Digital Farming in India

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India is the world's top producer of pulses, paddy, wheat, and wheat, respectively. The National Agricultural Research System (NARS), which includes the Indian Council of Agricultural Research (ICAR) institutes and state agricultural universities, is one of the largest agricultural research systems in the world. Agriculture in India employs over 42 percent of the labour force (2019), contributes 19.9 percent of the Gross Domestic Product (GDP) (2020–21), and provides food security for about 1.3 billion people. Hence, technology and the digitalization of agriculture here play a role as catalysts to improve and increase production.

Prime Minister Narendra Modi launched Digital India on 1 July 2015 to empower rural communities and create digital infrastructure in villages, his initiative enabled digital delivery of services and promoted digital literacy across the country. 68 percent of the country's population lives in villages and agriculture is the main source of livelihood for 58 percent of the population, hence it is very important to pay attention to the role of digital agriculture in India.

Digital agriculture is the use of information technology i.e. IT to provide safe, nutritious and affordable food as well as to make farming socially, economically and environmentally profitable and sustainable. Digital farming is integrating both the concepts – precision farming and smart farming.

Example:

• Agricultural biotechnology is a range of tools, including traditional breeding techniques, that alter living organisms or parts of organisms to make or modify products; Develops microorganisms for improving plants or animals or for specific agricultural uses.

• The discussion aims to increase agricultural productivity through monitoring of soil, plants and environment by harnessing advances in sensing, deep learning and artificial intelligence and the Internet of Things (IoT) to enhance efficiency and environmental sustainability.

• Digital and wireless technologies for data measurement, weather monitoring, robotics/drone technology etc.

Benefits

• Increases agricultural productivity.

• Prevents soil erosion.

• Reduces chemical application in crop production.

• Efficient use of water resources.

• Spreads modern agricultural methods for quality, quantity and low cost of production.

• Brings changes in the socio-economic condition of farmers.

Challenges

High capital cost: This discourages farmers from adopting digital methods of farming.

Smallholdings: Indian farms are very small in size and 1–2-acre farm plots are quite common. Also, leasing of agricultural land is also widely prevalent in India.

Land renting and sharing practices: Due to limited financial resources and small farm plots it is quite common to rent and share land instead of outright purchasing it for equipment and machinery like tractors, harvesters, etc.

Illiteracy in rural areas: Lack of basic computer literacy is a major hindrance in the rapid growth of e-agriculture.

Related government efforts

AgriStack: The Ministry of Agriculture and Farmers Welfare plans to create 'AgriStack', a collection of technology-based interventions in agriculture. It will create an integrated platform to provide end-to-end services to farmers across the agri-food value chain.

Digital Agriculture Mission: This initiative was launched by the government from 2021 to 2025 to promote projects based on new technologies like artificial intelligence, block chain, remote sensing and GIS technology, use of drones and robots in the agriculture sector.

Unified Farmers Service Platform (UFSP): It is a combination of core infrastructure, data, applications and tools that enables seamless interoperability of various public and private IT systems in the agriculture ecosystem across the country. UFSP plays the following roles:

- It acts as a central agency in the agriculture ecosystem (like UPI in e-payments).

- Enables registration of service providers (public and private) and farmer services.

- Enforces various rules and assumptions required during the service delivery process.

- Serves as a repository of all applicable standards, Application Programming Interface (API) and formats.

- To act as a medium for data exchange between various schemes and services to ensure wide delivery of services to farmers.

National e-Governance Plan in Agriculture (NeGP-A): It is a centrally sponsored scheme, this scheme was launched on pilot basis in 7 states in the year 2010-11. It aims to promote rapid growth in India through the use of Information and Communication Technology (ICT) to deliver timely agricultural information to farmers.

In the year 2014-15, the scheme was expanded to all the remaining states and 2 union territories.

Other digital initiatives: Farmer Call Centre, Kisan Suvidha App, Krishi Bazaar App, Soil Health Card (SHC) portal etc.

Way forward

- The use of technology has defined the 21st century. As the world moves towards quantum computing, artificial intelligence, big data and other new technologies, India has a tremendous opportunity to leverage its IT giant status and revolutionize the agriculture sector. Just as the Green Revolution increased agricultural production, the IT revolution should be the next big step in Indian farming.

- There is a need for satellite imaging, soil health information, land records, cropping patterns and frequency, market data and creation of a strong digital infrastructure in the country.

- Data efficiency can be increased through digital elevation models (DEM), digital topography, land use and land cover, soil maps, etc.

Conclusion

As Indian agriculture and allied sectors embrace new technologies such as IoT and agricultural drones, foreign companies can play an important role in supplying these new technologies to farmers. It is estimated that close to 267 million farmers in India need to be catered to, despite the many Indian companies active in the sector. This enables private and foreign entities to expand their footprint in this part of the globe. However, their technologies also need to be affordable. To cater for them, the government, industry, and Research institutions have to form a consortium so that AgriTech start-ups can flourish and meet the demands of Indian farmer. To reach goals like doubling farmer incomes and sustainable growth, the Indian government is undertaking these initiatives and programmes. The widespread adoption of digital agriculture in India would therefore require a multi-stakeholder strategy in which the government plays a significant enabler's role in the ecosystem.

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