



Session on Precision Agriculture

Why in News

Recently, a session on “**Sensors and Sensing for Precision Agriculture**” was organised by the [Indian Council of Agricultural Research-Indian Agricultural Research Institute](#) (ICAR-IARI).

Precision Agriculture

- Precision agriculture (PA) is an **approach where inputs are utilised in precise amounts to get increased average yields**, compared to traditional cultivation techniques such as [agroforestry](#), [intercropping](#), crop rotation, etc.
- Sustainable PA is this century’s most valuable innovation in farm management that is based on using **Information and Communication Technologies** (ICTs).
- It is **based on sustainable agriculture and healthy food production** and it consists of profitability and increasing production, economic efficiency and the reduction of side effects on the environment.
- **Benefits:**
 - Increases agriculture productivity.
 - Prevents soil degradation.
 - Reduces chemical application in crop production.
 - Efficient use of water resources.
 - Disseminates modern farm practices to improve the quality, quantity and reduced cost of production.
 - Changes the socio-economic status of farmers.
- **Challenges:**
 - Research suggests **educational and economic challenges** as the two most important in the application of precision agriculture.
 - Among the **variables that contribute to educational challenges**, lack of local experts, funds, knowledgeable research and extension personnel have more of an impact compared to others.
 - PA and initial costs have more of an impact among the **economic challenges** compared to the other issues.

Key Points

- **Discussions at the Session:** Recent **advances in the field of sensors**, [remote sensing](#), **deep learning**, [artificial intelligence](#) and [Internet of Things](#) (IoT) **for monitoring and quantification** of soil, plant and environment to enhance farm productivity with increased input use efficiency and environmental [sustainability](#).
- **Part of VAIBHAV Summit:** The session is a part of the [Vaishwik Bhartiya Vaigyanik \(VAIBHAV\) Summit 2020](#).

- VAIBHAV is a **Government of India initiative** to bring together the thought process, practices, research and development (R&D) culture of overseas and Indian scientists/academicians.

▪ **Research Gaps Identified:**

- **Development of indigenous low-cost sensors** with integrated platforms, robotics, IoT for high throughput field phenotyping and soil and crop health monitoring and management.
 - **Phenotyping is the process** of determining, analysing or predicting all or part of an organism's phenotype (observable physical properties of an organism).
- **Big data analytics and modelling** for sensor-based early detection of stresses, discrimination in the agriculture sector.
- **Standardized protocols for [Unmanned Aerial Vehicle](#) (UAV)** based imaging using different sensors, inter sensor calibration and data analytics for near real-time crop condition monitoring and management.
- **Development of affordable scale neutral precision agricultural technologies** suitable to the ecosystem of Indian agriculture.
 - Scale neutrality means, if other things remain the same, one small plot of land gives the same proportion of output as a large land holding.

Way Forward

- Keeping in view the research gaps, a specific objective-driven collaboration needs to be proposed.
- More R&D in the field and on the concept is needed. For that, collaborations with global universities can be done for further excelling in education and research and capacity building.

Source: PIB

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