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Emerging Role of Information Communication Technologies in Extension Service Delivery in Nigeria: A Review

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Abstract

Effective communication of agricultural information to farmers is crucial in achieving optimum efficiency in agricultural extension administration and practice in Nigeria. Agricultural extension in this information age has been recognized as an essential medium of disseminating information and advice to farmers and this is achieved through the ICT. In Nigeria today, the concept of ICTs has become a global concern and the increasing application of the technology in every segment of our natural life, especially through the GSM, radio, television, projectors, internet, video, camera, computers, e-wallet, has been felt. The paper relies heavily on literature. It highlights the emerging role of ICTs in agricultural extension service delivery in Nigeria and suggests areas of improvement in fulfilling the roles. ICTs play numerous key roles in extension service delivery such as: helping in expanding outreach to a large number of farmers; offering a solution to resource and capacity issues within the agricultural sector; improving information flow and connecting people within the rural areas; answering questions relating to farm problems with the advantages of getting feedback using telephone; obtaining market price information, weather forecasts, etc. Problems identified include poor ICT infrastructural development, high charges for radio/television presentations, inadequate capital for farmers and insufficient knowledge of ICTs. It is recommended that farmers be encouraged to access and utilize ICTs by supporting them financially and materially. Also more awareness creation and training of both farmers and extension agents on the effective and efficient use of ICT facilities be intensified by the governments.

KEYWORDS: ICT, role, extension service delivery, Nigeria

Introduction

Agricultural extension are already being acknowledged as information and knowledge sharing where by innovations and improved methods and techniques of planting crops and rearing animals are made available to the farmers in their settlements through service inform of advice and assistance given to them to help them improve their methods of production, marketing and processing activities (Olaitan and Omomia, 2006). Globally, the objective of agricultural extension services remains the development of rural populaces and raising the standard of living of the farmers through increased farm production and income.

Growth in the field of agriculture has being made possible through the use of the latest technology for communication which is known as information communication technology (ICT). According to Asian Development Bank (ADB) (2003), Greenindge (2003) and Centre for Agricultural and Rural Cooperation (CTA) (2003) ICTs are omnibus term that encompasses computer and telecommunications technology. Chadwick (2003), Flor (2004) and Arokoyo (2005) broadly highlighted on the electronic means to include: radio, television, telephone (fixed and mobile), world wide web (www), short messages (SMS), cameras, video, e-mail, computer, CD-Rom, DVD, groupware, rural radio (RR), Web publishing, search engines among others. Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) (2011) concludes that ICT in general are an expanding assembles of technologies that are used to handle information and aid communication.

ICT as the biggest factor for change in extension service plays important roles in enhancing agricultural extension administration such as helping in producing knowledgeable and well informed farming communities, individually and collectively through diagnosing problems, interpreting data and applying their meanings (Gurstein, 2000). Again, by providing knowledgeable and new technology, up-to-date information and services for increased production, improving market access, capacity building and empowerment and information for improvement, management of new developed agricultural practices and methods emanated from extension education (Chadwick, 2003).

In Nigeria today, the concept of ICT has become a global concern and increasing application of it in every segment of our natural life has been felt essentially through the use of the global system of mobile telephone, radio, television, internet, camera, computers to mention but few. According to Farrell (2003), the ICT facilitates and promotes the collaboration between agricultural researchers, farmers, extension agents and other stakeholders. For example, in Nigeria generally and Anambra State in particular, urban areas have witnessed development in the sighting of computers and internet cafes in the last few years, whereas the rural areas did not smell this development. It is worth to note that one of the major objectives of the Nigerian's ICT's policy is to empower Nigerian people with ICT skills and ICT capable country in Africa and a key player in the information society by the year 2005 through using ICT as an engine for sustainable development and global competitiveness. This is 2014, whether the vision of 2005 time line has been fully realized or not especially in the field of agriculture is an open question. The study however seeks to identify the emerging roles of ICTs in agricultural extension service delivery in Nigeria.

The specific objectives of the study were to:

- i. identify the types of ICTs tools used by extension agents/ farmers;
- ii. ascertain the emerging roles of ICTs in extension service delivery;
- iii. ascertain the benefits/importance of ICTs to extension agents/farmers;
- iv. determine constraints limiting effective use of ICTs by extension agents / farmers; and
- v. ascertain extension agents'/farmers' perception of possible ways of improving the problems encountered in the ICTs utilization.

The paper relied heavily on literature.

1. Types of ICTs tools used in extension services

ICTs as hand tools that have great value for use in agricultural extension services include: Television; Radio; Short Message Service (SMS); Cameras; Computer; E-mail; 2go; you-tube; Web-metrics; DVD; Video; Contact data bases and systems; CD Rom; Web publishing; Distance

learning; Packet Digital; Packet Digital Assistants; Printed Materials; Group meetings; Contact farmers; photographs; Workshop; handbills; Charts among others (Mukesh, Deepati and Kanini, 2010). In several developing countries of the world like Nigeria the adoption of ICT in agricultural extension is receiving the fastest response. Presently, the extension service and farmers are researching with these newer digital opportunities that can be used to exchange, process, store, manage and communicate information and idea. The use of digital camera with video capabilities has gain popularity because as stated by Manu (2003) a picture is worth a thousand words and will enable even those constrained by literacy to communicate.

More so, use of radio has gained popularity because of their special interest and focus in broadcasting to audience in their local language. This is in line with Oroyokot (2003) that access to radio is extensive compared to any other ICTs with 4 in 10 persons living in the rural areas possessing radio.

The use of ICT has arisen because of the need to cope with information explosion in the various sectors including Agriculture. In-order-to keep pace-with disseminating the increasing number of information from different research institutes, computers telecommunications must be utilized to handle information processing and dissemination with greater speed and accuracy than manual processing and delivery through extension agents and/ or contract farmers because we live in a rapidly changing world.

2. Emerging roles of ICT in extension service delivery

Various forms of ICT devices abound in the country today and are used by extension agents to enhance agricultural extension services. These available ICT facilities according to Mukesh, Deepati and Kanini (2010) are grouped into three parts as follows: Broadcast Technology, print technology and Telecommunication/computer technology. Broadcast technology refers to broadcast-media; radio; projectors; media van among others. Print technology include: print media such as newspapers, magazines, newsletters, leaflets. The telecommunication or computer technologies include: global system and mobile system, telephones, computers, fax, internet etc.

Arokoyo (2005) noted that ICTs include mobile telephone, innovative communicating radio and television programmes, videos shows, web portal, rural telecasters, farmer call centers, video-conference, offline multimedia CDs, open distance learning etc. These can help expand outreach to a large number of farmers. Increased use of ICTs could also offer a solution to resource and capacity issues within the agricultural sector as there may be less need to increase the number of extension staff.

The use of ICTs to improve information flow and to connect people within the rural areas has proved that illiteracy of farming communities may no longer be an excuse to deny some form of extension system. Communication or the dissemination of information about agricultural extension and productions play a vital role in sustaining an effective agricultural extension service. Hence, Nwachukwu (2003 & 2010) affirmed that agricultural communication is the effective transfer of agricultural technological innovation from technology developers to the technology utilizers. For agricultural information to be useful, the extension agents have to map out the information and communication needs of farmers within their agricultural and socio-economic systems and help key elements in that system to find information they need, when they need it, in accessible term and language, at prices that are realistic, at the given available resources and developmental objectives. Effective communication of agricultural information to farmers is of critical value in achieving optimum efficiency in agricultural extension administration and practice in Nigeria.

Radio communication is one of the fastest, most powerful and the most popular used means of communication with the rural farmers. It defeats obstacles faced by extension workers (Gurstein, 2002). Many studies have proven that as far as agricultural extension administration is concerned, radio has proven to be one of the most vital and the most effective means of information dissemination. For example, Mundy and Sultan (2001) stated that in Mali the establishment of community radio stations with a radius of 100 kilometre, enables extension agents to reach about half a million farmers in their languages. Moreso, radio is adaptable to local conditions as it can be used without electricity and it is easily affordable.

The television set contains sight and sound thereby increasing the possibility of grasping and retaining the information. It provides its viewers with a good sense of participation. Projectors can be used to send information using motion pictures to demonstrate different farming techniques. Telephone can be used to communicate information between agents and farmer and also answer questions relating to farm problems with the advantages of getting feedback.

Computer as means of information storage retrieval is used for graphic work with the production of images that serves as teaching aids for the farmers. The role of ICTs in enhancing food security and supporting rural livelihood is increasingly recognized and was officially endorsed at the world summit on the information society (WSIS) between 2003 and 2005 (Nwachukwu, 2010).

3. Importance/ benefits of information communication technology (ICT) in extension administration

1. ICTs as a developmental tool can enhance the livelihoods of small scale farmers. New ICTs represents the greatest package to date for self education, distance learning, sustainable development, women empowerment (Mohan, 2001). Agwu (2007) reaffirms that ICTs has become the most effective method of training, informing and disseminating proven technologies to rural farmers, hence an extension worker can learn new technologies, rainfall forecast, commodity prices among others and use that information to advice farmers in rural villages.

2. ICT has considerable instrumental value for other related innovation; the internet which is a functional member of the ICT family is very beneficial in providing opportunities for distance education and training, thus overcoming some of the problems of location and lack of time in family-run small business (Fillip, 2000)

3. Moreso, publications from the internet are produced in down loadable election form instead of paper format, thereby allowing access to information unlike before one must go to library to look for books by professionals.

4. ICT is one of the promising area to do agricultural extension, aids in sharing of knowledge. Mobile phone in combination with radio enables messages to be given to a large number of listeners.

5. The use of knowledge management, web portals with pertinent production and marketing information has even been tried in some communities in Asia and Africa with some challenges which are not insurmountable. Evidence also suggests that the technology is being effectively used in some countries in Africa with remarkable success on market price information, weather forecast, transport information on storage facilities (World Bank, 2011).

6. Knowledge and information according to Christoplos & Kidd (2000) have become the major drivers of social and economic transformation in the world, they play a critical role in the transformation process to transfer technology, support learning, assist problem-solving and enable farmers to become more actively embedded in the agricultural knowledge and information system.

7. The use of ICT in extension provides several benefits, for example, ICT based on agricultural extension and advisory service bring incredible opportunities and has the potential of enabling the empowerment of farming communities and market information etc.(Davis and Asenso-okyere, 2010 and World Bank, 2011). For example , the International Rice Research Institute (IRRI) launch a program called Nutrient manager for rice mobile (NMRice-Mobile) to provide Philippine rice farmers with advise through their mobile phone on optimal timing, amount and type of fertilizer to apply to their rice crop to maximize production and profit and reduce waste (IRRI, 2011).

8. ICTs are used in distribution and supply chain management and traceability to increase efficiency and predictability to reduce spoilage. Examples are diary sector and agribusiness in Kenya; fruit and vegetable supply system in Mali and Ghana (Payne, 2010; Macathy Action for Enterprise, 2010).

9. Market information is provided through SMS so that small holders have access to daily agricultural commodity prices, extension agents and channels to sell or bid text messages,. They

use IDs, KCH system where updated market information is sent daily to subscribers in the database as e-mail messenger (KACE, 2011).

10. In Nigeria, cassava growers receive market information through a new initiative known as the integrated cassava project. Its information is based on phones, internet and online market price. For example, ICT services obtained by the cassava growers' include: prices, demand volumes and offers, trade assistance, training, SMS Alerts and Technical messages (Pyramids Research, 2010).

Finally, mobile banking is another ICT service which has had a tremendous impact on the socio-economic status of farmers especially in Kenya and Malawi (ITU, 2010). Similarly, Nyirenda-Jere (2010) stated that the smart-card-based MAKWACHA system in Malawi allows rural farmers to receive payments and purchase farm inputs electronically.

4. Constraints limiting the effective use of ICTs in extension administration

The important specific constraints limiting ICT utilization by agricultural extension officers and farmers according to Chadwick (2003) and Mukesh, Deepati and Kanini (2010) are as follows:

1. Poor ICT infrastructural development on which ICTs depend on such as erratic and fluctuating power supplies determines the length at which ICTs will be utilized.
2. High charges for radio/television presentations. Most radio/ television for instance (FM, Channels) in the state charge a huge amount of money for any presentation. It is not free.
3. High cost of access/ interconnectivity (non functioning telecommunication systems). Most rural areas lack internet access because of bad road network, poor enabling environment, interconnectivity and high costs of equipments of ICTs.
4. Insufficient/ inadequate knowledge of ICTs (user friendliness of the technologies). Most extension workers lack competence and confidence in handling and operation of ICT facilities because they lack training on how to handle most modern ICTs.

5. High illiteracy rates: Most farmers/extension officers are not educated and as such are not aware about the ICT benefits. Through ICT, farmers will become aware of the latest agricultural tools and methods that make farming easy instead of the use of crude method. Farmers can form groups and hire these tools.
6. Inadequate capital: Some of the Nigerian farmers especially small scale are not aware of existing loan facilities due to poverty and low level of literacy. ICT can assist these farmers by providing vital information on existing loan facilities.
7. Under- developed transportation networks.
8. Poor documentation, storage and retrieval techniques. Results of research in African countries are known to be available in industrialized countries but hardly in the country of origin due to poor documentation, storage and retrieval techniques

5. Perception of possible ways of improving/solving the problems encountered by extension agents/farmers in ICT utilization

Integration of ICT to agriculture: Agricultural extension aims at improving the livelihood of farmers and high productivity, integration of ICT to agriculture is a necessity. Information is an essential ingredient in agricultural administration/ development programs. For example, most Nigerian farmers seldom feel the impact of agricultural innovations either because they have no access to such vital information or it is poorly disseminated.

The integration of Information and Communication Technology (ICT) in agriculture can be utilized for providing accurate, timely, relevant information and services to farmers, thereby facilitating environment for more remunerative agriculture.

Government should make ICT facilities readily available and affordable to farmers and extension agents. With this made possible, farmers can be updated on temperature, humidity, rainfall with additional parameters such as atmospheric pressure, solar radiation, soil moisture and wind speed.

Agricultural websites should be provided to farmers and they should be directed on how to register which will help in dissemination of vital agricultural information such as online detailed contents,

crops, crop management techniques, fertilizers and pesticides and many other agricultural related materials.

There should be provision of commodity prices and market information on the internet where small scale farmers can sell their products to avoid middlemen who determine the prices to the detriment of farmers. The farming communities can be provided with choices they lack today and this will ensure better price relating and stimulate a drive towards better productivity (Samuel, 2010).

There should be steady supply of electricity for prompt ICT information on weather, pest and disease management. This can help farmers avert calamity experienced in agriculture in recent times due to varieties of weather and attack of pest and diseases. For instance, in India, “aQua technology” is applied to assist farmers. It is a farmer- expert questions and answer database supporting Indian languages. It is an online multilingual multimedia informatics laboratory that answers farmers’ queries, based on location, season, crop and other information provided by farmers (Mukesh, Deepati and Kanini, 2010).

Extension agents and farmers should undergo training in order to become computer literates so that they will be able to use the Global Positioning System (GPS) as it will help them describe the exact latitude and longitude of their farms. This is a way of promoting what is known as precise farming (Hutching and Sawyer, 2000). GPS can be used to control costs and boost crop yield. With GPS, farmers can map and analyze their fields for characteristics such as acidity and soil type.

Conclusion and Recommendations

ICTs play numerous key roles in extension service delivery such as: helping in expanding outreach to a large number of farmers; offering a solution to resource and capacity issues within the agricultural sector; improving information flow and connecting people within the rural areas; answering questions relating to farm problems with the advantages of getting feedback using telephone; obtaining market price information, weather forecasts, etc. Problems identified include poor ICT infrastructural development, high charges for radio/television presentations, inadequate capital for farmers and insufficient knowledge of ICTs.

It is hoped that with proper harnessing of the potentials of ICTs by extension agents, Nigerian agriculture will be transformed such that the rural poor farm families will have access to global knowledge system. When Nigerian agriculture has been transformed, the problem of food scarcity would have been solved and the standard of living improved for all.

Recommendations are made as follows:

1. Farm families should be encouraged to access and utilize ICTs by supporting them financially and materially by governments and private sector/ donor agencies.
2. More awareness creation and training of both farmers and extension agents on the effective and efficient use of ICT facilities be intensified by the governments through extension agency.
3. As a developing country, ICT should be integrated to agriculture in order to provide accurate, timely, relevant information and services to farm families thereby facilitating good environment for more remunerative agricultural production.
4. ICTs should be integrated into primary and secondary school agriculture curriculum for the pupils and youths to embrace agriculture as lucrative enterprise. Also, ICT programmes should be inculcated in various gender associations and cooperatives in agrarian communities.
5. ICT facilities should be subsidized to farmers by the government for easy accessibility and affordability.

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