



ADVANCES IN AGRICULTURE TECHNOLOGY

प्रविष्टि तिथि: 11 AUG 2026 4:37PM by PIB Delhi

Advancements in agricultural technology have significantly transformed the agriculture sector by enhancing productivity, improving resource-use efficiency, reducing the cost of cultivation, minimizing labour drudgery and promoting climate-resilient farming practices. Modern technologies such as improved farm machinery, precision agriculture, drones, Artificial Intelligence (AI), Internet of Things (IoT), robotics, sensors, remote sensing, Geographic Information Systems (GIS), satellite-based applications, automation and digital technologies are increasingly integrated into agricultural operations.

The Department of Agriculture & Farmers Welfare is promoting agricultural mechanization through the Sub-Mission on Agricultural Mechanization (SMAM), which is being implemented as a component of the Centrally Sponsored Scheme "Rashtriya Krishi Vikas Yojana (RKVY)". Financial assistance is provided to farmers for the purchase of agricultural machinery and equipment, establishment of Custom Hiring Centres (CHCs), High-Tech Hubs, Farm Machinery Banks (FMBs) and for demonstration, training, testing and capacity building relating to agricultural mechanization. These interventions enable small and marginal farmers to access modern farm machinery at affordable rates.

The Department is also promoting the use of agricultural drones by providing financial assistance for drone procurement and demonstrations under the SMAM. Drone technology is being utilized for pesticide and nutrient application and generation of digital agricultural data thereby improving efficiency and reducing input costs.

To promote precision agriculture and digital technologies, the Department is implementing the Digital Agriculture Mission under which digital public infrastructure, technology-based farmer-centric services and data-driven decision support systems are being deployed for improving agricultural planning and delivery of services. The Farmer Registry created under AgriStack is designed to serve as a foundational database for the efficient, transparent and targeted delivery of agricultural services and benefits. It is envisaged to facilitate integration with various farmer-centric schemes and digital platforms, including PM-KISAN, the Jan Samarth platform for Kisan Credit Card (KCC) loans, and MSP-based crop procurement systems. As on 06.08.2026, a total of more than 10.33 crore farmers IDs have been generated. Further, the Digital Crop Survey, i.e., survey to digitally capture crops being grown on every farmland in the country with photos and geo-tags, has enabled plot-level visibility of crops and better estimation of areas sown across seasons, which in turn supports evidence-based planning for production estimation, procurement, input supply and logistics management. In Kharif 2025, the Digital Crop Survey (DCS) has been conducted in 604 Districts covering more than 28.5 crores plots. BharatVistaar (Virtually Integrated System to Access Agricultural Resources) is a multilingual Artificial Intelligence (AI)-powered Digital Public Infrastructure (DPI) for Agriculture. The platform provides farmers with AI-enabled, real-time and location-specific agricultural advisories and access to Government schemes and agricultural support services. To date, the platform has served over 5.9 lakh farmers and addressed more than 93 lakh farmer queries.

Research, design, development, testing and refinement of agricultural machinery are undertaken through the Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs) and other research organizations. These institutions have developed location-specific and crop-specific machinery suitable for diverse agro-climatic conditions and varying farm sizes.

Mechanization of harvesting in horticultural crops is being promoted through the development and dissemination of crop-specific harvesting technologies suitable for diverse horticultural crops, taking into account variations in crop characteristics, plant architecture, fruit maturity, farm sizes and the need to minimize mechanical damage while maintaining produce quality. Under the Mission for Integrated Development of Horticulture (MIDH), financial assistance is provided to States/UTs for the adoption of improved horticultural tools, implements and machinery including equipment required for horticultural operations. In addition, the Indian Council of Agricultural Research (ICAR) and its institutes undertake research and development to develop, refine and evaluate appropriate mechanization technologies for horticultural crops, which are disseminated to farmers through demonstrations, training and extension programmes.

Agriculture has increasingly evolved into a multidisciplinary field involving agricultural, mechanical, electrical, electronics, automation, instrumentation, computer and data science engineers. Integration of engineering, computing, robotics, Machine Learning, AI, IoT, Global Navigation Satellite System (GNSS), GIS, remote sensing and data analytics has accelerated the development of intelligent farm machinery, autonomous equipment, precision farming systems, protected cultivation technologies and smart farm management solutions.

The Government continues to promote innovation, research, technology development, skill development, entrepreneurship and adoption of modern agricultural technologies through its various schemes and programmes so as to enhance productivity, improve resource-use efficiency, strengthen sustainability, and make Indian agriculture more resilient and competitive.

This information was given by the Minister of State for Agriculture and Farmers Welfare **SHRI RAMNATH THAKUR** in a written reply in Lok Sabha today.

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