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Internet and its impact on extension advisory services: A critical review

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Abstract

Internet is influencing all aspects of life, in which the impact of internet is significant on extension advisory services. It is expected that the Internet/IT led extension systems are going to act as a key agent for changing agrarian situation and farmers' lives by improving access to information and sharing knowledge. There is an urgent need of internet in agricultural extension especially in the areas like; to expand knowledge resources, to facilitate better information access, to supplement inadequate technical manpower, for stronger research-extension-client system linkage, to develop efficient feedback mechanism, for cost-effective extension delivery, to ensure gender equity in technology transfer process, to empower small and marginal farmers, to develop knowledge managers and to serve the farm stakeholders beyond technology transfer role. The purpose of this review article is to discuss the benefits of internet use in agricultural development in general and extension advisory services in particular.

Keywords: Agricultural development, e-extension, internet and impact

Introduction

In the Indian scenario, agriculture constitutes an important part of economy and about two-thirds population of India is directly or indirectly depends on agriculture and allied activities for their livelihoods (Bommarco *et al.*, 2013) [3]. India ranks second worldwide in farm output. Share of agriculture and allied sectors to Gross Domestic Product (GDP) was around 20 per cent in 2020 (The Economic Times, 2020) [23]. There is a continuous decline in the share of agriculture and allied sectors to GDP from around 52 per cent in 1951 to around 20 per cent in 2020. It is a significant source for the overall socio-economic development of the country (Wagh & Dongre, 2020) [24].

Strengthening of agricultural infrastructure should be given utmost priority needed including input delivery, credit, minimising post-harvest losses, cold storage chains, marketing, etc. Shrinking of the extension services is another component of infrastructure that needs attention. The government has a huge research and development infrastructure in the form of institutions such as Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs) and Agricultural Technology Information Centres (ATICs). The role of this set-up in research and extension activity is of immense importance. However, crumbling public extension services are a cause of concern (Malik and Kumar, 2019) [14]. The farmers need timely agro-advisory services to do better farming and good returns. However, the farmer and extension service gap is rising day by day because of various constraints in the system i.e. agro-input supply chain inefficiencies, digital divide existed among the research-extension & farmers, agriculture marketing deficiencies, shortage of finance, significant problems in the diffusion of and access to agricultural information and coupled with the limited human resources of extension professionals due to which the information needs of the farmers were not met. Particularly, the farmer looks for instant help when some pest or disease attacks on the crop avoid losses. The farmer mainly depends on the fellow farmers and input dealers for instant advice in order to avoid damage to the crop (Mittal *et al.*, 2010) [16].

Agriculture was facing a severe challenge and coupled with the limited human resources of extension personnel due to which the information needs of the farmers were not met. As in India, the extension worker: farmer ratio is 1:1000 (Kaur *et al.*, 2017) [10]. Whereas in Haryana, the condition was even more worse having a ratio of 1: 2500 (Haryana Kisan Ayog Report, 2018) [7].

Therefore, it is very much difficult to provide a large number of paid officials to do the job. In this context, the arrival of ICTs in agriculture extension services is well in time.

ICT stands for Information and Communication Technologies. ICT refers to technologies that provide access to information through communications. It is similar to information technology (IT). "But primarily focuses on communication technologies. This includes the internet, wireless network, cell phones and other communications medium". In the past few decades, information and communication technologies have provided to society with vast array of a new communication capabilities. Modern information communication technologies have created a global village in which people communicate with others across the world as if they were living next door. "For this reason ICT is often studied in the context of how modern communication technologies affected society". In short, ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning (Khan *et al.*, 2015) [12]. The use of ICT, in extension, enables the extension workers to be more effective in meeting the information needs of the farmers and to speed up the extension process. ICT aimed at harnessing the present day technology platforms that are already available and use them innovatively to build tools that can aid in bridging the information gaps that exist between the farmers and the extension workers/agricultural scientists. ICT can also play an important role in bringing sustainable agricultural development when used to document both organic and traditional cultivation practices. Improved agricultural, environmental, and food security planning and systems for the agriculture sector are obvious areas where ICTs can add significant value.

Internet, the base of ICT, overcomes some of these most challenging issues related to advisory services like – accessibility, literacy and language barriers, geographic coverage and local focus. Earlier, the agriculture information and technology transfers are mostly done by village level workers, extension personnel, scientists, subject matter specialists of KVKs, universities etc. But, with the arrival of internet, most of the information were tried to avail by web-based approach (e-based services) through e-choupals, kiosks, SMSs and voice message delivery system, social networking websites like Whats App, Facebook etc. so that farmers can get timely information about policies, good agricultural practices, market prices of commodities, current demand of commodities and various useful agriculture schemes and reap good profit. However, the experience of introducing internet as an agro-advisory tool all over the world over the past several decades suggests that the full realization of the potential benefits of internet as an extension tool is not automatic. The effective integration of internet into the agricultural extension system is a complex, multifaceted process that involves not just technology-indeed, given enough initial capital, getting the technology is the easiest part but also curriculum, institutional readiness, extension personnel competencies, and long-term financing, among others.

Review of Literature

The review of literature is made available from different

researchers about the usage of ICT for transfer of technology and then critical analysis is done.

Kaushik and Singh (2004) [11] conducted a study on reforming the agricultural extension system in India: What do we know about what works where and why and reported that it was widely accepted that extension services were an important element in farming, but poor and marginalized farmers in remote villages remained beyond the reach of appropriate services. Internet allows efficient and transparent storage, processing and communication of information and that entrepreneurial innovation in this field may affect economic and social chain. Through the work, Nazim and Saraf (2006) [18] presented the factors influencing the use of internet among extension personnel. The important factors that affected the use of Internet were slow speed, high internet charges, lack of training and lack of organized information. In the paper access of farmers to ICTs for agricultural development in Bauchi local government area, Bauchi state, Adejo and Haruna (2009) [1] emphasized the use of ICTs in boosting agricultural production among farmers. They also indicated that ICTs promoted access to and sharing of information in agriculture and allied fields. Agwu and Elizabeth (2013) [2] throw a light on the access and utilization of modern ICTs among extension personnel in Benue state of Nigeria and reported that most of the women in agriculture staff had access to telephone, television and radio, respectively. Radio, video machine, television and telephone were used by the respondents to a large extent in reaching out to farmers. As far as constraints are concerned, absence of correspondence framework on which ICTs depend was ranked as a major constraint followed by absence of adequate prepared PC staff, sporadic power supply, poor fund etc.

A research conducted by El-Siddig and Musa (2013) [5] on challenges of using ICT to disseminate agricultural information to the farmers in Sudan revealed that the dissemination processes faced cultural, technical and socio-economic challenges. Through the work, Naik (2014) [17] identified the barriers which effect the adoption of ICT based extension services. Major barriers identified were lack of training, poor infrastructural development and poor network connectivity. He further stated that easy to adopt, up to date nature of the ICT based extension services, no requirement of physical presence of expert, useful content of the services, timeliness of the information, and relevancy of the information were the major drivers of adoption of the ICT based extension services. As far as consequences of not adopting the ICT based extension services are concerned, loss of contact with timely information was ranked as major consequence followed by loss of production, loss of competitiveness etc. Casaburi *et al.* (2014) [4] reported that sending SMS messages with agricultural advice to small holder farmers increased yields by 11.5 per cent relative to a control group with no messages. Enabling farmers to report input provision delays to the company reduces the proportion of delays in fertilizer delivery by 21.6 per cent.

Syiem and Raj (2015) [21] throws a light on access and usage of ICTs for agriculture and rural development by the tribal farmers in Meghalaya State of North-East India and reported that factors like; age, education, annual income, cosmopolitaness, social participation and attitude towards ICTs had a significant association with the usage of ICTs of the farmers. They further revealed that lack of confidence in operating ICTs, erratic power supply, low network connectivity, lack of awareness of benefits of ICTs, lack of

skill in handling ICTs, low ICT literacy, lack of repairing facilities, attitudinal barriers towards ICTs, poor finance, lack of training and practical exposure, high cost of repairing ICTs and insufficient regional language were the major constraints faced by the farmers in the effective use of ICTs. Kale *et al.*, (2016) ^[8] highlighted the scientists' perception towards the role of ICTs in agricultural extension and illustrated that internet is an important source for collecting current information on production technology, processing, value addition, marketing and other aspects of agriculture. They also revealed that ICTs were helpful in KVKs to carry out the extension activities like training, demonstration, field day, farmers fair, campaign etc., which was perceived as first important application followed by strengthening the research-extension-farmer linkage etc. Malik *et al.*, (2017) ^[13] revealed that majority of the extension personnel used the internet regularly for various agro-advisory related activities followed by occasionally and never used it. They further revealed that almost half of the respondents devoted less than one hour on internet usage per day at their work place followed by 1-2 hours and 3-4 hours per day.

In the paper constraints and suggestions perceived by KVK scientists in utilization of ICT for agricultural extension, Kale *et al.*, (2017) ^[9] revealed that the lack of expertise to use ICT, slow functioning of internet, lack of trainings related to ICT use, lack of awareness among the farmers regarding ICT use for educational and agriculture purpose were the major constraints in ICT use. To resolve these challenges, they suggested different remedies like; proper and improved infrastructural facilities at KVKs as well as village level, skill development and updating with trainings, creating awareness regarding use of ICTs for educational and agricultural purpose. Tata and McNamara (2018) ^[22] conducted a study on social factors that influence use of ICT in agricultural extension in Southern Africa and reported that personal and wider socio-economic conditions do have an impact on the proficiency of extension agents using Farm book. They also suggested that government and the international community should increase awareness of ICTs including Farm book and integrate such technologies for use within government extension programs. In addition, both the public and private sectors should work together to support further ICT development and applications like Farm book. Malik *et al.*, (2018) ^[15] conducted a survey on effectiveness and opinion of agri-extension personnel about IT as an extension advisory tool: a case study and indicated that internet has enhanced the practice of extension and personal contact adjudged as a most effective extension tool.

Sulibhavimath and Sharma (2018) ^[20] highlighted the extent of use of ICT by KVK extension personnel of Punjab and Karnataka states for acquiring & disseminating the knowledge and revealed that most of the KVK extension personnel of both the states always used Google search engine for acquiring knowledge under different purposes and used mobile phone, camera, SMS service system and WhatsApp (social media application) for disseminating knowledge to farmers. They also suggested that that more training programme should be organized for increasing the extent of use of ICT for reaching maximum number of population. Nyarko and Kozari (2021) ^[19] presented a study on Information and Communication Technologies (ICTs) usage among agricultural extension officers and its impact on extension delivery in Ghana. The general picture highlighted that use of ICT tools is higher among extension officers, but

has very little application in extension service delivery. They further indicated that most critical factors affecting extension officers' access to ICT in Ghana were weak telecommunication network connection, lack of ICT training opportunities, and the lack of ICT infrastructure to cushioning extension activities. As far as suggestions are concerned, the authors suggested that extension services should also provide the extension officers with ICT devices and software designed purposely for extension advisory service to enable them communicate easily with farmers.

Major ICT initiatives and use of internet for agricultural development

Various initiatives in the recent past portrayed the significant role of ICT plays in the realm of agricultural development. Several projects have reduced the costs and it also has increased transparency. India has taken up major initiatives in terms of content delivery and furthering agricultural development through internet. For example, National Agriculture Technology Project was launched in 1998 to revitalize the agricultural research and extension systems to develop and transfer sustainable technologies for food security, poverty-alleviation, natural resource management, and environmental degradation prevention. The direct beneficiaries were the farming communities, especially the small and marginal farmers in the participating districts and upazilas (sub-districts). Similarly, Warana Wired Village project initiated in 1998 by the Prime Minister's Office Information Technology (IT) Task Force, which aims at giving villagers access to information in local language about crops and agricultural market prices, employment schemes from the government of Maharashtra and educational opportunities. Moreover, the ambitious Agricultural Marketing Information Network (AGMARKNET) was launched in March 2000 by the Union Ministry of Agriculture. It facilitates web-based information flow, of the daily arrivals and prices of commodities in the agricultural produce markets spread across the country. Community Information Centre (CIC) which aims at bringing the multifarious benefits of Information and Communication Technology (ICT) to the grass-roots in the relatively remote and less developed regions of India launched by Government of India on the historic day of August 17, 2002, is the world's largest tele-centre initiative. It was envisaged that the CICs would create IT awareness among local people, conduct computer training programmes and disseminate tender notification and e-employment notification.

Gyandoot project was launched in Dhar district of the state of Madhya Pradesh, India, in January 2000. The project extends the benefits of information technology to people in rural areas by directly linking the government and villagers through information kiosks. The kiosks provide access to a variety of government services, such as registration of complaints and submission of applications for the issuance of certificates and loans. Similarly, e-Seva, an e-Government project initiated by the State Government of Andhra Pradesh (GoAP) in June 2002. It act as a tool to bridge the digital divide and has used ICT for providing access to various citizen-to-citizen (C2C) and citizen-to-government (C2G) services to the people living in rural areas. Under this Project, web enabled rural kiosks (centres) have been established in the villages. Bhoomi (Land record computerization) is a flagship project of the Karnataka State Government that was launched in 2000 with an aim to digitize all land records in the state to prevent corruption and

manipulation of data. It is jointly funded by the Government of India and Government of Karnataka. Moreover, the ambitious project ITC e-Choupal was launched in 2000 and it covers the states of Madhya Pradesh, Uttar Pradesh, Maharashtra, Rajasthan, Andhra Pradesh and Karnataka. Moreover, the project helps to increase farmers' incomes by facilitating empowered access to farm input and output markets to the farmers, small and big alike to enhance resource productivity, improve product quality and reduce transaction costs.

Main application of internet in agriculture sector

E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use internet in the rural domain, with a primary focus on agriculture. The main application of internet in agricultural sector is (Food and Agriculture Organization, 2015) [6].

- Office Automation
- Wireless Technologies
- Global Positioning System
- Geographic Information Systems (GIS)
- Computer-Controlled Devices (automated systems)
- Smart phone Mobile Apps in Agriculture
- Radio-Frequency Identification Technology (RFID)
- Agricultural Resources and Services Management (ARSM).

Conclusion

The available literature reveals that online agricultural extension is a paradigm shift in the mode of the communication and interaction resulting in the qualitatively change in the existing practices of agricultural extension. It has not only improved the speed of communication but has also effectively addressed very large audience across large catchments across even in remote parts. Online agricultural extension can be an effective tool of informing the farming community about the government vision, policy and practices with in fraction of time. Moreover, the paper recommends that online agricultural extension model can be used as an effective guide for e-governance, information sharing, transparency and addressing public grievance in speedy manner.

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