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## Improving Rural Farmers' Access to Information Through ICT Based Extension Information Services

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### Abstract:

*The research was designed to determine how ICT based extension information services(EIS) has helped to improve rural farmers access to information. Interview and questionnaire were deployed to elicit information from extension agents(EA) and rural farmers(RF) from three towns of the three agricultural zones in Anambra state of Nigeria. ICT deployment for agriculture extension services was embraced with testimonies of success in the areas of delivery cost effectiveness, easy and timely access as well as undiluted information to farmers. This mode of service will yield more fruit for national economic growth if power infrastructure is extended to the rural areas, the communication facilities made available with reduced cost and improved quality, while the farmers are educated to enhance their ICT literacy.*

**Keywords:** Information Communication Technology, Rural Farmers, Extension Agents, Extension Information Services, Capacity Building, access to agriculture extension information, ICT based extension information

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### Introduction

In Nigeria, millions of rural farmers (RF) are the bedrock of agricultural and food supply chains. Lack of information on modern and efficient agricultural practices have brought about low farm produce. For RF to improve, there should be adequate knowledge, education and adoption of modern farm practises. Given the challenges faced by extension agents (EAs)

especially as it relates to providing state of the art information on farm practises in real time to farmers, it is expected that deploying modern means of information dissemination will go a long way in bridging this gap. Information and communication technology (ICT) based extension information services (EIS) includes the transfer of practical knowledge and exchange of agricultural information through ICT platforms.). Though EAs offer a range of extension services (ES) to farmers from pre to post-harvest stage, it is not clear the specific services they render to RF and how they have deployed ICT in such services. The paper therefore aims to determine how ICT based EIS has helped to improve RF access to information. Specifically, the work is designed to:

- Identify the EIS rendered to RF in Nigeria;
- Find out the ICT related extension EIS rendered to RF in Nigeria;
- Identify the ICT facilities deployed in rendering ICT based EIS;
- Ascertain how the ICT based EIS has helped to improve RF access to information.
- Find out the challenges RF and EAs face in accessing/rendering ICT based ES;

### **Literature Review**

Rural farmers constitute greater part of the country's population and serve as a source of food for the increasing population, raw materials for the industries, foreign exchange and revenue for the country and employment for a majority of the people (Obidike 2011 and Omoregie & Igbinsa 2010). These RFs need information to achieve maximum yield in agricultural inputs, market prices, transportation systems; environmental sound production techniques and practices; new agricultural technologies; food processing and preservation; decision-making process; trade laws and trends in food production ((Munyua, 2000) as well as, early warning systems, improved seedlings fertilizers etc. (Blait 1996 and Unomah 1998). These could reduce farmers' risk and uncertainty while empowering them to make good decisions. These vital information are provided to the farmers mainly through the EAs who act as advisers, technician and middleman operating between agricultural research institutions and the farm families; as change agents, consultant and advocate helping farmers to identify their problems and find their own solution. In Nigeria EAs are staff of Agricultural Development Programme (ADP) (Hamisu, Ardo, Makinta, Garba and Musa 2017) where they are organized on a 3 or 4 tier system or hierarchy (Anaeto, Asiabaka, Nnadi, Ajaero, Aja, Ugwoke, Ukpongson, Onweagba 2012). The changing mode of information packaging informed by deployment of ICT necessitates the jettisoning of the traditional information dissemination approach practised by the EAs to more robust ICT platforms. Hence as positioned by FAO,

(2004) ICT, a tool in this era, should be utilized and integrated into the dissemination of information in modern agriculture. Tinsley (retrieved 2018) noted that ICT driven EIS transcend beyond the traditional media such as radio and television to include the use of Internet, mobile applications, digital video disks (DVDs) and interactive voice response (IVR) technology to 'provide information services which can help improve agricultural yields and guide farmers in procuring and using the right inputs and participating in commercial value chains'. Rathgeber (2000), Anie & Otolu, (2007), Morgan (1993) and Munyua (2000) variously explained how ICT facilities including telephone, radio, television, audio-visuals, print technology as well as email, news groups, file-transfer protocol, telecentres, CD-ROMs, Internet, electronic conferencing and networking were deployed in places like Kenya and other developing countries to deeply penetrate remote areas for agricultural EIS. Though ICT driven ES has ameliorated the difficulties of the traditional services, it is not without drawbacks. The challenges associated with third world status which are also associated with EIS (developing state) like Nigeria include erratic power supply, poor and inadequately maintained ICT Infrastructures, high illiteracy of the information users or extension service clients, limited coverage of radio stations; poor policy implementations, limited use of computers and the Internet in rural areas (absence of cyber café). However, it was affirmed that 'the potentials of ICT utilization in EIS far outweigh its draw backs if there is the political will to make ICT a priority in Nigeria's agriculture. For instance, over 60 million Nigerians possess a mobile telephone line which means communication between 'extensionist' and the client is very possible through this medium' (Omoregie & Igbinsosa 2010).

### **Method**

The instruments used for the collection of data were self-designed questionnaire and structured interview for EAs and farmers respectively. The population consists of all the rural farmers and EAs in the four (4) Agricultural Zones (AZ) in Anambra State. Three (3) AZs (Awka, Anambra and Aguata) were purposively selected. Three (3) towns namely Achalla, Anam, and Ufuma were purposively selected, one from each zone cognizance of the remote nature of the zones and towns. The instruments were distributed to thirty EAs and interviews session provided to seventy rural farmers.

### **Results and Discussion**

The results were analysed and discussed based on the objectives of the study.

## **Demographic Characteristics of the Farmers**

Result of the responses indicated that majority (62.90%) of the farmers are male while the remaining 37.10% are female. In eastern part of Nigeria, most land are in the possession of men. However, the women have been known to do the farming. The result also shows that 34.30% of the farmers are within the age bracket of 41 - 60 years while the remaining 27.10%, 20.00% and 18.60% are within the age bracket of 21 - 40 years,  $\geq 61$  years and 0 - 20 years respectively. The mean age of the farmers was approximately found to be 50 years. This corroborates reports of FAO (1998) which placed the active age of farmers between 40 – 50 years. It also reflects the active nature of farmers in the area. A 35.70% of the farmers spent 7 – 12 years to obtain SSCE formal education, while the remaining 27.10%, 20.00% and 17.10% spent 1 – 6 years (FSLC), 0 years and 13 years – above (OND, HND, BSc., MSc.) respectively in school. The mean years spent in school was approximately 11 years, this therefore means that adoption of technology based extension service will be possible in the area which conforms to the findings of Albert (2014).

## **EIS Rendered to the RFs**

Multiple responses on the EIS rendered shows that majority of the farmers (57.14%) indicated that one of the ES rendered to them was linkage to agro input dealers which also aligns with the response from the EAs (31.43%). This confirms the situation in Nigeria recently where most extension information is directed towards helping the RFs to identify the right agricultural inputs suitable to their own ecology and soil. The second rated EIS by farmers is capacity building with the response rate of 45.71% which is the third rated response of 25.71% from the EAs. Other EIS though, of varying but significant responses from RFs and EAs were Linkage to Off-takers (structured market) with 22.86% and 28.57%; financial linkage with 34.29% and 8.57%; improved farming technology with 20% and 25.71%; Small Plot Adoption Training/ Demo PLOTS with 5.71% and 24.29% respectively. The disparity in the responses could be associated with the level of awareness on the part of the RFs and depth of deployment of the services by the EAs. The capacity building services rendered to the RFs include training on negotiation skills, group dynamics and leadership training, record keeping, farm calendar, budgeting, business plan, climate smart agriculture, financial literacy and financial inclusion. Improved farming technology were provided as packages embedded in good agronomic practice (GAP) like spraying, plant population and spacing, land preparation and implement use, irrigation facilities, etc. Linkage to Nigerian Agricultural Insurance Programme elicited

a response of 15.71% from EAs without any from the RFs. This could be attributed to the unique nature of the services which is rendered to only farmers registered with the Agricultural Development Programme (ADP).

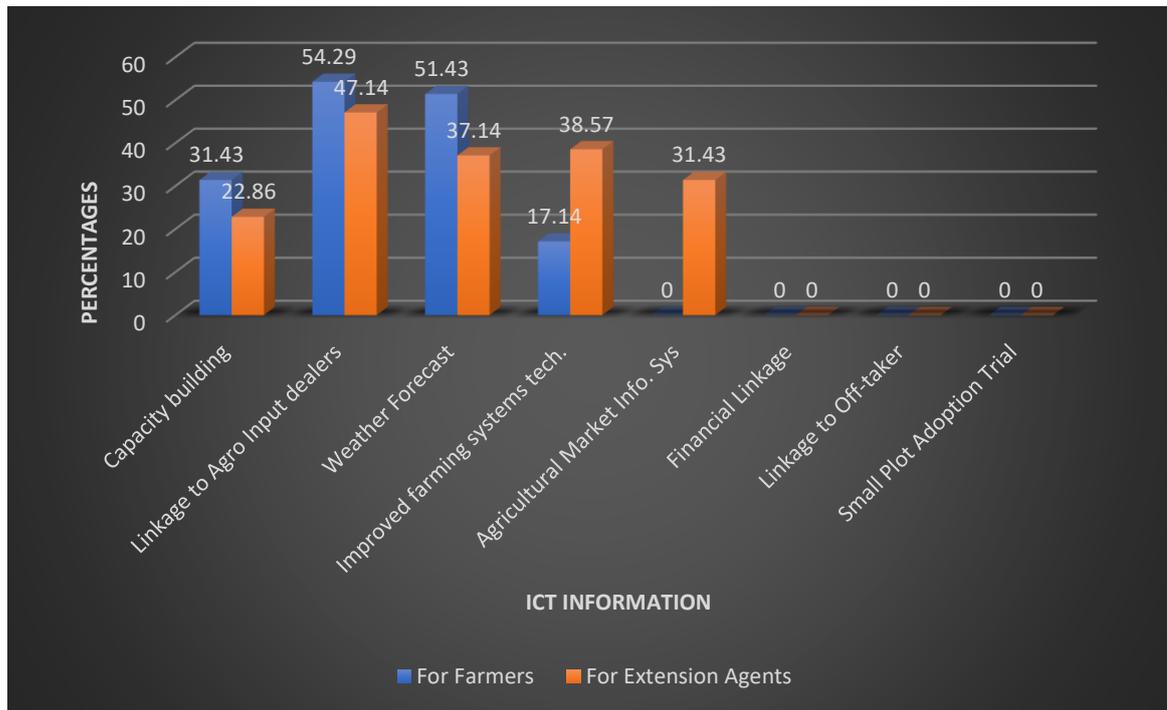
### **Farmers Access/EAs Delivery of ICT EIS.**

The result from the interview shows that majority (70%) of the RFs have access to ICT based EIS while the remaining 30% of them do not. The reason could be associated with the remoteness of the farmer's area without the required ICT infrastructure or their education status which affected their adoption of ICT based EIS. Response from the questionnaire shows that all (100%) EAs affirmed that they deliver ICT based EIS.

### **Type of ICT based EIS Provided**

Multiple responses were recorded from farmers and EAs on the type of ICT based EIS provided and received. The result as presented in Figure 1 shows the same trend with first, second and third responses RF and EAs on the ICT based EIS as linkage to agro input dealers (54.29% and 47%), weather forecast (51.43% and 37.14%), capacity building (31.43% and 22.86%) for the RFs and EAs respectively. This is a pointer that the respondents were agreeable that such ICT based EIS were available. Improved farming systems technology elicited a response rate of 17.14% and 38.57% from RFs and EAs respectively. Only the EAs indicated that Agricultural market information System (AMIS) are rendered to the farmers. The reason was as practised in the studied state; AMIS is accessed by EAs only. The farmers make orders during sales and input disbursements; tokens are being sent to the farmers as a qualification code to redeem agro inputs. West Africa AMIS ([www.resimao.net](http://www.resimao.net)), is where farmers can buy and demand for a product online, they can also see the prevailing market price for a product to guide them in their negotiation with the off-takers during sales. The low response rate across the RFs and EAs is a reflection that it is likely that the ICT based EIS does not cut across the entire group.

**Fig. 1: Distribution of RFs According to the Type of ICT based EIS Received and Rendered by EAs.**



**Source: Field Data, 2018. \*Multiple Response.**

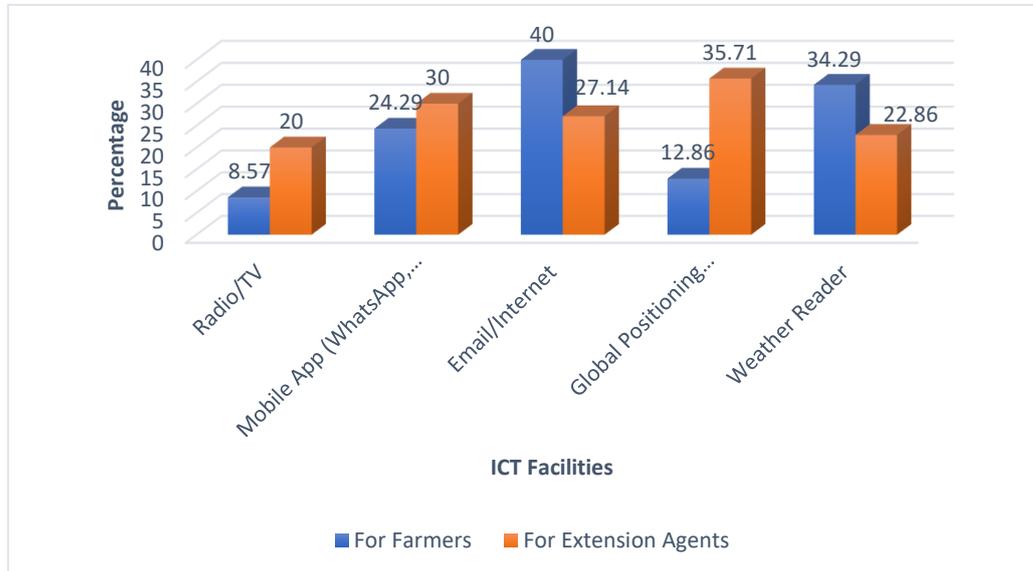
### **ICT Facilities Used by EAs to Render EIS to Farmers.**

The responses from the farmers and EAs on the ICT facilities deployed for the services is presented in Figure 2. It shows that 40% of the farmers receive ICT based ES using E-mail/Internet while 27.14% of EAs affirmed to that. Further interview discussion with the farmers revealed that most of the capacity building materials were received via email aimed at minimizing cost of printing.

Weather reader which elicited 34.29% and 22.86% from RFs and EAs were used to teach the RFs how to read the temperature, rainfall and effective time for each agricultural activities. Mobile Applications (social media: WhatsApp, Facebook, Twitter, Skype, etc.) elicited a response rate of 24.29% and 30% from RFs and EAs respectively. Mobile Applications are cheap means of communication where farmers are organised in groups depending on their areas of concern. Global Positioning System (GPS) (12.86% and 35.71) is used mostly by the EAs to take the farm coordinates which helps for easy identification and possible intervention on farmer's farm. This is a way of promoting precise and accurate farming systems as noted by Hutchinson, Clifford & Sawyer (2010).

Radio/TV with 8.57% and 20% from farmers and EAs are used to pass information to farmers thus confirming the highlights from Flor (2004) and Arokoyo (2005).

**Fig 2: Distribution of RFs/EAs response according to ICT Facilities used/rendered.**



**Source: Field Data, 2018. \*Multiple Response.**

### **Benefit of ICT based EIS to Farmers and EAs**

The distribution of RF's response according to the benefit of ICT based EIS is presented in Table 1.

The Table shows that majority of the farmers (70%) were of the view that the benefit of ICT based EIS to them was improved access to agricultural information. This corroborates Christoplos and Kidd (2000) views that Knowledge and information have become the major drivers of social and economic transformation in the world, including to enable farmers become more actively embedded in the agricultural knowledge and information system. Other benefits according to the RFs are increased productivity (34.29%), improved source of farming inputs (42.8%) and adequate methods of produce preservation (5.7%), These benefits are in tandem with the International Rice Research Institute (IRRI) with a program in Philippines called Nutrient manager for rice mobile (NMRice-Mobile where farmers are advised through mobile phone on issues relating to rice production (IRRI, 2011).

On the part of EAs, wider coverage and cost saving elicited the highest response of 58.57% and 57.27% respectively thereby confirming the position of Obinne (1994) that ICTs have helped in reaching a wider audience for awareness on recommended farm practices in most rural household in Nigeria.

A 51.43% of the EAs indicated that Weather forecast helps to plan the appropriate time to teach and render information to farmers for effective and value added agriculture. This is in line with CTA (2003) position that ICTs have the potentials to enhance farmers' ability to collate demands; collaborative learning; exchange of time sensitive information.

Unbiased access to information, ease of information sharing, and extension transparency, had response rate of 21.43%, 20.00% and 15.71% respectively. EAs maintain a good level play ground to all the farmers since they need not filter information for a particular farmer. This conforms with Kaushik and Singh (2004) views that ICT allows efficient and transparent storage, processing and communication of information.

**Table 1: Distribution of Farmers/EAs Responses According to the Benefit of ICT Based EIS.**

<b>Benefits of ICT Extension</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Farmers Response</b>		
Increased productivity	24	34.29
Improved access to agricultural information	49	70.00
	14	20.00
Improved Market share	4	5.71
Adequate methods of produce preservation	30	42.86
Improved source of farming inputs		
<b>EAs Response</b>		
Wider Coverage	41	58.57
Information Sharing becomes easy	14	20.00
Weather forecast help the Extension agents to	36	51.43
plan	11	15.71
Transparency in dealing with farmers	15	21.43
Unbiased access to information	40	57.27
Cost effective		

**Source: Field Data, 2018. \*Multiple Response.**

### **Challenges of ICT Based EIS to the Farmers.**

The distribution of RFs' response according to the challenges encountered in the use of ICT based EIS shows that the challenges with significant responses include repeated power failure (37.14%), high cost of ICT facilities (37.14), untimely access to credit (for data subscription and airtime; 32.86%) and poor communication network (22.8%). Thus confirming the position of Adam (2011) on dearth of infrastructure for deployment of ICT facilities and constant power supply needed flow of information for and to the farmers.

On the part of the EAs it was affirmed that poor communication network service, lack of fund, high cost of Smart phones, cost of data subscription, and farmers ICT illiteracy were the challenges they faced. This result is in line with the findings of Nnadi, Chikaire, Atoma, Egwuonwu, and Echetama, (2012) as well as that of Albert, (2014), and Pandey, Deepali & Kanini (2010). The challenge of ICT illiteracy is expected since 35.7% of the farmers had only 12years of education which is basically secondary education. In Nigeria except of late, students at the secondary education were not exposed to basic computer literacy. However, the research did not enquire on the ICT literacy of the rural farmers.

### **Conclusion and Recommendation**

Rural farmers have always depended on EAs to provide them with information to enhance their agricultural practices. Though the agents are willing to discharge this government assigned responsibility, its actualization is bedevilled with challenges of space and time. ICT deployment in this agriculture extension services was embraced with testimonies of success in the areas of delivery cost effectiveness, easy and timely access and undiluted information to farmers. It is believed that this mode of service will yield more fruit for national economic growth if power infrastructure is extended to the rural areas, the communication facilities are made available, their cost reduced and quality improved while the farmers are educated to enhance their ICT literacy.

It is recommended that:

- Government and private organizations should engage in sensitization programmes with emphasis on continuing education programmes that can enhance the ICT literacy level of the farmers;
- Telecommunication agencies should endeavour to provide adequate network to boost coverage in remote and rural areas;
- Telecommunication companies can support farmers by changing the current system of ICT facility purchase pattern to a system where farmers can pay with proceeds from their produce

Government and private organizations can assist rural farmers with solar and uninterrupted power supply (UPS) systems by subsidizing purchase to address repeated power failure.

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