EFFECT OF INFORMATION TECHNOLOGY ON AGRICULTURE FOR EMPOWERING INDIA

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ABSTRACT

Massive technical advancements and opportunities over the past few decades have changed people's lives. Nevertheless, the agriculture industry has not greatly profited from this potential. The farmers and other people involved in the agricultural value chain need a lot of data. Knowledge exchange, targeted guidance, market integration, and funding availability are all crucial components of an information and communication technology (ICT) infrastructure that may transform agriculture into a profitable industry that attracts young people. This descriptive analysis article focuses on farmer awareness, the scope of digital agriculture, the role of technology in agriculture, the ways in which technology impacts farmers' lives, the ways in which technology controls farmers' farms and enterprises, and the ways in which technology creates changes in agricultural operations.

Keywords: ICT, Agriculture, sustainable

INTRODUCTION

The Indian government launched the "Digital India" program to ensure that residents may access government services online through increased Internet connectivity, improved online infrastructure, or technical empowerment. In order to empower rural areas, streamline the delivery of digital services, and promote digital literacy, Prime Minister Narendra Modi launched Digital India on July 1, 2015. Given that 68% of the Indian population resides in rural regions and 58% earns most of their money from agriculture, digitization of agriculture is an important component of digital India.

The term "digital agriculture" describes the use of data ecosystems and information and communication technology to support the production and dissemination of timely, relevant, locally based information and services with the goal of making farming more profitable, sustainable, and socially, economically, and environmentally responsible while simultaneously ensuring that all people have access to affordable, healthy food. In order to supply inexpensive data and information access, rural connectivity will be essential. Farmers would become more profitable by having access to fair markets, rural businesses would be able to provide value-added services, and young people in rural areas would be empowered to reach their full

potential.

ROLE OF TECHNOLOGY IN AGRICULTURE

Adoption of digital agriculture depends on SDI (spatial and temporal data infrastructure) and affordable smartphones and tablets that allow data and information to flow both ways to rural customers. Agriculture becomes a data-intensive industry when variables like soil variation, nutrient and moisture levels, rainfall fluctuations, the timing of critical activities like planting and harvesting, and market price volatility are taken into consideration. Cloud-enabled spatial and temporal information connected through Application Programming Interfaces (APIs) are used by advanced agriculture enterprises to assist farmers in managing production and market risks. Here, a dynamic data environment is created that enables sophisticated analytics to advise farmers on the best financial solutions, helping them optimize revenue while minimizing risk—two important variables that Indian farmers would also want to manage.

The other crucial intervention is smartphones, which have GPS (Global Positioning System) built in to track the locations of images of hail damage or field pests for technical assistance or insurance claims. Additionally, farmers can use mobile phones to enter organized markets that follow established criteria and grades, which can be confirmed with calibrated images and mobile money payments. The future of agriculture lies on digital technology, which may provide farmers with tailored recommendations depending on their crops, planting dates, seed varieties, local weather conditions, and expected market prices.

Digital agriculture primarily has two effects: first, it makes market pricing more accessible to everybody, and second, it reduces transaction costs, allowing farmers to retain a bigger portion of the marketable value of their crops. Despite the multiplicity of participants in agricultural value chains, farmers face information asymmetry with aggregators and middlemen, causing them to sell into crowded, untrustworthy, and non-standard marketplaces.

With the Aadhaar number and the Direct Benefit Transfer system, India is well-positioned to assist its citizens in receiving government subsidies. These platforms may be able to assist with earlier programs such as soil health, weather-indexed insurance, national marketplaces, and the Prime Minister Krishi Sinchayee Yojana. Examples of data that may be utilised in conjunction with spatial/temporal data infrastructure to validate and target subsidies include a rainfall forecast, a digital soil map, and the crop to be planted. This motivates farmers to invest in their farms, which raises productivity even more, manages production and market risks, and increases farm profitability.

Social media networks will also be used by digital agriculture to increase human potential. Digital Green is one of the best examples that comes from India. Through interactive films, producers educate other farms on best management techniques. Because farmers may more easily relate to others who are establishing a livelihood in similar situations, they are more likely to trust other farmers, making this method cheaper by a factor of 10 compared to conventional extension services.

Much as mobile money has done for rural consumers in Africa, it will do the same for India's rural consumers. Secure mobile payments, more affordable to send, and more convenient for clients in rural areas, especially women, than paper money. Additionally, mobile money enables rural consumers to acquire credit and boost savings by avoiding inadequate infrastructure.

CHANGES IN THE LIFE OF FARMES THROUGH TECHNOLOGY

Building on the digital revolution, the Fourth Industrial Revolution (4IR) promises to accelerate technological progress at an exponential rate, combining existing technologies, creating new ones, and changing businesses, nations, systems, and even society. Emerging countries stand to benefit greatly from recent developments in increasingly powerful technologies, such as computer power, communication, biotechnology, artificial intelligence, GIS (geographic information system), and other similar fields. Technological advancements might accelerate the structural transition from agricultural to high-productivity manufacturing and other economic sectors, as well as inclusive agriculture and rural development advancements that improve people's lives and enable emerging countries to progress at unprecedented speeds and sizes.

Young men are rapidly feminizing agriculture as more of them move from rural poverty to metropolitan regions in search of work. The majority of the backbreaking labour is done by women, who are particularly reliant on agriculture. Policymakers must take action in response to their low agricultural production, which is being exacerbated by climate change. Women's restrictions must be lifted for agriculture to undergo any change.

A new national initiative was introduced by India's Prime Minister Narendra Modi in 2016 with the goal of doubling farmers' earnings by 2022. Priorities included alleviating poverty, guaranteeing access to nutritious food, and combating climate change, which is having a devastating effect on farming owing to hotter weather, more intense droughts and floods, and more pests and illnesses. The Pradhan Mantri Krishi Sinchai Yojana (PMKSY), a statewide

initiative, was launched by the Ministry of Agriculture & Farmers Welfare to improve water-use efficiency and irrigate every Indian farm.

GOI is attempting to develop skilled jobs in rural areas and change the rural economy of the nation through its Digital India program. According to India's National Sample Survey Organization (NSSO), 156 million rural households—the vast majority of whom are poor—need investments in infrastructure like roads, electricity, and the internet in order to spur economic growth and provide more job opportunities for rural youth and women.

The Ministry of Communication and Information Technology is helping small farmers make the shift from input-intensive to knowledge-intensive agriculture. Precision agriculture may improve agricultural extension, boost planting timeliness, and get the highest market price for fertiliser through direct bank transfers that eliminate or reduce the cost of financial intermediaries by utilising market data and e-market reforms.

By improving seed supply, land management, and water management, farmers may increase their income and increase the likelihood of double and triple cropping.

With the launch of eNAM (National Agriculture Market) in April 2016, Prime Minister Modi aimed to assist farmers in bidding for the highest prices across several marketplaces. Through this online platform that integrates agricultural markets, users may access a multitude of services and information on the Agriculture Produce Market Committee, commodity arrivals and price, buy and sell trade offers, and more. In 2016, the Indian government introduced a crop insurance scheme called the Pradhan Mantri Fasal Bima Yojana (PMFBY). At the moment, 37 million farmers are covered.

The Indian government is also investing in water conservation measures, such as mapping the country's aquifers and implementing technological controls. It would be helpful to measure the link between rainfall and groundwater levels under various agricultural and irrigation techniques in order to prioritize prospective investments in water and irrigation.

Mobile phones, 'Rubberised' tractor services, and digital land registration are all helping to improve farm management. Millions of land records are being updated by the Digital India Land Records Modernization Programme (DILRMP), which also encourages land consolidation and land rentals by unprofitable smallholders while giving farmers title guarantees and greater land tenure security.

To enhance communications, Digital India aims to link 2.5 million Gramme Panchayats (local governments) to high-speed internet by 2018. Currently, hundreds of thousands are online. As

of July 2017, the Government of India (GOI) mandated that all mobile phones support at least one of 22 Indian languages, in addition to Hindi and English. Because there are only 27% of communities having financial services within 5 miles, the government is licensing more banks and promoting the use of mobile phone payment technology. There is extensive mobile coverage in India, where over 1 billion of the country's 1.4 billion inhabitants are connected.

ROLE OF TECHNOLOGY FOR FARMERS

Digital Farming: Enhancing Agricultural Productivity

Digital farming enables real-time monitoring of day-to-day farming operations, facilitating informed decision-making. Agribusinesses are able to manage the whole value chain, from planting seeds to collecting the crop, thanks to this new method.

Key Features

1. End-to-end solutions: Comprehensive management of the entire value chain.

2. Constant data transfer: the office receives instantaneous updates from the field.

3. Advisory systems: Guidance on optimal chemical and fertilizer application.

4. Field staff support: Ensuring best practices for farmers.

5. Digital monitoring: Instant notification of pests and diseases.

6. Plot management: Remote monitoring and course correction advice.

7. Weather integration: Aligning farming activities with weather changes.

Benefits

1. Enhanced productivity: Data-driven decision-making.

2. Improved crop health: Timely interventions and advice.

3. Increased efficiency: Optimized resource allocation.

4. Better weather management: Strategic planning and decision-making.

By leveraging digital farming solutions, agribusinesses can unlock new levels of productivity, efficiency, and sustainability.

CHANGES OF AGRICULTURE OPERATIONS DUE TO TECHNOLOGY

Agricultural practices will be altered by digitisation in a number of ways. For example, remote sensing of plots using satellite systems with a resolution as close to 5X5 meters can assist in

identifying the portions of the plot that are impacted by pests or diseases. Using metrics like the Red Edge Index and the Normalized Difference Vegetation Index (NDVI), among others, big data analytics can do this. It will be very beneficial for controlling pests and weeds.

Field workers can also perform quality checks on farms to see whether lot of their goods satisfies client orders. If the company is exporting, they can also perform Lab Test Integration to determine whether or not the inventory they have entered into the system satisfies the Maximum Residue Limits (MRL) requirement. Traceability throughout the whole supply chain can be achieved through the digitalization of agricultural techniques.

Alternatively, technology in its context also helps the farmer in getting in touch with the right people when they need something, like an input supplier or a provider of equipment. When it comes to crop management, the farmer must also establish contact with customers in order to start a sale. In addition to connecting farmers and buyers, an online marketplace can provide farmers with the autonomy and choice to select a buyer.

We know that if the product is easy to use, education won't be an obstacle. Facebook and WhatsApp, for instance, have made their way into India's far-flung villages. Our clients send out employees from nearby villages who are illiterate but can use the CropIn app with ease. We created a straightforward and user-friendly application with our user base in mind. Additionally, local languages are supported by the application.

Himachal Pradesh, Punjab, Rajasthan, Haryana, Gujarat, Maharashtra, Madhya Pradesh, West Bengal, Sikkim, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, and Bihar are among the 14 Indian states where the agencies are located. Customers and farmers in Gujarat's Sabarkantha, Patan, Mehsana, and Gandhinagar districts as well as Punjab's Ludhiana, Jalandhar, and Moga districts responded overwhelmingly to them. We are expanding our services in the other states since we are getting similar replies in other parts of the country. They serve nine countries in addition to India: Kenya, Nepal, Portugal, Indonesia, Vietnam, Brazil, Columbia, and Mexico.

CONCLUSION

Although digital agriculture is most developed in the United States, smallholder farmers worldwide are effectively implementing the concepts, which are scale neutral. If we want to fulfil the Prime Minister's vision of a Digital India and help reach the Sustainable Growth Goals by 2030, we need to act quickly to use these new tools and boost agricultural growth. Additionally, the research states that the information and recommendations are vocally rather

than in writing, are in their native tongue, and pertain to the corps and areas. The illiterate formers would also be far more advanced if they asked enquiries without hesitation to get their uncertainties cleared out. Additionally, by guaranteeing that everyone has access to reasonably priced and healthful food, digital agriculture may contribute to the most efficient, equitable, and successful achievement of the goals of the National Food Security Act.

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