

Impact of Information and Communication Technologies in Agriculture Development

Addul Razaque Chhachhar^{1*}, Barkatullah Qureshi,² Ghulam Mujtaba Khushk³,
Shakil Ahmed^{4,5}

¹Department of Communication, Faculty of Modern Languages and Communication, Universiti Putra Malaysia 43400, Serdang, Selangor

²Faculty of Computer Science and Information Technology Universiti Putra Malaysia, 43400, Serdang, Selangor

³Department of Social and Development Science, Faculty of Human Ecology, Universiti Putra Malaysia,

⁴Department of Computer and Communication Systems Engineering, Faculty of Engineering, Universiti Putra Malaysia. 43400, Serdang, Selangor

⁵Department of Computer Engineering, Sir Syed University of Engineering and Technology, Karachi-Pakistan

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ABSTRACT

Information and communication technologies are increasing day by day among different communities for obtaining the information about related issues, problems and their solutions. In the context of agriculture development, information and communication technologies have played important role in developing countries. Most of the developing countries have got fruitful results of the technologies. Internet, mobile phones, radio and television are most important tools of communication providing knowledge and information to farmers about agriculture. By using these technologies in different countries it was found Positive results in agriculture development have been found by using these technologies. In remote areas radio is still favourite tool of communication which broadcasts many agriculture programs while television also contributes much in disseminating information about agriculture in developing countries. Furthermore, mobile phones have reduced the gap among farmers and buyers, now farmers directly communicate with customers and get price of their products from market. Mobile phones have also provided new approach to farmers to get latest information from metrological department for weather conditions before using pesticides in their farms. However, internet is also disseminating information regarding price and marketing of goods and farmers are receiving information within minutes from all over the world.

KEYWORDS Internet mobile phones television and radio for agriculture development

INTRODUCTION

In the 21st century agriculture is one of the divers industry which are increasing rural income as well as long term stability of its natural resources. This can create different activities which will affect farmers, stakeholder, customers and government industries. Information and communication technologies have transferred most important information about agriculture in developing countries. These developing countries now are connected with developed nations and getting the latest information and technologies regarding weather, natural resources and other related information (Rao, 2007).

Most of the developing countries are using different technologies and other sources for the development of agriculture and economic development. In this context developing countries such as African and Asian countries are using information and communication technologies for growth of the agriculture. However, it was indicated that due to lack of knowledge and information about these technologies farmers are not getting benefit from these technologies in their working places. Furthermore farmers directly could not communicate with buyers and their customers for selling their production in good prices and track medical expenditure on their livestock as well as expenditure on farm chemicals to receive information from other stakeholders.

Information and communication technologies are proving new approaches for communicating and sharing the information. By using such kind of technologies improve the knowledge and skills of individuals. The term information and communication technologies could use for multitude of stand including telephone, television, video, voice information systems, and fax (Warren, 2002). Information and communication technologies are real source of information and knowledge for people including farmers and reduced the distance among different communities of the world (Herselman, 2003). ICT represents the formation of knowledge in rural areas of the developing world which can share the knowledge and information effectively harvested for agricultural and rural development.

The use of ICT in agriculture for rural development is very important. There is need of such technologies in rural areas for increase the production of agriculture especially in African countries it has provided average

access to agricultural information where farmers are getting many problems in connectivity of communication technologies (Meera, Jhamtani, & Rao, 2004). Use of information and communication technologies have played very effective role in the agriculture development and in the decision making of farmers communities in different countries (Cash, 2001; Galloway & Mochrie, 2005; Opara, 2008; Taragola & Van Lierde, 2010). The information and communication technologies have brought significant changes in agriculture development and transfer information and knowledge through various technologies among farmers (Birkhaeuser, Evenson, & Feder, 1991). Information and communication technologies have potential to disseminate the agricultural systematic information among smallholder farmers similarly the mobile phones, Television, Internet and radio have the facility to transfer related and timely information that helps to make decisions to use resources in the most productive and profitable way (Ekbia & Evans, 2009; Ommami & Chizari, 2008).

Last two decades information and communication technologies (ICT) in agriculture and rural development have spread very fast in all sectors of the society and also played vital role in rural development recently ICT has given significant results in almost all areas of rural life (Fawole & Olajide, 2012).

Information and communication technologies are the integrated with different devices such as computer, internet, mobile phones, television and radio. ICTs have a key role in agri-food sectors to provide a fast information and knowledge about agriculture through all over the world. Their effective distribution of ICT can increase agricultural attractiveness by production, transaction costs, raising production, efficiencies and farmers' incomes, by providing more information and value to stakeholders (Rao, 2007).

Recent year's information and communication technologies have been introduced in agriculture projects which have provided fruitful results in rural and agriculture development. For instance information and communication technologies can be used for distance learning programs and help the farmer for learning new approaches and technologies for the use of agriculture development in developing countries. Such kind of technologies can provide information on weather, prices, and profitable income. It was showed that those farmers who have used the information and communication technologies in agriculture have increased their production information and knowledge. Similarly those who have used the e-services, e-commerce applications also increased their income (Chapman and Slaymaker, 2002 B Sideridis, 2010).

Internet and Farmers

Berman (2008) showed that new ICT methods had played a crucial role in the development of emerging countries. In this regard India and Sri Lanka have made significant developments in ICTs use in remote areas. In the context of India the Proletarian Organization funded by government and United Nations Agencies have started participatory, bottom-up approach to enhance its development projects in remote areas and implemented Virtual Knowledge Centres (VKCs) equipped with computers, internet access, and communication systems for farmers including the use of loudspeaker systems. These centres of the internet have played a vital role in the capacity building of farmers in their development. Furthermore, internet increased many opportunities for community. By using the internet farmers were getting the information about their production from different markets of their near cities as well as big markets of the country. Similarly obtain the information about agriculture new techniques and methods for increase their product. Internet has created a room for farmers to get latest information on market.

Farmers mostly were using Internet and their emails for communicating with their family and friends in other places of the country. This internet was famous among the farmers in India. Nowadays farmers are using different websites for getting the information about proper use of pesticides in their farms (Joshi & Ayyangar, 2010). The Korean agriculture forestry fisheries information service (AFFIS) was also played a very important role in provide information to fishermen and farmers. The education management system was established in 2002 in which the main function of this department was to provide online and off-line learning programmes and educational information services to the fishermen and farmers. The fishermen and farmers were provided few opportunities to learn through the internet service. It manages educational contents and has lot of information about agriculture and fisheries. By using the Internet farmers improved their skills and achieved lot of information and using of new technologies in agriculture sector.

Mori & Assumpção (2007) indicated that community Internet access centres provided good opportunities to people. This approach could focuses on the major number of decentralized initiatives where in different rural areas the farmers are getting benefits. This was proved the successful local government initiatives and international experiences served as examples and encouragement for the dissemination of internet centres throughout the country. It could not denied that the federal government with the help of local governments and civil society organization were provided digital revolutions and good opportunities in rural areas such technologies not only given the advantage to the farmers and fishermen community as well as to other public.

According to Sein & Furuholt (2009) the internet could also investigate in discovering the role of the intermediary. In the DNet project Bangladesh, the community could not use internet directly but the operators helped them to find out their requirements. Farmers use mobile phones to communicate questions by the users to the Pallitathya Kendra Rural Information Centre. (KRIC) meanwhile the operators access the internet and

then give the response to farmer about the agriculture issues and try to solve their problems. Similarly inform the farmers about use of pesticides in their field. However in India farmers also use megaphones to obtain the information about weather by Internet. The information Village Research Project was implemented in India and the computer centre was established in Fisher village where the fishermen and farmers connected to the internet regularly and updated with weather reports from the Indian metrological office. The reports about forecast were broadcasted through loudspeakers by very high frequency (VHF) radios to inform the fishermen about low and high wave's before going to sea for fishing and use the pesticides in their field (Rao, 2004).

Internet is one of the most important sources of finding information about agriculture as well as other related issues (Burke & Sewake, 2008). Seeking the online information about banking is on the most important agri- business activity among farmers. In Malaysia, current statistics shows that 94% of the Malaysian farmers used internet for the purpose of seeking agriculture information while 85% of the farmers get information by using the text messages (Hassan et al., 2010). In India the project has been started for the farmers about application, internet and mail servers this center provides the latest information regarding agriculture to farmers. The network was connected by telephone landline in their areas. In projects around 85 to 92% of the farmers were uneducated and they have no knowledge of computer. Furthermore, to provide internet knowledge farmers' trainers were appointed to provide trainings farmers. In these circumstances farmers were not feeling any hesitation to obtain information about use of internet and getting the information about pesticides as well as market (Meera et al., 2004).

Mobile phones and Farmers

The mobile phone has reduced the gap among traders and farmers and same time farmers directly communicate with buyers and customers to find the good price of their product. Farmers before going to market simply contact one of the best buyers who purchase production in good price. In the rural areas of developing countries mobile phones spreading day by day and different organizations have launched many projects for the agriculture development and increase the production by using different technologies in agriculture. Mobile phones have created a new business opportunities for the poor farmers and has given the access to information about market, health and weather services in remote areas. The uses of mobile phones among farmers have played positive impact in their income and productivity because before travel communicate with buyers and sell their product in good price (de Janvry et al., 1991, Grameen, 2007, Fafchamps & Vargas Hill 2005).

Another study was conducted in Ghana where mobile phones were introduced among farmers for communicate with traders and their representatives for selling their bananas in advance and negotiate with customers and get high price. The mobile phones technologies directly connected the farmers and buyers without any disturbances and they receive directly good price from brokers and customers. Farmers have another advantage of mobile phones they not go to market but directly communicate and ask the price of their production. In this context they save their money, time and energy (Muto, et al, 2011, Lee et al, 2013).

Mobile phones have reduced the gap between rural and urban areas. The mobile phones connected farmers and market customers. In Mali, farmers of Timbuktu were able to communicate with their family member who lives in capital cities. Furthermore, in Ghana, farmers in Tamale send a text messages to learn about corn oil and tomatoes prices thousand kilometres away from their cities. Mobile phones have provided good facilities and access the farmers for getting the information about agriculture from their near market especially in West African countries. However many farmers live in remote areas and they have no proper access of communication technologies in their areas. The study was conducted in South Africa showed that mobile phones have given a positive impact on farmers' income (Aker, & Mbiti, 2010, Klonner and Nolen, 2008).

Muto and Yamano (2009) the effect of mobile phones on agriculture product and markets information in Uganda farmers get information about market effectiveness. In 2003 and 2005 the mobile phone coverage was increased 10% among farmers' probability of market participation. Mobile phones are more useful for increase the knowledge and product of the crop. This kind of technology has provided a good benefit to farmers those who live in remote areas of the country.

It was showed that mobile phones have provided a platform to farmers for sharing and getting the information about agriculture. Farmers nowadays using a mobile phones for multipurpose some are using for getting the price of product from market while others are directly communicating with customers for selling their goods in better price. Furthermore, farmers are using SMS services for keeping the up to date about weather as well as use of pesticides in their farms (Murthy, 2009).

The one of the most important role of mobile phones in developing countries were showed that farmers use the mobile phones for getting the information from different markets and weather information while other communicate with agriculture experts to obtain information about the use of pesticides in their farms. For instance the Bangladesh farmers directly contact with buyers and get the information about rice price and vegetables while some of them inquire about the price of coffee from international brokers Countries. Two decades before it was very difficult for farmers to take information about their production from market within minutes from their villages (Kefela, 2011). There are no doubt the mobile phones technologies were used in

different sectors of the society such as in health, education, rural development and in agriculture for the economic growth in developing countries. The impact of information and communication technologies the empower farmers' communities in rural areas and provided access of marketing information. Furthermore, farmers communicate with buyers in different markets of cities and sell their product where they find better price of their good and services (Siraj, 2011).

Mobile communication technology and wireless sensor networking also were used in weather monitoring system which has provided lot of benefit to different communities in the shape of increasing the income and awareness. Similarly these kinds of technologies should introduce in agriculture sector which can give new approaches to farmers for their agriculture development. Using communication technologies without any disturbance mobile phone users have provided Wireless Multi-hop, for different feature to communicate with each other (M. Tahir *et al.*, 2013, Javaid *et al.*, 2013, Javaid *et al.*, 2011).

Television and Farmers

The development about agriculture in developing countries mostly depends on the use of information and communication technologies which can connect the different communities of people. The radio and television have played a very important role in enhancing the capacity of farmers by broadcasting different agricultural related programs. Similarly Television disseminates scientific and agricultural knowledge among farmers and provides latest information with the discussion of agriculture experts. In the context of India and Ethiopia television has played a most vital role as a medium of diffusion information about agriculture. It was showed that farmers can get easily information by watching the agriculture related programs on television (Murty and Abhinov, 2012).

Television has provided lot of information to all stakeholder of the society. Television has created awareness and knowledge among farmers about use of technologies in farming television produce such kind of programs which create interest among masses and mostly the masses depend on media for getting the information regarding education, health and agriculture (Age, 2012).

The fruitful results about agriculture development depend on the use access and the mobilization of the community relies on television. The experts of agriculture extension believe that mass media can bring the positive changes and growth of agriculture in developing countries by using the communication technologies in their countries (Salleh, 2010). Television is one of the effective medium of communication for dissemination agriculture information among farmers quickly. In different countries such as India, Pakistan, Bangladesh and Srilanka the farmers' education is low therefore television is one of the best and favorite medium of communication where farmers can watch and get the information about use of different techniques and pesticides in short time (Nazari and Hasbullah, 2008).

The study was conducted in Iran result indicated that 68% of the respondents believe that television produced agriculture programs which provided good benefit to farmers. Furthermore, it indicated that the programs should produce in their regional languages which can provide good benefit to farmers. However, 87% of the respondents said that 6 to 8 pm is more suitable time for broadcasting the agriculture programs in this time most farmers were free to watch program easily and around 20 minutes duration is enough for agriculture program on television It was indicated that in various related issues of agriculture such as in bad weather situation television is one of the most important source of disseminating agricultural related information among farmers (Nazaril and Hassan, 2011, Loges, 1994).

The information about agriculture could be transferred by using the appropriate tool of information communication technologies such as television is famous communication medium of communication tool among farmers to use and diffuse the information regarding agriculture. There are many ways to transfer the information about agriculture by newspapers, magazines, brochures as well as electronic media such as radio and television (Rolle & Satin, 2002).

Different communities use the information and communication technologies in different ways such as farmers prefer to watch the television and get the information about weather and markets regularly. However, farmers also use the other communication tools for information. It was showed that many developing countries have established different centres of communication technologies for providing the information about agriculture to farmers. While in some countries government have started information services centres for agriculture information. However, television is one of the good source of agriculture information among farmers in developing countries (Fara 2009, Goyal 2010).

The electronic media have brought revolutionary changes in the life of different communities mostly farmers are getting more benefit from these technologies such as television. Television has given new choice the farmers for watching the different agriculture programs on different channels. Farmers choose the best way for keeping up to date each other about different information of agriculture. It was also showed that television is not only the sufficient source of agriculture information but there is need to provide other technologies for latest information to farmers. Television is playing an important role in sharing attitude, creating interests and presenting factual information (Buren, 2000). Television helps the different stakeholders for provide information

about different issues while the farmers are also getting good benefit from this technology and obtaining the information about agriculture. Television has provided new approaches in the development of countries. By television many new programs were introduced for awareness of farmers in rural areas of developing countries. In the perspective of agriculture development television producers and directors should make the objectives for the development of agriculture by producing the different programs for growth of agriculture (Age, 2012).

Radio and farmers

The study was conducted in Bhawalpur, district of Punjab Pakistan; it was revealed that radio was the more effective source of dissemination of agriculture information among farmers about agroforestry. Furthermore, it was also indicated that most of the farmers were interested in agro-business news and farmers were obtaining the information various aspects of agriculture and improving their skill and knowledge. The study was conducted in Nigeria about dissemination agriculture information among farmers showed that radio provided livestock as well as fisheries information to farmers and radio was the prominent medium of communication among farmers in Nigeria (Abbas et al., 2009, Bolorunduro et al., 2004).

Okwu et al. (2007) the effectiveness of radio about agriculture programs cannot be denied. It was revealed that majority of the farmers like to listen agriculture programs. Furthermore, it was showed that most of the farmers to listen programs about agronomic and plant production. However some respondents like to listen livestock information on radio. Radio is multidimensional source of transferring the information in the rural areas of developing countries and the impact of radio was showed a positive among different communities of people such as farmers. There is no doubt that modern information about agriculture can be diffuse by using the television. The findings of the study showed that Television was the best source of information about dissemination information about wheat, seed and soil (Fossard. 2005, Saadi et al., 2008).

The information and communication technologies are main element which disseminates effective technologies to growth agricultural production. By use of these technologies access to farmers and learn how to effectively utilize these technologies in farming systems and practices. The use of Radio among farmers in remote areas still popular most of farmers depend on traditional media such as radio and newspaper these media channels could transfer information among farmers in remote areas and can enhance the knowledge and skills for the development of agriculture (Ani & Baba, 2009).

Radio is one of the best medium of communication which has played a very vital role in socio, economic cultural and agricultural information. It is powerful communication tool in rural areas which provides agricultural and marketing information. However, it was showed that in developing countries there is problem of electricity in rural areas therefore farmers and other communities mostly depend on radio to meet their needs of information regarding education, health, agricultural news and weather information. The achievement of agricultural development programs in developing countries basically depends on the nature and level of use of mass media channels in mobilization of people for development in general. Radio is one of the best sources of diffusing agricultural, technical and scientific information to the farmers (Murty & Albino, 2012).

Radio has brought changes in different sectors of society such as radio broadcast agriculture programmes and latest information for farmers. Radio has provided new approaches and knowledge to millions of people in remote areas. The radio is very benefit tool of communication especially for illiterate farmers to gather information of various kinds on agriculture and other features to keep up to dates their knowledge and services. The credibility regarding radio information is one of the most important elements of communication process and its success will growth proportionally if the receivers of the information perceive the sources to be trust worthy and competent (Sadaqath & Mariswamy, 2007). Food and Agriculture organization FAO working in Mali to provide information among rural farmers about marketing, weather, environmental, diseases, water management an pest monitoring to increase the productivity of agriculture in their country. This kind of information was broadcasted by radio in remote areas. Radio technology has played an important role the information about agriculture, weather and use of pesticides among farmers (Weiss et al. 2000).

There is no doubt that radio is one of most important tool of communication technologies played an important role in the development of agriculture. Radio provides latest information and knowledge about market to farmers. Furthermore, by using the radio farmers get immediate response from agriculture experts about agriculture issues and problems. Similarly the role of radio in socio, economic and cultural information spreading is also important in rural areas of developing countries. However, it was showed that in different developing countries there is no access of electricity therefore farmers and other communities mostly depend on radio to meet their needs of information regarding education, health, agricultural news and weather information.. In developing countries such as Pakistan, India and Bangladesh where education level is low and the choice of mass media very vital particularly Electronic Media for farmers to keep up to date them about agriculture (Murty & Albino, 2012). Radio broadcast new approaches, ideas, research findings and scientific information for farmers which increased their knowledge and skills and farmer adopt such techniques for the development and increase the productivity of their production. In the perspective of Pakistan mass media produce many programs and publish articles, features and columns about agriculture information. These technologies

introduced new techniques for the growth of agriculture such as protects from diseases, use of pesticides and market information of their goods and services (Kalirajan & Shand, 1984).

Conclusion

It was showed that still there is many problems were indicated by researchers about information communication technologies in the shape of lack of infrastructure in rural areas of developing countries. There is need to establish new technologies centres and media houses for dissemination the agriculture information among farmers in rural areas. Government also should take initiatives for the development of agriculture and provide trainings and latest information by using the communication technologies tools in their countries. Most of developing countries farmers education level is also low therefore government of these countries should start technical and educational programs for farmers in their countries and enhance the capacity building of farmers by using information communication technologies that farmers can also get good benefit from these technologies and increase their income and improve their standard of life. Furthermore, there is shortage of electricity in remote areas have also decreased the agriculture production therefore it is also important to create alternative sources for increase the agriculture production in these countries such as solar energy system for agriculture development.

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