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INFORMATION AND COMMUNICATION TECHNOLOGY IN AGRICULTURAL DEVELOPMENT

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ABSTRACT

Agriculture is different from industry and plays a significant role in the economic development of a nation. Information and Communication Technology (ICT) plays a significant role in developing agricultural growth through the use of various procedure to attain economic sustainability and self-reliance. Most studies focus on weighing up critical adoption success factors while broadly discussing the failure to adopt information technology. This paper is a focused attempt to contribute to a better understanding of adoption success factors and adoption problems of ICT in agriculture. Data has been collected on the basis of secondary sources such as economic survey, research articles, papers etc. It also highlights e-Agriculture as arising field focusing on the enhancement of agricultural and rural development through improved information and communication processes.Cited in Economic survey 2019. Even today, nearly half of our population depends on agriculture as their primary occupation and income source. But changing time necessitate changing needs and changing demand. ICT is viewed as a game changer in dealing with new challenges of agriculture.

Keywords: *-ICT, Agriculture, Farmers, Information, Enhancement of Agriculture.*

1. INTRODUCTION

Agriculture is a critical sector that is vital for the growth of the Indian economy. It contributes about 15.4 per cent to the total gross domestic product (GDP) and gives work to more than 60 percent of the population. The food grain production has increased from 51 million tons (MT) in 1950-51 to 283.37 MT in 2015-16. Indian agricultural economy is characterized by low degree of market integration and connectivity, accessibility of reliable and timely information by the farmers on prices of commodities.

1.1 ICT:

Internet and Communication Technology (ICT) is utilized as a preeminent term consolidating all methods of transmission like electronic gadgets, systems, mobiles, administrations and applications which support to disperse data with the assistance of innovation. In the previous years, data and correspondence innovations have given society an extremely huge number of new correspondence capacities. Individuals can speak with one another in various nations utilizing advancements, for example, voice over IP (VoIP), video-conferencing and

texting. Long range informal communication site likes LinkedIn, Facebook, Twitter permit own all clients from everywhere throughout the world to stay in contact and impart all the time.

2. Need of ICT in Agriculture

ICTs have been a noteworthy supporter of development and financial improvement in business divisions, nations and districts where it all around embraced and coordinated. Almost 40 percent of the worldwide populace approaches the Internet in it, and 7 out of 10 family units have a cell phone. The huge response and joining of ICTs has decreased data and exchange costs, improved assistance conveyance, made new openings, created new income streams and spared assets. In agriculture as well as in food sectors across the world, ICT companies, multinational farm input business, large machinery manufacturers, but also small and medium farm input suppliers provide a number of services to farmers through ICTs, including extension advice. Downstream, grocery stores and agricultural item purchasers additionally take part in the food esteem chain through ICTs, where the innovation is likewise utilized by farmers' cooperatives, global associations, the common society and governments to effectively provide information on many aspects of farming.

3. Applications of ICT in Agriculture

3.1. Wider Market Access

One of the major drawbacks in Indian agriculture is complex supply stations for marketing of agricultural produce. Farmers do not get familiar with the updated prices of commodities, appropriate place for vending their inputs and purchaser inclinations also. ICT has the unlimited potential to expand marketing prospect of farmers directly to the customers or other suitable users for maximum profit. Farmers may connect directly with numerous users and may get information about existing prices for their commodities and can contact to the market sitting at home. Further, it will shorten the middle profit also which will be beneficial for the farmers. This can improve a farmer's source of income; empower farmers for making good decisions about suitable upcoming crops and commodities and marketing channels to sell their produce as well as to get inputs.

3.2. Irrigation Management

Real-time irrigation of crops is important to save water and increase productivity. need a convenient instrument to help illuminating them of right time to irrigate in real time. IT industry has conceivably biggest open door in the horticulture division for information age, constant observing and dynamic to achieve huge changes in agricultural water use by concentrating on some of the following areas − Agriculture field monitoring for humidity, soil moisture, crop water retention, weather information, plant characteristics etc. − Irrigation water reservoirs, canal & command area ICT can help in scheduling the optimal time of irrigation along with optimal water use for agriculture, which helps in preventing damage due to drought stress or over irrigational practices. Utilization of ICT apparatuses and correspondence organize like the web, mobiles, GPS, and so forth can help in far off management of water system exercises, groundwater extraction siphons. Utilization of ICT apparatuses

in irrigation management system can help water authorities in regulating supply of irrigation water from reservoirs and minimizing the distribution losses in command areas.

3.3. Land Management

Agricultural lands should be managed properly to confirm receiving maximum financial profit. As lands are cultivated by rural famers, economic viability reduces. Therefore, to enhance the economic viability of rural famers, land consolidation is essential. Land consolidation includes land reorganization which can be done by using efficient technology – fast and consistent. Conservation of land records and the availability of easily accessible land information is one of the most important issues facing governance today. "Land Records" itself is a generic expression and can include records such as, the register of lands, contracts and crop inspection register, mutation register, disputed cases register, etc. It can also include geological information regarding the shape, size, soil type of the land; and economic information related to irrigation and crops.

3.4. Digitization of Land Records

The Digital India Land Record Modernization Programme (DILRMP) is launched by Government of India in August 2008 meant to revolutionize organization of land records, minimize possibilities of land or property disputes boost transparency in the land records conservation system. The major apparatuses of the Programme are computerization of all land records including mutations, digitization of maps and integration of textual and spatial data, survey/re-survey and updating of all survey and settlement records including creation of original cadastral records wherever necessary, computerization of registration and its integration with the land records maintenance system, The main objective of the DILRMP is to develop a up-to-date, complete and clear land records management system in the country.

3.5. Weather Forecasting

Weather forecasting is the application of Information and technology to forecast the state of the atmosphere for a specified site and made by gathering measurable statistics. Weather plays a significant role in agricultural production. It has a profound effect on the growth, development and yields of a crop, occurrence of pests and diseases, water and fertilizer requirements. To avoid from weather changing issues, the weather advisory facilities have been launched. Indian farming community is in great requirement to have access to weather information to plot and manage crops and livelihoods. The ICT plays vital role in weather advisory service. It provides tools and techniques for weather forecasting services. ICT tools can be used to broadcast the information directly to the user in very lucrative behaviors. It can also modify according to geography, language and specific need of users. The weather forecasting assistances the farmers to regulate the time of numerous actions such as sowing, weeding, spraying and harvesting.

3.6. ICTs and Farmers' Consultative Services

Information broadcasting is an important aspect of farming. The form of this information may be recorded texts, drawings, photograph, video of events, audio, animations, and so on. Another aspect of this is how to handover

this information specially in digital form. The most extensively used and available tools of farmers' advisory services are- telephone based Tele Advisory Services, the mobile based Agri Advisory services, television and radio-based mass media programs, web based online Agri Advisory services, video-conferencing, On-line Agri video Channel, besides traditional media like, printed literature, newspapers, and farmers exhibition/fair etc. Most of the agricultural institutes and organizations have their own telephone based advisory services for farmers which provide telephone based Agri advisory services over a dedicated telephone number to deliver real-time information and advisory.

3.7. Remote Sensing

There are numerous kinds of remote sensing systems used in agriculture but the most common is a passive system that senses the electromagnetic energy reflected from plants. When farmers or ranchers detect their fields or pastures to assess state without physically touching them, it is a form of remote sensing. Detecting the colors of leaves or the complete appearances of plants can determine the plant's condition. Remotely sensed images taken from satellites and aircraft provide a means to assess field conditions without physically touching them from a point of view high above the field. Most remote sensors see the same visible wavelengths of light that are seen by the human eye, although in most cases remote sensors can also detect energy from wavelengths that are invisible to the human eye. The remote assessment of the sensor and the capability to store, examine, and show the sensed data on field maps are what make remote sensing a possibly significant instrument for agricultural producers.

3.8. Geographic Information System (GIS)

A geographic information system (GIS) is a technological instrument for understanding geography and making smart decisions. GIS systematizes geographic data so that a person reading a map can select data essential for a specific scheme or job. Geographical Information System (GIS) combines site data with both quantitative and qualitative information about the location, to visualize, study, and statement information through maps and charts. Using the technology, conduct what-if situations, and visualize outcomes. GIS is recognized as a system used to achieve infrastructure resources, natural resources and any substances as per condition. GIS aids geographical location, parent child relationship, unique identification, attributes, technical parameters, 2D/3D view and any other requirement modified. GIS information/data is most adoptable, correct and user-friendly to meet all-purpose requirements of processes and other software applications.

3.9. Global Positioning System (GPS)

In agriculture, the use of the Global Positioning System delivers assistances in geo-fencing, map-making and surveying. The Global Positioning System (GPS) is a satellite-based navigation system that can be used to discoversites anyplace on the earth. GPS delivers nonstop (24 hours/day), real-time, 3- dimensional positioning, navigation and timing worldwide in any weather condition. More recently farmers have gained access to site specific technology though GPS. GPS makes use of a sequence of satellites that classify the location of farm equipment within a meter of an actual site in the field.

3.10. Decision Support Systems

Decision Support Systems (DSS) are a precise class of computerized information system that supports commercial and structural decision-making actions. DSS are data-driven, as the entire process feeds off of the gathering and obtainability of data to investigate using many tools, which use input data/information and produce output/ decision after certain processing based on some set rules/criteria. DSS facilitate users in understanding the influence of numerous factors/constraints on the system. ICT has aninordinate role as decision support system to the farmers. The decision support system through ICT facilitates farmers for planning type of crops, practicing good agricultural practices for cultivating, harvesting, post harvesting and marketing their produce to get better results.

4.ICT and Its Challenges in Agriculture

It is very significant that the application of ICT in agriculture is growing. Use of ICTs in Agriculture supports in dissemination ofcollected information to the farmers, mostly lived in rural areas. The information provided by the system must be in easy to access, cost-effective, accessible system and well protected from unauthorized admittances. This ensures the actual and well-organized use of information and communication technologies for studying, applying existing and scheming and innovative applications to help the agricultural sector. An authentic agricultural database based on climate condition and soil, crop cultivation history, demand of raw material, farmers interest, pest and disease management technologies, marketing system, storage facilities, etc. have to be developed with the help of ICT and Geographic Information System.

4.1. The major challenges to "Agriculture Sector in India" are following:

1) Inadequate use of ICT for agricultural purposes.
2) Connectivity especially high speed Internet connectivity in rural areas is also another big challenge.
3) Agricultural content up-gradations and its development.
4) Insufficient agricultural support facilities and infrastructure.
5) Ownership issues of the public and government generated data.
6) Inadequate use of Public-Private Partnerships in India.
7) Lack of consciousness regarding appropriate agricultural approaches among the farmers.
8) Absence of an "Agricultural Think-Tank" in India,
9)The information asymmetry between farmer and farmer, village and village, region and region and the country as a whole against other countries.
10) Deficiency of policies, plans, arrangements, intensive care and switch that ensure cross-sectoral and multi stakeholder involvement.

5. Conclusion

Agriculture is different from industry and plays a significant role in the economic development of a nation. Information and Communication Technology (ICT) plays a substantial role in developing agricultural growth

through the use of various devices to attain economic sustainability and self-reliance. Most studies focus on evaluating critical adoption success factors while broadly discussing the failure to adopt information technology. This paper is a focused attempt to contribute to a better understanding of adoption success factors and adoption problems of ICT in agriculture. Data has been collected on the basis of secondary sources such as economic survey, research articles, papers etc.It also highlights e-Agriculture as an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. Mentioned in Economic survey 2019. Even today, nearly half of our population depends on agriculture as their primary occupation and income source. But changing time requires changing needs and changing demand. ICT is viewed as a game changer in dealing with new challenges of agriculture. The results show that Agriculture is a major profession for the majority of residents in India. The agriculture sector has been on under development for recent years due to lack of technology. Information and Communication Technology (ICT) can modernize Indian agricultural segment and can support all farmers as well as small landholders. Agriculture needs valuable utilization of technology to speed up production. ICTs can develop communication collaboration and eventually modernization among the growing collection of actors in agriculture. Internet, mobile phones, radio and television are main tools of communication providing information to farmers about agriculture. In this paper, several significant issues discussed with use of ICT in agriculture and make an effort to explore the range of ICT methods for agriculture. These technologies, when utilized in a suitable approach, would prove to be advantageous in improving yield and profitability. Usage of technology would develop in supporting livelihood opportunities for the farmers.

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