention and reduces crop losses.

Benefits:

- Early detection of pests and diseases
- Mapping of orchard variability
- Efficient pesticide and fertilizer application
- Improved crop monitoring



b) Soil and Plant Sensors

Sensors placed in soil or on plants continuously measure soil moisture, temperature, nutrient levels, and crop growth parameters. These sensors provide real-time data to farmers and automate irrigation and fertigation systems.

Benefits:

- Accurate irrigation scheduling
- Reduced water wastage
- Better nutrient management
- Improved plant growth and yield



c) Precision Irrigation and Fertigation

Precision irrigation systems such as drip irrigation combined with automated fertigation supply water and nutrients directly to the root zone based on crop requirement. This improves water use efficiency and nutrient uptake.

Advantages:

- Higher water use efficiency
- Reduced fertilizer losses
- Uniform crop growth
- Increased productivity



3. Advantages of Precision Horticulture

- Increased crop productivity and fruit quality
- Efficient use of water, fertilizers, and pesticides
- Reduced production costs
- Early detection of crop stress
- Environmentally sustainable farming
- Improved decision-making using real-time data

4. Applications in Horticultural Crops

Precision horticulture is widely used in:

- **Fruit orchards:** Mango, citrus, apple, grapes
- **Vegetable crops:** Tomato, cucumber, capsicum
- **Protected cultivation:** Greenhouses and polyhouses
- **High-density planting systems**

These technologies help manage spatial variability in orchards and maintain optimum growing conditions for high yields.

CONCLUSION

Precision horticulture is transforming modern fruit and vegetable production by integrating digital technologies with crop management. By monitoring crops continuously and applying inputs precisely, farmers can increase productivity, improve quality, and ensure sustainable horticulture. Adoption of these technologies is essential to meet the growing demand for food while conserving natural resources.