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Emerging role of information communication technologies in agriculture extension

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Abstract

With the use of information and communication technology (ICT) tools, farmers can obtain up-to-date market prices for inputs, commodities, and consumer trends. This can strengthen their negotiation position and enable them to make a living. A key component of information and communication technology (ICT) is timely and accurate information delivery to farmers so they can use resources on their farms more sustainably. The issue that now has to be addressed is how this knowledge can be shared with such a wide range of farmers. ICT will become more important in market information, market intelligence, and private sector agribusiness in addition to agricultural extension. This research examines the impact of information and communication technology (ICT) on farmers' attitudes regarding attempting to adopt new technologies, as well as their increased awareness and knowledge of agricultural technology and information. In the information era, agricultural extension has been acknowledged as a crucial channel for providing farmers with guidance and information, and this is made possible by information and communication technology (ICT).

Keywords: Agricultural, ICTs, cyber, extension and impact

Introduction

In agricultural extension, new and improved methods and techniques for planting crops and raising animals are made available to farmers in their settlements through service informatics, advice, and assistance given to help them improve their methods of production, marketing, and processing activities (Olaitan and Omomia, 2006) ^[17]. Agricultural extension is already recognized as information and knowledge sharing. Agricultural extension services' global goals continue to be the improvement of rural populations and farmers' standards of living via greater farm income and productivity.

Utilizing information communication technology (ICT), the most recent advancement in communication technology, has enabled growth in the agricultural sector. In the words of the Asian Development Bank (ADB) and the Center for Agricultural and Rural Cooperation (CTA) (2003) ^[16], information and communications technology (ICTs) is a catch-all term that includes computer and telecommunications technology. In their general highlights of electronic means, Chadwick (2003) ^[5], and Arokoyo (2005) ^[1] listed radio, television, landline and cell phones, the internet (www), short messaging services (SMS), cameras, video, e-mail, computers, Compact Disk—Read-Only Memory, digital optical disc (DVD), groupware, rural radio (RR), Web publishing, and search engines, among other things. According to the Food, Agriculture and

Natural Resources Policy Analysis Network (FANRPAN) (2011) ^[8], information and communication technologies are an ever-expanding collection of technologies used to manage information and facilitate communication.

ICT, the primary driver of change in extension services, has a significant impact on improving agricultural extension administration by assisting in the diagnosis of issues, the interpretation and application of data, and the creation of knowledgeable and informed farming communities on both an individual and group level (Gurstein, 2000) ^[9]. Once more, extension education contributed to the management of newly developed agricultural practices and methods by offering knowledgeable and new technology, current information and services for increased production, bettering market access, building capacity and empowerment, and providing information for improvement (Chadwick, 2003) ^[5] information communication technology helps and encourages cooperation between farmers, extension agents, agricultural researchers, and other stakeholders, claims Farrell (2003) ^[7]. Thus, information communication technology can be used as a tool to revitalize the nation's extension network, meeting the demands of an ever-growing population information communication technology is becoming a more vital instrument for societal progress and is the engine of the global economy.

Information communication technology in Agriculture

Information communication technology has the potential to boost Indian agriculture markets' production. With the right technological infrastructure and tactics, knowledge can be a valuable resource that can significantly impact the growth of agricultural markets as a whole. Jones (1997)^[10] asserts that agricultural extension is a crucial means of providing guidance and information as a modern farmer's input. It is necessary to refocus on the distribution of knowledge and information rather than technology. This is made feasible by the use of ICTs, which may help agricultural extension become a more knowledge-driven and diverse system to fulfil farmers' information needs and help them manage resources on their farms more sustainably. Technology may constantly bring new information services to the agricultural sector, giving farmers more control over the dissemination and access of information. One of the most important prerequisites for the farming systems' sustainable development is having access to these new information sources.

Role of information communication technology (ICT) on Agricultural extension services

In order to disseminate innovations and information more effectively, extensive use of contemporary information technology will be encouraged for communication between researchers, extension agents, and the farmers they serve. Additionally, it highlighted the use of IT in marketing, the expansion of electronic mass media's application in agricultural extension, farmer involvement in IT initiatives, and support for state governments utilizing IT in agricultural extension. According to the National e-Government Plan, typical agricultural services would be provided as Mission Mode Projects (MMPs) to farmers, offering them information on government programs, soil advice, crop management, seeds, fertilizers, pesticides, weather, and agricultural output marketing. The Department of Agriculture and Cooperation (DoA and C), Government of India, has started a number of projects, including Krishi Maratha Vahini in Karnataka, KISSAN and e-Krishi in Kerala, and ASHA in Assam. DoA and C have chosen a twin strategy using AGRISNET and the two portals AGMARKNET and DACNET to lead the deployment of MMP in agriculture (Mathur *et al.*, 2009)^[14].

Information communication technology as hand tools that are very valuable for use in agricultural extension services include: CD Rom; Web publishing; Distance learning; Packet Digital; Packet Digital Assistants; Printed Materials; Group meetings; Contact farmers; photographs; Workshop; handbills; E-mail; 2go; YouTube; Web-metrics; DVD; Video; Contact data bases and systems; among other things, charts (Mukesh, Deepati, and Kanini, 2010)^[15]. More specifically, their unique interest in and emphasis on transmitting to audiences in their local language has contributed to the rise in popularity of radio use. This is consistent with findings that radio access is more widespread than that of any other ICT, with 4 out of 10 people residing in rural areas owning a radio.

One of the biggest challenges facing agricultural experts and the farming community is increasing production. Agricultural extension services give farmers vital access to the knowledge, data, and technology they need to increase productivity, which in turn improves the standard of their

life and means of subsistence. For this reason, it is essential to give farmers access to timely and high-quality knowledge and information. Due to a lack of infrastructure, farmers in distant communities have limited access to some innovative technologies, such as the tele-centre, which can be key catalysts for information, knowledge, and development prospects (UN, 2005)^[21]. Services provided by agricultural extension include information transmission, decision-making guidance and education, helping farmers define their own objectives and opportunities, and promoting desired agricultural improvements.

It has been discovered that information communication technology enables transparent and effective information processing, communication, and archiving, and that entrepreneurial innovation in this area may have an impact on social and economic transformation (Kaushik and Singh, 2004)^[11]. Kraemer and Dedrick (1994)^[13] showed a significant correlation between the rise of ICT investment and the growth of GDP and productivity in Asia-Pacific nations between 1984 and 1990. Extension agents would be able to collect, store, retrieve, and distribute a wide range of information with the use of ICT that small producers require, including information on new technologies, best practices, improved input and output prices, better storage facilities, enhanced transportation connections, group negotiations with buyers, and weather data.

Information communication technology in daily life

All technical tools used for managing information and promoting communication are referred to as ICT (Information and Communication Technology), and these tools include computers, network gear, communication lines, and all required software. Stated differently, information and communication technology (ICT) includes all forms of processing and transferring of audio and video signals, telephone, electronic media, and all control and management tasks based on network technologies (Celebic and Rendulic, 2011)^[4].

Agricultural extension

A supporter of regulatory change and information communication technology policy

It's important to moderate enthusiasm over the possible applications of new information communication technology by considering the realities of basic telecoms services' accessibility in rural and isolated locations. If the observatory had one takeaway, it would be this: "Rural connectivity" is a crucial problem. Increasing the active participation of agricultural extension practitioners in policy advocacy for rural telecommunications is one method to address the situation. A large number of observatory participants were eager to learn more and were in Favor of agricultural extension playing a position in rural telecommunications policy. Research demonstrates that even modest attempts to get rural telecommunications policy on the national agenda can yield significant outcomes.

Indian agricultural extension initiatives: insights from ICT

Syndrome of the pilot project- The majority of ICT-based agricultural extension projects were started as pilot

programs, and most of them were never carried out on a broader scale when the trial program ended. The funding (donor) and implementing agencies did not show sincerity in their efforts to keep up the pilot programs.

Unsustainable tremendous investments- A significant sum of money was spent on the development of portals such as the Rice Knowledge Management Portal (RKMP), TNAGRITTECH portals, and DG portals. These portals were created over a specific amount of time while in project mode. With little to no financial resources available, it was challenging to maintain pace and update the portal after the project term.

Users refusing to pay- The majority of farmers who benefit from ICT-based agricultural extension programs are not willing to pay for the services they obtain. Like farmers in most developing nations, the majority of Indian farmers believe that agricultural consulting services are a government welfare initiative, both at the state and federal levels. Therefore, they refuse to cover the cost of the services.

Small-scale functioning: The information communication technology for agricultural extension programs were deployed over a relatively small geographic area, serving hundreds or perhaps thousands of farmers at most. A remarkable number of initiatives, such as the "farmers call centres" and the "e-Soil Health Card Programme," span the whole nation. However, only a small number of websites, such as AGMARKNET, e-Krishi, and the Rice Knowledge Management Portal, were created for the bigger agricultural stakeholders. However, maintaining and updating online portals consistently requires enough resources, which after a few years were lacking.

Less permanent knowledge intermediaries- The majority of published projects were from academic and research organizations, which typically disregarded conventional extension systems and the long-term workers who provided extension services in rural India. They employed facilitators and mediators and implemented time-bound ICT-based programs. When the project's goals are met and its objectives are fulfilled, the facilitators likewise vanish. Because most field-level extension employees had never utilized the internet and lacked proficiency with other ICTs, public extension staff in the case of e-Arik were unwilling to work with the ICT project (Saravanan, 2008)^[20].

Challenges in locating material- In order to quickly modify content for local usage, it must be gathered from many sources and organized in a granular format. It was still uncommon to localize and customize material on a large basis (Balaji *et al.*, 2007)^[3]. In the event that there is insufficient scientific data, content must be created, evaluated, and improved before being used with ICTs to provide more advisory services. The majority of web sites are devoid of pertinent localized material.

One-way knowledge flow- The majority of information communication technology efforts have one-way information flow. There wasn't much room for conversation.

Farmers and experts can engage through projects like Farmers Call Center, Village Resource Center, e-Arik, e-Sagu, Digital Green, Lifelines India, and IKSL.

Lack of systematic evaluation- The majority of the initiatives never disclosed the findings of the evaluation; instead, they typically reported "positive" results and mentioned common issues such poor rural ICT infrastructure and trouble localizing and customizing material. Seldom was there a methodical, impartial assessment of the programs' effects. Similar projects were carried out in confined settings with minimal changes. With a few exceptions, the evaluation results of many initiatives were never shared or published even after testing hundreds of ICT initiatives for rural development over the previous 20 years. In India, there hasn't been a particularly remarkable thorough comparison analysis of e-agriculture initiatives (Keniston, 2002; Saravanan, 2010)^[12, 20].

Lack of co-ordination- Despite the time, money, and effort committed thus far, ICTs have not sufficiently permeated rural India due to the lack of collective and coordinated efforts by public-private agricultural research and extension institutes (Patil *et al.*, 2009)^[18].

Conclusion

The majority of people in India are either directly or indirectly dependent on agriculture, which is the backbone of the country's economy. Therefore, it is important to encourage low-cost information communication technology application, such mobile phones, to deliver agricultural information on plant protection, weather forecasts, agronomic practices, Price information, Livestock herders, Livestock farms, Health services and other topics. Information communication technology will be used more in the private sector for things like market intelligence, market information, and agribusiness. It is helping farmers decide more wisely on what crops and commodities to grow in the future. It's critical that farmers receive accurate information at the appropriate time. Therefore, it is imperative to determine pertinent information to convey via ICTs.

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