

## **Impact of Digitalization in Agricultural Sector**

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### **Abstract**

About 68 percent of the total population of India is covered by rural areas and 58 percent of people's livelihood main source depends on agriculture. The rapidly increasing population demands a 50 percent expansion in the production of food. Simultaneously, the traditional unskilled practices, including water crunch for irrigation, unprolific land, double cropping, etc, are laying down pressure on fertility followed by manipulation of middlemen preventing the farmers from gaining best price for their product. Under such a scenario, the digitization of the agricultural concepts becomes more vital. There is an essential need of encouraging the rural community by developing digital infrastructure, and providing ample exposure to digital service along with digital legacy.

Digitization in the agricultural sector can be termed as ICT (Information and communication technology) and data ecosystem to hold up farming with sustainability. The Prime minister's has sharp vision regarding various initiatives to provide 'Protective shield' to enhance production with better storage and communication facilities in order to gain a better supply chain and profit. This paper briefly satisfies the resourceful initiatives taken by the government to furnish digital infrastructure such as smart sensors, agriculture equipment, and automation system to help farmers and also relates how it would double the income of farmers. It has largely three center areas that encompass data ecosystem, smart analysis, and communication.

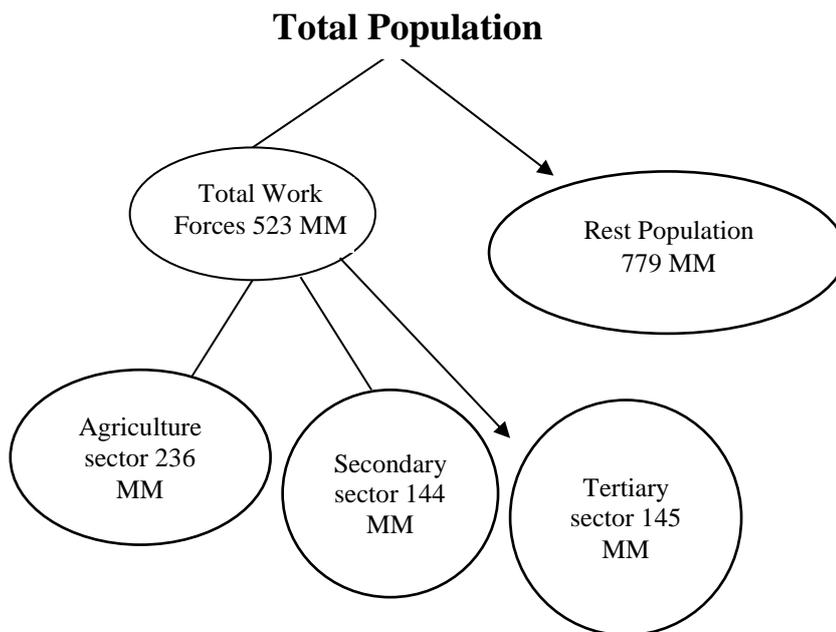
### **Keywords**

Digital infrastructure, Information and Communication Technology (ICT), Protective shield, Smart analysis, and Data ecosystem.

### **1. Introduction**

Agriculture plays a vital role in the Indian economy, with more than 58 percent of the people directly employed in the field. Agriculture is the most comprehensive growth sector of the Indian economy because it not only contributes to overall economic growth, but also reduces poverty

by providing jobs and food security to the majority of the population. There are many possibilities for combining agricultural technology with reliable digital mechanisms. Technology has the potential to improve agricultural development while increasing farmers' incomes. While India faces a serious problem in terms of food scarcity and low agricultural production; it also faces an even greater one in terms of growing more sustainably and inclusively. According to one source, According to a UN Development Program assessment, it has become much more important as a result of the Covid-19 epidemic, which has the capacity to force an additional 207 thousand people into utmost poverty by 2030. This is not to imply that the government has not taken steps to support the burgeoning agriculture industry. The e-NAM, for example, provides a national e-marketing platform and encourages the development of infrastructure to facilitate e-marketing. Farmers' portals, Kisan call centres, and Kisan portals that help farmers make informed decisions for increased productivity are commendable and a positive step forward. Aside from that, addressing local concerns and supporting policies and institutions are important.



**Figure 1: Total Population**

## **2. Review of the Literature**

- I. Nedumaran, G. and Manida, M. (2020) observed that e-farming administration is advantageous because it is likely to increase profitability, improve quality in items, generate a higher pay, expand productivity and raise profit. The effect of ICT activities on agriculture, for example, The Kisan Credit Card must be evaluated and convenient access to horticultural data must be provided while educating the rural population on these practices. To become prosperous, the advances in enrolling power, accessibility, electronic thinking, and biotechnology are the need of the hour.
- II. Farooq et al., (2020) stated that countries all over the world have adopted various technologies and similarly the Indian government has also made use of several policies to boost up their agriculture. Their major focus is to measure the soil conditions, temperature, and earth density in order to help farmers control pests and prevent crop diseases. However many open issues and challenges are associated with the implementation of these policies like loss of data, high costs, lack of knowledge of technology, and reliability which ought to be addressed and resolved in the near future.
- III. Landmann, D.H. (2018) observed that the entry and consumption of smartphones for agricultural purposes is still very limited among farmers in various developing countries. They provide access to frequently updated and authentic information and have the potential to improve income generation and reduce poverty in developing countries. Despite this, adoption and usage rates among farmers in developing economies remain relatively low. The perceived favorability of smartphones for capacity development among farmers should be the special focus of extension programs. Correspondingly, smartphone applications should be designed with user-friendly interfaces for the specific target group.
- IV. L.L. Samantaray (2015) analyses the links between structural, technological, and institutional policy changes which would be accountable for the consecutive agriculture development in his research entitled "Surveying the Current Trend of Agriculture Productivity in India and its Future Outlook." Secondary data on agriculture, industry and services were acquired and analysed by

the researcher and has investigated some of India's big disadvantages in the agriculture sector and shows the government that important sectors such as marketing, price mechanism, research, and development must be given priority.

- V. It was noted that Govt. assistance and private intervention can be achieved in sustained growth. Sangeet, Sukhpal Singh, Shruti Bhogal (2013) tracked Agriculture and contrasted its many characteristics, such as employment creation and productivity, and food grain availability, in their research project "Agriculture for Sustainable Development of India." The research shows that more than 60 percent of the population relies on non-durable agriculture. The authors feel that sustainable development is a vision and a time to reflect and conserve fear and scarce resources optimally and effectively.
- VI. According to Hasna Vancock, the growth of all elements of human existence, which affects sustenance, is a process of sustainable development. The solution to the conflicts between the different competing objectives means that economic prosperity, environmental quality, and social justice are pursued simultaneously. The resulting technological vector is a process in constant development; the journey is, of course, vital. The process of achieving sustainable development (the desired future state). But sustainability's "destination" is not, as we understand it, a fixed place in the conventional sense of destination. Rather, it is a set of good wishes for a future system.

### **3. Research Methodology**

The subject of the research paper uses exploratory research methodology in this method of investigating a problem that has not been studied or thoroughly investigated in the past. It helps to have a better understanding of the impact of digitalization in agriculture and also helps in further study what more can be done for farmers in coming days. For analyses and conclusions, the time series data for chosen variables from 2001 to 2018 are utilized.

#### **4. Objectives of the Study**

- 1) To identify the existing problem in agriculture.
- 2) To analyze the impact of digitalization in agriculture.
- 3) To study the initiative taken by the government to support farmers.

#### **5. Digital India and Rural Development**

In 2015, Digital India was established with the goal of building digital infrastructure to empower rural areas and promote digital literacy. Digital India has likely to be an important tool in the development of India's agricultural sector. Agriculture in India is hampered by a number of issues, including a disorganized and complex agricultural supply chain. It suffers from a lack of transparency and collaboration among numerous stakeholders, resulting in a higher rate of agricultural waste. In order to promote accountability and transparency, the crop's pre-and post-harvest state must be tracked. Improved transparency about agricultural operations in the food supply chain would reduce waste and boost consumer confidence. The most significant contribution of digital India is the ability of farmers to communicate with each other. These technologies help the farmers adapt faster to adverse weather conditions, especially in flood and drought-prone regions. The availability of sensors and drone helps the rural youth fight pests, spray pesticides and monitor crop health among others. Replacing farmer's subsidies, the government can reach the farmers directly for cash transfers. This in turn helps the farmers come out of debt traps and enhance agricultural productivity. When combined with data infrastructure, subsidies can help increase the farmers' profit margins, enabling them to further invest in their farm's to increase production. With the help of social media platforms, participatory videos explain best management practices to farmers. With digital platforms, farmers can overcome poor banking infrastructure, support savings, and access credit.

#### **6. Problem Analyze in Agriculture Sector**

Despite the importance of agriculture to the Indian economy, the part of agriculture and related activities in India's GDP has been steadily dropping over time. It was 14.6 percent in 2009-10, but it dropped to 13.9 percent in 2013-14. Agriculture in India is a high-risk business. The danger can be viewed in a variety of ways once more. Agricultural risk highlights all of the issues related to farming that discovered in order to develop a suitable solution.

**The following are some of the issues that have been identified:**

- **Production Risk:** This section focuses on the different issues related with the production of food materials. Whether or not there is a climate change, the entire reliance on rain causes an issue. Furthermore, the lack of accurate information on natural disasters exacerbates the situation.
- **Lack of Infrastructure:** Agricultural techniques fail to maximize production due to a lack of storage systems, newly designed machinery, and knowledge of how to use them.
- **Lack of Farm Labor:** People favor industrial sectors that provide more jobs, whereas they lose interest in putting their time and effort into tilling land that does not pay well scarcity of resources.
- **Illiteracy:** A lack of awareness of current technological breakthroughs, and the right quality of fertilizers and pesticides-can occasionally result in the complete destruction of a crop. According to a report published by Reuters Market Light in 2015, 94 percent of Indian farmers prefer to get knowledge from 'fellow farmers,' followed by 10 percent from agri-retailers, 4 percent from TV/Radio, and only 3 percent from agri-extension officials. Due to a lack of consistency, accuracy, and personalization, the information offered by extension services is seen to be either biased (e.g. agri-marketing companies) or less actionable. Farmer relies on market-available seeds that claim great yields, which can often be deceiving.
- **Sustainability:** Farmers will be pushed into a vicious spiral of loans, heavy fertilizer use, water mismanagement, low output, and hence additional debts for the following cycle due to a lack of awareness of the need to raise crops sustainably.
- Agricultural yields in India are still just 30 to 60 percent of the best sustainable crop yields achieved in industrialized and developing countries.
- **Lack of a Proper Marketing Channel:** Farmers are lacking to reach their customers directly because the surplus of the profit is taken by middlemen owing to a lack of infrastructure, leaving the farmer vulnerable to intermediaries and unable to receive the reserve

price for their hard work. Due to tiny tradable quantities and socio-economic constraints, small and marginal farmers are enforced to deal with many layers of middlemen. Farmers in the area sell 85 percent of wheat and 75 percent of oilseeds in Uttar Pradesh, 70 percent of oilseeds and 35 percent of cotton in Punjab, and 90 percent of jute in West Bengal. Approximately 47 percent of the price of rice is taken away by these intermediaries, and 52 percent of the price of rice is taken away by these middlemen.

- **Lack of Fertile Land:** The farmer's ability to use contemporary techniques is limited by a lack of fertile land, soil erosion, and a tiny landholding. Incorrect application of fertilizers and pesticides results in a deficiency of nutrients in the soil, which are essential for agricultural output.
- **Water Scarcity:** Agriculture in India is mostly reliant on the monsoon, which determines the economy's upward or downward trajectory in the field of agriculture. Water scarcity is caused by the excessive demand for water in the industrial sector and for agriculture purposes.

## **7. Digitization of Agricultural Sector**

The government efforts provide a lifeline for farmers, allowing them to improve their lot in life while also strengthening the foundation of the Indian economy by developing the agricultural sector. Our honorable Prime Minister Narendra Modi's vision clearly states that the changes and progress of India are inextricably associated with the development of the agricultural sector. "From this land of Uttar Pradesh, I ask all the states to put priority to agriculture and then observe the improvements," Modi said, emphasizing his goal of doubling farmers' income by 2022, the country's 75<sup>th</sup> anniversary of independence. In order to deliver innovative technologies to farmers, the PM has also asked agricultural scientists from around the country to speed up the lab to land method. It will result in a significant increase in productivity. By defining bigger targets, he hopes to focus on the overall development of the rural sector. He stressed the value of the food processing industry, warehouse expansion, and technological inputs. These advances would be impossible to imagine without acknowledging technological progress. Drip irrigation, according to Ran Maidan, has helped farmers spend less time in the fields, allowing them to devote more time in their personal

development, learning new skills, engaging in local activities and forums, and taking better care of their families. The government has broadened the scope of its Digital India programme by introducing new initiatives and extending them to the agriculture sector.

**7.1 Virtual Agricultural Market:** The government intends to create a common electronic platform that will allow farmers to trade their produce to purchasers from all across the country. The Centre has committed up to Rs. 200 crores for the development of this online trading site for the National Agriculture Market. The platform, which will go live on April 14, 2017 will address the issue of distressed selling. It is in the country and intends to connect 585.

**7.2 Rashtriya Krishi Vikash Yojna:** Its purpose is to encourage states to commit more funding to agriculture and allied sectors, as well as to incentivize states to plan and implement appropriate growth-oriented projects in agricultural and associated sectors.

**7.3 The Pradhan Mantri Fasal Bima Yojna:** It has been authorized by the government. Farmers will be charged a premium of 2 percent of the sum insured for all Kharif crops and 1.5 percent for all Rabi crops under this scheme. The remainder of the insurance premium will be covered by the government.

**7.4 Use of New Technology and Equipment:** Using modern technology and improvised machines in production and storage would yield better results.

**7.5 Increase Soil Fertility:** The constant dissemination of information via mobile phones about the types of practices required for maintaining soil fertility and increase production has proven to be effective. Kisan call centre services are also available to farmers, allowing them to speak directly with executives about their concerns.

**7.6 Information Communication Technology (ICT):** Transmission of information in terms of increasing crop yield and profitability per unit area and resource, technology has the potential to revolutionize Indian agriculture. In remote places, mobile connectivity has become a standard service. When compared to the urban subscriber base, the rural subscriber base is rising twice as fast. In March of this year, the national Teledensity in urban areas was 79 percent, while

rural teledensity was 46.5 percent. Telecom Policy intends to boost rural teledensity to 60 percent by 2017 and 100 percent by 2020. According to the IAMAI, 80 percent of people use it for communications, 67 percent for online services, 65 percent for e-commerce, and 60 percent for social networking on the internet. Conceptualization, design, development, assessment, and application of innovative agricultural technologies are all part of e-agriculture ways to apply (ICT) in rural areas, with a focus on agriculture. Mobile phones can be successfully utilized for purposes including generating, processing, broadcasting, disseminating, sorting, archiving, and to rectify critical information and data relating to agriculture. Mobile phones are worldwide and cost at effective means to uprising agriculture in India. Several apps are in fingertips and much more can be developed to meet farmers' following specific needs.

## **8. Government Initiatives**

- To assist farmers in making educated decisions for efficient farming under varied agro-climatic circumstances, the government has launched three portals: Farmer portal, Kisan call centre, and mkisan portal.
- For eight states, the e-Governance programme has standardized soil health card software and built web-based software to deliver integrated nutrient management recommendations utilizing the soil test-crop response technique.
- National Bank for Agriculture and Rural Development has also designed agricultural portals for farmers.

## **9. The Future Vision of Indian Agriculture**

According to Reihem Roy, VP-Omnivore Partners, "the world is an oyster in terms of possibilities" when it comes to the future of Agri-tech in India. You have the option of moaning and groaning or taking action and developing answers. It's our decision." With the increasing population and demand for food, the future will be more challenging. Mr. Rajesh Agarwal, MD, Insecticides India Ltd, in his report "Future of Agriculture in India: Is the Nation Ready," emphasized that several studies on rising food prices and their cascading effects on the economy have clearly proven that India's dream of achieving a two-digit growth rate will remain a pipe dream unless the rural economy is freed and speeded up.

Digital India, according to Nitin Gupta, Co-Founder, and CEO of PayU (India), is an idea for a 'Cradle to Grave Identity' that will be unique, everlasting, and online. His words appear to be right, as we see the authorities prioritizing India's equipment for the future, and ensuring that technology is at the heart of the transition. This project appears to be based on the equation  $IT+IT=IT$ . It essentially suggests that India Today + Information Technology = India Tomorrow. Many of the above-mentioned difficulties have already been overcome, and the job of resolving others has begun, thanks to government initiatives under Digital India raising awareness among the working population. Technology has consistently proven to be a superior answer to the issues at hand with regard to agriculture.

## **10. Conclusion**

As a result, it can be argued that in the coming years, Indian farmers will feel compelled to improve food and nutritional security while also considering all of the other factors described previously. 'Digital India' is about to change the way the country's socio-economic processes interact. It is expected to modernize processes and infrastructure while also leveraging the country's people, laying the groundwork for long-term development and progress. "We are on the cusp of the next revolutionary wave of digital agriculture," Michael Stern stated emphatically. The scenario allows for new inventions and chances because the country will undoubtedly undergo a significant shift in the next 10 to 20 years.

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