Smart Farming and Agritech Education: Teaching Students to Bridge Traditional Farming with Modern Innovation

Dr. Kannan. V
Dy. Dean, School of Agriculture, Mohan Babu University

Agriculture has been the backbone of many human civilization and economies across centuries. Until 19th century farmers practised traditional farming techniques to produce crops with limited resources. Across the world during mid-19th century's scientist and farmers participated in the green revolution to increase the crop productivity to meet out the growing population by using new short duration varieties and excess application of fertilizers, which in turn increases the yield but increased application of pesticides and fertilizers degraded the cultivable land and cause more environmental pollutions. Adoption of traditional farming practices and green revolution techniques increased the input cost like labours, seeds, pesticides and fertilizers.

However the rapid growth of global population, shrinking land resources, climate unpredictability, soil degradation, and the increasing need for sustainable food production have placed enormous pressure on traditional farming practices. Agriculture stands at a critical crossroads as a global population

grows exponentially and climate pressures intensify, the sector must radically enhance its productivity and sustainability.

Smart farming refers to the application of advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), deep learning and machine learning, image processing, sensors, robotics, drones, big data analytics, and precision agriculture tools to improve the efficiency, productivity, and sustainability of farming operations. These technologies are used to enhance the crop productivity by providing deeper insights into soil health, weather patterns, crop water requirement, pest and disease behaviour, and resource management.

For example, earlier farmers relied on experience to determine the irrigation schedule now can use soil moisture sensors and automated drip/sprinkler irrigation systems to deliver water precisely based on the crop needs and its growth cycle. This advanced technology not only increases yields but also conserves valuable resources reduces environmental impact. like human's agriculture practices and techniques also evolved parallelly, In this evolving landscape, smart farming and agri education have emerged as transformative forces. By integrating age-old wisdom with modern technology, educational institutions are now preparing students to become the next generation of innovators capable of revolutionizing agriculture.

Recognizing the need of the technological interventions needed in the smart farming, the Indian Council of Agricultural Research (ICAR)

https://doi.org/10.52151/aet2026502.1938

has also updated its agricultural curriculum to equip the students receive the knowledge and skill sets to cater the needs of future smart farming. NAHEP is the major initiative taken by the ICAR (National Agricultural Higher Education Project) with world bank funding to modernize the Indian Agricultural Education. Through NAHEP it developed the Climate Smart Agriculture and Water Management (CAAST-CSAWM) at Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, they provide training to faculty and students on Drone technology, IoT-based sensor technology, Geo-informatics and data analysis.

Students learn to use digital tools, analyze field data, program automated systems, and apply scientific reasoning to solve farm-level challenges. By combining theoretical knowledge with hands-on training, these educational programs ensure that students not only understand how to operate technological tools but also appreciate the cultural and ecological importance of traditional practices. Students trained in smart farming can serve as intermediaries, helping local farmers understand and apply modern solutions without disrupting cultural or ecological practices. When young agricultural graduates work closely with rural communities, they become catalysts for change, promoting sustainability, profitability, and resilience.

State and central governments along with many agricultural universities now encourages innovation hubs and and agribusiness incubation centres at their campus they regularly conduct start up competitions where young minds can experiment, conduct trials, and develop prototypes that can later be commercialized for farmer benefit. These centres supports the selected teams through continuous mentorships and funding through government and angel investors.

Additionally, the integration of smart farming in education creates a wide range of entrepreneurial opportunities. Students can develop start-ups focused on smart and precision farming equipment, mobile-based advisory services, climate-smart innovations, agribots, or supply-chain optimization platforms. This not only addresses real-world agricultural challenges but also contributes to rural employment and economic growth.

In conclusion, India is transforming its agricultural educational system with the aim of producing a new generation of young professionals who are able to lead the sustainable and productive smart agriculture sector. This is achieved through sustained efforts aimed at making technology more affordable and ensuring that small-scale farmers are also able to access agricultural innovations.