

REMOTE SENSING AND ITS IMPORTANT ROLE IN HORTICULTURE

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As we all know, Horticulture plays an important role in our day-to-day life, which includes crops like fruits, vegetables, medicinal plant, aromatic plants, spices and plantation crops, which leads to us, to our morning tea to clothes and includes all our meals. Due to increasing population and increasing demand, we need more food to feed our population. But due to deficiency of moisture, nutrients or less labour, we are unable to get an excess to these products, which all lead to the more retail price, which a lower-middle-class family cannot afford. So to meet the demand of the population, High-tech farming is a prominent solution. Remote Sensing with other advanced techniques such as Global Positioning System(GPS) and Geographical Information System (GIS). These techniques are playing a major role in the assessment and management of horticultural activities. Accomplished planning along with the advanced technologies for the crops need the application of agricultural meteorology. Agricultural weather and climate data system are essential to accelerate the generation of products, analyses and forecasts that act on horticultural cropping and management verdict, irrigation scheduling, commodity trading and marketing (Saxena, *et al.*,2017).

Remote Sensing

It is a process of obtaining information and monitoring about an object, area, and the environment through the analysis of data acquired by a device without being in physical contact or direct touch.

It involves the collecting and storing of spatial data of the environment without physical contact with the object by using EMW (Electromagnetic waves).

- The ability to collect information over large spatial areas.
- The record is unprejudiced one which is stored permanently.

- It allows for the collection of data over a variety of scales and resolutions,
- It can be used for crop identification, crop area, biomass and yield estimation.

Geographic Information System (GIS)

It is defined as a powerful set of computerbased tools for collecting, storing, retrieving, transforming, and displaying spatial data from the real world for the particular set of purpose or information.

It involves data gathering, data collecting, data processing, data modelling and visualization in a digital environment.

- Crop mapping and yield estimation.
- Erosion identification and remediation.

Global Positioning System (GPS)

GPS is a network of satellites, they continuously transmit coded information, which makes it possible precisely identify location on earth by measuring distancing from a satellite.

Determination of position by satellite in digital form.

- Relatively low-cost system, with no user charges.
- Available to users anywhere on the globe.

Types of Remote Sensing

1. **Active Remote Sensing:** Active Remote Sensing has its own source of energy for illumination. It emits energy in order to scan objects and areas to collect the data.

2. **Passive Remote Sensing:** Passive Remote Sensing has to depend on other sources of energy like Sun, to detect the naturally reflected or emitted EMR (Electromagnetic radiation). When the sun shines, Passive sensor measure this energy and then tend to collect information.

Applications of Remote Sensing in Horticulture

The first event of using remote sensing technique in India was documented during coconut wilting in 1970.

1. Crop Classification:

The multispectral image of Remote sensing system plays an important role to determine the difference between different horticulture crops (like grasses, herbs, shrubs, trees and climbers) or whether it is a flourishing plant or an infected unhealthy plant/weed (Dakshinamurti *et al.*, 1971).

2. Crop Insurance:

Due to excess pollution and global warming, we never know how and when the climate will show its destructive effect. But now we can know prior, about weather conditions and take safety measures accordingly with the help of remote sensing.

3. Crop Area Estimation:

It helps to get the estimation of a particular crop cultivated in an area to support crop forecasting system at a regional level. Horticultural crops usually face fluctuation both in its production and consumption (Nageswara Rao, *et al.* 2004). That's why genuine statistics concerning the area and production of horticulture crops is necessary for market planning and its export.

4. Yield Monitoring System:

Remote sensing is an important tool to estimate the yield of all seasonal and non-seasonal crops annually. It also helps us to know that production is enough to meet the needs and demands of the population.

5. Detecting Pest and Disease:

Pest and Disease both responsible for the damage of crops and hence, affects the economic importance of horticulture crops. It has been demonstrated that remote sensing helps to identify the pest and disease and its damage stage (Usha *et al.*, 2013).

6. Monitoring Abiotic Stress:

Remote sensing also helps to detect abiotic stresses like drought, flooding, salinity, temperature fluctuations etc. with its feature of hyperspectral and multispectral imaging.

7. Soil Moisture:

Due to the advanced technology of Multispectral Photography and FTIR Spectroscopy, we are also able to detect the amount of moisture content present in a soil and water table.

8. Crop Stands:

Remote sensing helps in the identification and establishment of good crop stand to get maximum and uniform seedling and production.

9. Crop Canopy Measurement:

Remote sensing also makes us easy to measure and maintain the canopy of a crop. So that we can apply an accurate amount of fertilizer, pesticide and any other chemical.

10. Soil Property Sensing:

To know the qualities and deficiencies of soil moisture, soil nutrients soil texture and soil structure.

Conclusion

Remote sensing and other geo-informatics technologies are an advanced technique used for precision and high-tech farming these days. It helps to know the accurate condition of a crop and with what all stresses our crops are going through. Remote sensing plays an important role in the forecasting and predicting of drought, flood or any other natural calamities and also includes biotic stress like disease and pest. And how and when fertilizers and pesticides should be applied and at what ratio and amount should be applied to control and manage the situation. Remote sensing has solved most of our problems like collecting data, storing and analyzing etc. It also makes us easy to maintain a record and form a statistical report of all-season crops.

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