



Session on Precision Agriculture

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Why in News

Recently, a session on “**Sensors and Sensing for Precision Agriculture**” was organised by the (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