Information Explosion and the 21st Century Youth:
Prospects and Challenges

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Information Technology for Agricultural Development in India

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ABSTRACT

India is an agrarian economy with 68% of population lives in the villages. Rural sector play an important role in Indian economy, because most of the raw material for industrial sector as well as agricultural and food grains product are arise from rural sector. It is also known as back bone of Indian Economy. Due to fast Growing Population of our country demands for foodgrains is also increasing. At the same time, the traditional inefficient agricultural practices are pressurizing to reduce fertility and yields followed by the exploitation of farmers by the middlemen who prevent the farmers from getting the best price for their produce. Under such circumstances, information technology becomes more important for agriculture sector. Since information technology is creating revolution in every field there is a necessity toempower the rural community also by creating appropriate technological infrastructure, promoting digital literacy and providing various digital services. The vision of our Honorable Prime Minister assures several initiatives taken to provide "Protective shield" to the farmers to increase production, improve storage and connectivity with the consumers for timely supply and profit. This paper intends to explore the possibilities for scope of information technology in agriculture and initiatives taken by Government and other private sector companies for providing Digital Infrastructure.

OBJECTIVES

To study the need and possibilities ofinformation technology in Indian agriculture sector and to find out the scope of applying information technology in agriculture laying emphasis on various ICT tools used in agriculture and their impact on rural economic development.

METHODOLOGY

The methodology is divided in two parts one is conceptual study of possibilities of applying information technologyfor agriculture, and study of some practical application of these technologies in India for which information is collected from online source .This paper covers "Digital India Program" and the Impact of digitalization on Indian agriculture, which has PAN India coverage.

Second is to study the impact of information technology on agriculture. The methodology used in this research work is secondary data analysis. Only secondary data taken from some authentic government sources, magazines and research papers of some eminent researchers is taken. Information was collected from online data and information available through Government sources.

INTRODUCTION

Over the last few decades massive technological development has transformed people's lives India is experiencing technological boom and in recent times its need is being felt in the agriculture sector also. India being a country where about 68% of the population lives in rural areas and agriculture is the main source of livelihood for about 58% of the population, the role of information technology is rather important for the development of economy.

The emergence of farm technologies along with the information and communication technology (ICT) framework is still evolving in India, and it holds tremendous potential to both positively impact agricultural performance and enhance farmers' income.Information and Communication Technologies (ICTs) will play a key role in the exchange of knowledge, targeted recommendations, market integration and access to finance to make agriculture a profitable enterprise and attractive for youth. New digital technologies now make it possible to collect and leverage huge amounts of critical data at minimal costs.

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Thus making a farm's field operations more insight-driven, and potentially more productive and efficient. The agriculture eco-system is already starting to invest in these digital technologies. Greater use of digital agriculture services is vital to not only improving a farm's financial performance, but also to meet the food needs of an expanding population.

Technology isempowering Indian agriculture by helping overcome productivity stagnation. In providing climate information, strengthening market linkages, and enhancing farm management. In the past, Indian agriculture faced a challenge to grow more food, but presently it faces rather more difficult challenge today and for the future that is to grow food more sustainably for which information technology proves to be a reliable solution.

Need forInformation technology

» In India farmers still mostly depend upon 'fellow farmers' as the preferred source of information, followed by retailers of Agrobusiness, and TV/Radio/Mobile and only very few on Agri-extension officers. Information provided by extension services are either biased (e.g. Agri marketing companies) or less actionable due to lack of consistency, accuracy and personalization (e.g. some public sector programs). This actsas a hindrance for adoptionof modern Agri-practices due to which crop yields in India are still very low as compared to other developed as well as developing Countries. Thus proper digital platform for information is required by the farmers in order to get up to date information.

» Small and marginal farmers also suffer as they produce small quantities and their socio-economic conditions force them to depend on multiple layers of middlemen.Hence they also need information and other modern facilities.

» Information technology manages risk and creates opportunities by providing timely information and cost-effective techniques.

» Social effects of the Digital Green approach on the community can also be seen in the community's sense of empowerment through exposure to new skills and technologies. Most of the villages in India where Digital Green functions have little or no access to electricity or even basic technology like television, computers or mobile phones have the younger generation keenly interested in accessing them and also enthusiastic to learning the 'Modern' skills.

» Information technology will help Agriculture Sector to Improve Yield & meet the growing demand for agricultural produce.

» Make Agriculture More Profitable (Higher Production at Lower Price).

» Optimum Utilization of Resources

» Cheaper & Economical-Tailored to Specific Needs of the farmers

» Helping overcome productivity stagnation

Possibilities under Smart Agriculture

Information technology in agriculture sector will help improve yield and meet the growing demand for agricultural produce. There are number of possibilities under Smart Agriculture like -

» Information about Modernizing Warehousing and storage

» Making crop insurance more effective

» Precision farming with GPS assistsfor best crop management.

» Drought and moisture control and meteorological data analysis

» Information about Analysis of rainfall data and recommendations to aid in better decision making

» Information about irrigation data, rain fed areas, dry lands etc.

» Information about Soil quality and pest control

» Information about livestock and cattle health

At the pre-harvest stage, Information technology can be used torecommend type of crop and input selection and assist the farmer in obtaining credit and insurance, Plant disease and pest-related assistance; at the post-harvest stage, real-time data on both domestic and export markets are needed. The growth of competitive markets in the country and globally as well as demand for consistent food quality is making the adoption of such techbased solutions imperative for the Indian farmer in order to

...in the market.

Technologies that are important for modern agriculture are -

- **Mobile** Phones
- **Mobile** Money / Digital wallets
- **Remote** Sensing
- **Drones**/Unmanned Aerial Vehicles (UAV)
- **Big** Data and Analytics
- **Mobile** Soil Testing Laboratories
- **Soil** Health Cards
- **Digital** Soil Maps
- **National** Identity Databases (Aadhaar)
- **E-**Commerce
- **Sensors** Networks (plants, soils, irrigation, etc)
- **End**-to-End services for farmers Data ecosystem
- **Aggregates** geospatial and temporal datasets for sustainable intensification (e.g. digital soil maps, weather, variety adaptation zones, crop systems)

Digital Technologies Transforming Indian Agriculture

Government'sDigital India project launched on 1st July 2015 by Honorable Prime Minister Shri Narendra Modi, envisions empowering citizens with e-access to government services and livelihood related services. The project has three core components, i.e. digital infrastructure, digital services and digital literacy.

Program "Digital India" which seeks to empower people through access to digital technology providing increasingly robust infrastructure and service platform has immense potential to positively impact agriculture. The government has also launched the Custom Hiring Centre, a rental model for using tractors and other farm equipment with the twin objective of encouraging rural entrepreneurship.

Among the prominent ventures backed by large conglomerates in India is ITC's e-Choupal, a comprehensive digital knowledge hub for farmers, which has 6,100 installations covering over 35,000 villages and serving over 4 million farmers.16 Launched in 2000,[1] the first-of-itskind initiative not only benefited the farmers doing business through their network.

Mahindra & Mahindra (M&M), one of India's leading producers of tractors and farm equipment, is innovating along with expanding its core business. M&M's Trringo, a mobilebased app enabling farmers to rent tractors, is a unique example of leveraging technology to help farmers use machinery without having to make the large investment through Trringo.

Tata Consultancy Services (TCS), India's leading IT firm, offers personalized advisory services in voice and visual formats using communication devices such as mobile phones through its m-KRISHI platform. The growing penetration of mobile phones in rural regions of India is leading to the development of several mobilebased applications by government departments, entrepreneurs, and private sector.

A large number of entrepreneurs have also ventured into this sector to take up specific challenges. Due to technology thrust of these ventures there has been on reduction in the time duration of crop cycles,reducing the usage of agro-chemicals, saving on water and energy, automating for efficient farm management, reducing the usage of agro-chemicals strengthening farmer market linkages, and improving cold chain logistics for higher value addition. Examples of these leading startups are -

Ekgaon Technologies - Offers a range of services to farmers, rural businesses, and women. The Ekgaon One Village One World Network is leveraging mobile communication technology to encourage the sustainable development of women-self-help-groups (SHGs) and small farmer

Stellapps Technologies - This is providing dairy farm optimization and monitoring services with a special focus on small and medium-herd farms. Their applications and tools leverage the Internet of Things, big data, the cloud, mobility, and data analytics to improve milk production, milk procurement, and the cold chain, and to boost animal insurance and farmer payments.

A number of new start-ups are also developing solutions to tackle with the climate change

challenges. For example, Skymet Weather Services is involved in monitoring and predicting weather and providing Agri-risk solutions.Skymet can measure and predict yield at the village level for any crop with a high level of accuracy and can also accurately forecast the weather in the short, medium, and long term.

Ecozen Solutions has developed stateof-the-art solar-powered products for irrigation and cold storage, with the aim of catering to small & marginal farmers and regions with limited or no electricity.

Barrix Agro Sciences offers eco-friendly crop protection methods that have the potential to minimize a significant proportion of the damage caused by pests and diseases without overdosing crops and plants with chemicals, thus preventing soil and water contamination.

There are also ventures that started out as Agri-tech start-ups in India but, owing to their innovative solutions, are now operating as medium-scale businesses.

e-Kutir Global, offers an online and mobile based platform to connect marginal farmers with stakeholders across the value chain such as soil-testing labs, suppliers of seeds and fertilizers, banks, exporters, food-processing units, and branded retailers. Agri Suite by e-Kutir offers a one-stop solution for all the needs of a farmer; their field partners also train farmers to use their application.

The budget announced by the central government confirms its commitment to modernize agriculture systems in India through information technology. Due to the efforts of the government the rural internet penetration has grown from 18 percent in 2016 to 20.26 percent in December 2017.

"Even through the growth rate in rural India may seem higher, it is mainly due to low-base effect, given total internet users in rural India are still critically low," said the report titled "Internet in India 2017" released by the Internet and Mobile Association of India (IAMAI) and market research firm IMRB Kantar.

CONCLUSION

The application of information technology in agriculture has been helpful in promoting data generation as well as the advanced analytics that allow farmers to make smart decisions about farming and to benefit from an economical use of inputs and labor. Although application and innovation in the field of Digitalization of Agriculture, still remains to be exploited.New digital technologies now make it possible to collect huge amounts of critical data at minimal costs—thus making a farm's field operations potentially more productive and economical. It will also help to meet the food needs of an expanding population. Designed for developing countries and small farmers, digitalization can enable agro-input providers to boost productivity and help farmers improve agricultural yields by providing information regarding fertilizer, pesticide, and seed recommendations personalized for each farmer's land and needs. 'Digital India' is also aiming to transform the interface of country's socio-economic dynamics and will help to bring

systems and infrastructure up to speed and leverage the country's workforce. Hence, aiming to revolutionize the Indian agriculture and achieve the government's target to double the agricultural income by 2022. While we have already witnessed two revolution, first being Mechanization of Agriculture, second green revolution, we are now heading towards the third revolution that will be Digital revolution to transform the rural sector of our country.

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