

E- Agriculture leads to rural development in India: A Review

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Abstract

The United Nations' Food and Agriculture Organization (FAO) has developed an e-agriculture plan in partnership with the International Telecommunication Union to assist countries in using information and communication technologies to support rural development. Information and communication technologies (ICTs), which are mostly focused on agriculture, can assist enhance agricultural growth by enhancing farmers' access to essential information, allowing them to make the best decisions and manage their resources responsibly. In this era of climate change, when extreme weather occurrences are the norm, e-agriculture can provide services such as weather forecasts and disaster alerts that can assist farmers in making informed decisions. Agriculture has evolved into a knowledge-intensive industry, and having access to the appropriate information at the right time can make all the difference in a small-holder farmer's livelihood. Governments can supply rural communities with weather, market pricing, and insurance information that adds to their livelihoods with the correct kind of ICT services. Many of the challenges in the agricultural sector can be solved by having access to the correct information. Disaster planning and management, including measures like wise water management, watershed upkeep, and reliable meteorological information, can go a long way toward mitigating the effects of weather and climate change. Developed countries are already implementing a variety of agricultural technologies. Small-holder farmers in underdeveloped nations benefit from e-agriculture because it makes technology more accessible and affordable. Simple technology, such as soil health analysis, can assist a farmer in determining the sort of fertilizer to use in his land. Another excellent idea is to connect farmers with markets by providing market information and assisting them in receiving electronic payments. Initiatives like E-Choupal have proved the power of bringing communities together in India. A strategic approach to integrating the growth and reach of ICTs in other industries such as banking, insurance, and mobile technologies for agriculture is essential for identifying crucial services and solutions and ensuring their long-term viability. This research investigates the possible contribution of e-agriculture to the development of rural areas and the improvement of farmers' livelihoods.

Keywords: E- Agriculture, information Technology, Rural Development.

Introduction:

The goal of e-agriculture is to boost agricultural and rural development by improving information and communication systems. E-Agriculture, in particular, entails the conception, design, development, assessment, and deployment of creative ways to employ information and communication technologies (IT) in the rural domain, with a primary focus on agriculture. E-agriculture is a new term, and we expect its definition to adapt and evolve as our knowledge of the field expands. Agriculture accounts for 18.6% of India's GDP, and the agricultural sector employs approximately 59 percent of the country's population. Contract farming and other private-sector ventures have commercialized the Indian agriculture sector. To allow members of the Community to share their thoughts, experiences, best practices, and resources relating to e-Agriculture, and to ensure that the information generated is effectively shared and used around the world. Crop cultivation, water management, fertilizer application, pest management, harvesting, food transfer, safety, quality management, and marketing management are the primary phases of the agriculture business. Any system used to obtain information and knowledge for the purpose of making decisions in any industry should provide accurate, complete, and concise data in a timely or timely manner. To enable members of the Community to share their thoughts, experiences, best practices, and resources relating to e-Agriculture, and to ensure that the knowledge generated is effectively shared and used globally.

Review of Literature:

Pradhan, & Mohapatra (2015) stated that plentiful future for successful use of ICT in agriculture and initiatives are gifted. However, much still remains to be prepared. The execution of these subsequent recommendations can help to take in the full prospective of ICT in agriculture and recover rustic livelihoods.

Atanasoae (2011) observed the vast ranches that create crops that require remarkable capacity surroundings, it is recommended the utilization of diagonal circulation channels, through which can be sold extensive amounts of merchandise. These channels are: grocery stores, natural shops specific, processors and different middle people. A few buyers need a closer connect with makers, need to hear the account of the item since they put their trust in the individuals who deliver and move these items, and certainty is second rate if the firm is significantly further away

Ekaterina Arabska (2014) stated that consistence of natural creation to feasible advancement and change in buyer conduct and request towards sound and safe nourishment isn't sufficient. Market costs are a key component in the buyers' choice made by clients on one hand, and in the generation choice made by makers on the other. The simple directly to use to overall markets and great to acquire costs of simple materials, forms the division in the nation send out arranged. The investigation explores some critical issues in the natural homestead productivity and the impact of the European and the state bolster.

Jasur Hasanov and Haliyana Khalid (2015) observed that website quality has an oblique effect on the online purchase purpose of green food products; practitioners should also make the parallel value of their online stores with customers' expectations. To increase the level of online purchase intention, retailers should acquire relevant marketing strategies which include creating

awareness of the benefits of green products to the public, establishing affiliate network and conducting constant promotions to their objective audience. It is important to understand that website quality is not the only decisive factors that could increase consumer purchasing target. Other qualities such as good customer service, efficient product distribution and logistics and also activist reviews from customers also play an important responsibility.

Objective of the study

1. To study E- agriculture and Rural Development.
2. To analyze Government's initiative towards E- Agriculture.
3. To examine the growth of Economy with digitalization.

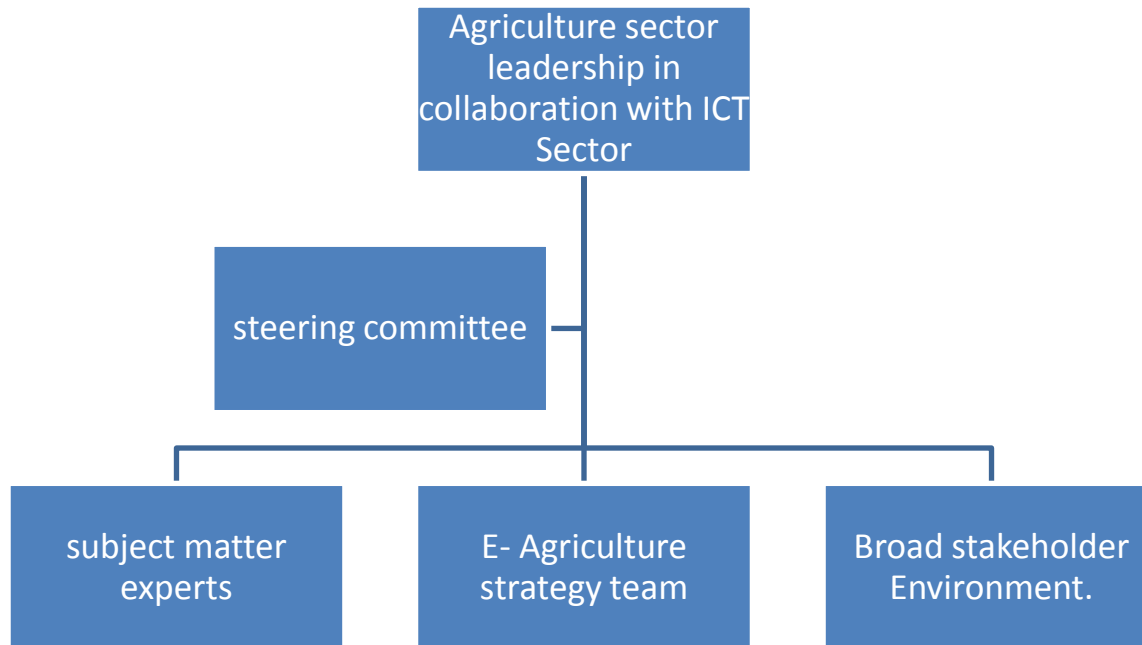
Technologies that assist in E- Agriculture:

Office Automation Tools: Computer applications, networks, telephones, printers, scanners, and other office automation tools are used in E agriculture. Many government, private, and non-government organizations work in the agriculture and rural development sectors. To provide greater service to the farming community, they must all work together. As a result, in all of the above-mentioned firms, using office automation is one of the methods for increasing the efficiency and interconnectivity of the employees' work. Many computer applications, such as MS OFFICE and the Internet, provide enterprises and individuals with limitless possibilities to meet their day-to-day data processing needs and provide effective service to their consumers.

Global Positioning system: The combination of the Global Positioning System (GPS) with geographic information systems has enabled the development and deployment of precision agriculture or site-specific farming (GIS). These technologies allow real-time data collection to be combined with precise position data, allowing for fast processing and analysis of massive amounts of geographical data. Precision agriculture, or site-specific farming, has been developed and deployed thanks to the integration of the Global Positioning System (GPS) and geographic information systems (GIS). These technologies enable real-time data collecting to be integrated with accurate position data, allowing vast amounts of geographical data to be processed and analyzed quickly. Farmers used to have a hard time relating production strategies and crop yields to terrain variability. This hampered their capacity to devise the most efficient soil/plant treatment options that could have improved their yield. Precision agriculture allows for more exact application of pesticides, herbicides, and fertilizers, as well as better control of chemical dispersion, lowering costs, increasing output, and creating a more ecologically friendly farm.

Automated system: Automatic milking systems are self-contained, computer-controlled systems that milk dairy cows without the use of human labour. An agricultural robot, complicated herd management software, and specialized computers are used to fully automate the milking operation. Automatic milking relieves the farmer of the task of milking, allowing him to devote more time to overseeing the farm and herd. Farmers can also improve herd management by utilizing the computer's data. Farmers can optimize milk yields by studying the influence of various animal feeds on milk yield. Because the data can be drilled down to the individual cow, each one can be tracked and evaluated, and the farmer may be notified if there are any unexpected changes that could indicate illness or injury.

E- AGRICULTURE GOVERNANCE MODEL:



Government's Initiatives for promoting E- agriculture in India:

The Indian government has introduced Digital India to address these challenges. Digital India is a platform for providing numerous services to Indian citizens via digitally equipped devices. It entails giving services over the internet to phones, computers, and other devices. In the agriculture sector, the goal of digital India is to offer farmers in rural and urban areas with government services over the internet. Digital India has been hailed as a blessing for Indian agriculture, and it has been demonstrated to be so.

(A) E- NAM: The National Agriculture Market (eNAM) is a pan-India electronic trading system that connects the existing APMC mandis to form a unified national agricultural commodities market. Under the Ministry of Agriculture and Farmers' Welfare of the Government of India, the Small Farmers Agribusiness Consortium (SFAC) is the key agency for implementing eNAM. To enhance agricultural marketing uniformity by streamlining procedures across linked marketplaces, eliminating information asymmetry between buyers and sellers, and encouraging real-time price discovery based on actual demand and supply. Integration of APMCs across the country via a shared online market platform to improve pan-India commerce in agriculture commodities, allowing for better price discovery through a transparent auction procedure based on product quality and quick online payment.

(B) NATIONAL MISSION FOR SUSTAINABLE AGRICULTURE: The National Mission for Sustainable Agriculture (NMSA) was created with the goal of increasing agricultural output, particularly in rainfed areas, by focusing on integrated farming, water efficiency, soil health management, and resource conservation synergy. Through the adoption of a sustainable development pathway, NMSA will address key dimensions of 'Water use efficiency,' 'Nutrient

Management,' and 'Livelihood diversification,' among others, by gradually shifting to environmentally friendly technologies, adoption of energy efficient equipment, conservation of natural resources, integrated farming, and so on.

Schemes under NMSA:

- I. Rainfed Area Development (RAD)
- II. Soil Health Management (SHM)
- III. Sub Mission on Agro Forestry (SMAF)
- IV. Paramparagat Krishi Vikas Yojana (PKVY)
- V. Soil and Land Use Survey of India (SLUSI)
- VI. National Rainfed Area Authority (NRAA)
- VII. Mission Organic Value Chain Development in North Eastern Region (MOVCDNER)
- VIII. National Centre of Organic Farming (NCOF)
- IX. Central Fertilizer Quality Control and Training Institute (CFQC&TI)

(C) **SOIL HEALTH CARD SCHEME:** Launched in 2015, the scheme has been introduced to assist State Governments to issue Soil Health Cards to all farmers in the country. The Soil Health Cards provide information to farmers on nutrient status of their soil along with recommendation on appropriate dosage of nutrients to be applied for improving soil health and its fertility. But many farmers say the **soil health cards** would be much more effective if better designed and composed.

(D) The Indian Council of Agricultural Research (ICAR) has established a network of 715 Krishi Vigyan Kendras (KVKs) in the country mandated with Technology Assessment and Demonstration for its Application and Capacity Development (TADA-CD). KVKs organize demonstrations, training programs and skill development programs for the benefit of farmers and farm women, rural youth and in-service extension personnel.

(E) During the year 2018-19, 42,361 on farm trials (OFTs) for assessing technologies and 2,74,736 front line demonstrations (FLD) showcasing potentials on improved varieties, modern technologies and practices were conducted on farmers' fields to create awareness among farmers. To update the knowledge and skills on modern agricultural technologies, 47,000 training courses on various technologies were organized benefitting as many as 13.51 lakh farmers and farm women. 139.67 lakhs farmers participated in various extension activities.

(F) Agro-advisories are given to the farmers through various service providers and the mKisan portal. mKisan portal is a platform which provides web-based mobile advisory to farmers with the technological backstopping from Research Institutes and Agricultural Universities supporting farmers. Information on weather, market, various farm operations, outbreak of pest and disease incidence and their control measures are given to farmers through Short Message Service (SMS). About 5.3 crore farmers are linked with mKisan Portal for sending SMS messages on various aspects of agriculture, horticulture and animal husbandry, weather forecast, and pest and disease control.

EMINENCE OF E-AGRICULTURE

- **Promotion of environmentally sustainable production practices:** The ‘Zero Cost’ extension model used in e-Krishok³ facilitates free extension related information and advisory services for farmers, bundled together with input packages. Every farmer who buys an input package is entitled to receive an information service package whose value depends on the value of products.
- **Disaster management and early warning system:** The Famine Early Warning Systems Network⁴, created by the US Agency for International Development (USAID), is a leading provider of early warning and analysis on acute food insecurity. Monthly reports and maps detailing current and projected food insecurity, timely alerts on emerging or likely crises and specialized reports on weather and climate, markets and trade, agricultural production, livelihoods, nutrition and food assistance are disseminated through the system.
- **Enhanced market access:** Esoko⁵ has developed a mix of web and mobile apps to improve communication with farmers, linking them to up-to-date market prices and connecting them with buyers, together with a whole host of other information, including extension advice, weather forecasts, agronomic tips and crop calendars. E-agriculture can increase food and nutrition security and food production and processing by managing information flow, data gathering and analysis.
- **Regulatory and policy:** E-agriculture has the potential to make a valuable contribution to improving a country’s agricultural policy and regulatory capability and awareness by offering access to timely, accurate and comprehensive information from the agriculture sector. ICTs can also improve dissemination of policies and guidelines to agriculture sector stakeholders.
- **Financial inclusion, insurance and risk management:** A service provider working with local insurance in the agricultural value chain undertakes risk assessment, product development and risk monitoring to facilitate access to insurance products for smallholders. The system uses automated weather stations to monitor rainfall. Payouts are made based on the stations’ measurements and a predefined formula of crop rainfall needs. If the weather stations’ measurement and related rainfall formula shows that there is a payout, these are sent to individual farmers using M-Pesa (mobile phone wallet).

CONCLUSION: There is great transformation in Indian agriculture owing to changes in the economic and trade environment. To cope up with these changes timely, relevant and accurate information to the farmers and other stakeholders will help them take optimum decisions. ICT should play a vital role in the efficient delivery of this information. Several ICT based initiatives have been tried by different players and the same are analyzed in the present paper. Based on the analysis review of the different initiatives, an attempt has been made to recommend measures to harness the full potential of ICT as given below: (i) Assessment of information needs of the

farmers and appropriate mode of reaching them as per local conditions is crucial before developing an ICT Model

(ii) The information dissemination model should be viable and user-friendly so that the initiatives may be sustained in long-run. A string backward and forward linkage should be in place for accurate information collection and its dissemination.

(iii) Integration of various agencies under one roof for providing vital information on various components of agriculture so that it will act as a one stop solution for the needs of the farmers.

(iv) Introduction of delivery mechanism of information in the case of government initiatives like agmarknet.nic.in is need of the hour so that the information reaches the end user.

(v) It is essential to create the requisite ICT infrastructure in rural areas for effective dissemination of information.

(vi) Creating awareness among farmers and other stakeholders on the importance of information and its optimum utilization will help in the development of agriculture and overall well being of the farming community.

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