

# Improving Agricultural Extension Delivery Service Through the use of Information and Communication Technology in Abia State, Nigeria

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## ABSTRACT

The study assessed improving agricultural extension delivery service through the use of information and communication technology in Abia State, Nigeria. A sample size of 220 respondents generated through random sampling technique was used for the study. Primary data were generated through structured questionnaire. Statistical tools such as frequencies, percentages, means, ranks and spearman's correlation coefficient were used in analyzing the data. Results revealed that 80 % of the respondents were within the age range of 18 – 65years while 70, 99, and 90 % respectively were males, had at least secondary school educational level and owned mobile phones respectively. Result further revealed that ICT facilities such as phone calls, text-messages, tape-recording, CDs, VCD and DVD, modems, flash drives, e-mails, video conferencing, social media, newspapers and animated images were not yet in use in extension delivery services. Results equally identified factors such as lack of ICT training, inadequate ICT infrastructure, fear for change, lack of government support, lack of funds, inadequate ICT skills, and unreliable electric power supply as factors hindering the access and use of ICT facilities. The study recommends that Government of Abia State and other stake holders in ICT development such as the GSM providers (MTN, GLO, AIRTEL and ETISALAT) should assist as to ensure that ICT facilities are fully deployed in extension delivery services in the study area.

**Keywords:** *Agricultural Extension Services, ICT Facilities, Abia-State and GSM Providers.*

## 1. INTRODUCTION

Information and Communication Technologies (ICTs) are being utilized for development efforts in Africa and Nigeria, but this trend is not being replicated in the food production and rural livelihood system (International Fund for Agricultural Development (IFAD) 2010). Akpabio (2013) postulated that farmers need more qualified digital (ICT compliant) extension professionals to update them on new technologies. In the same vein, Centre for Tropical Agriculture (CTA) (2003) listed the following as a potential ICT application in extension: i enhance farmers ability to collate demanding, ii collaborative learning, iii exchange of time sensitive information such as market rise, disease outbreaks, iv make extension system and structures, v exploring alternative production technologies, vi facilitating multi state holder brain storming, vii training and demonstration, viii community learning, ix early warning for disaster , and weather fore cast. However, according to the study conducted in the Niger Delta Region of Nigeria by Akpabio, Okon, and Inyang (2007) which confirmed that there was low level of utilization of ICT by extension professionals in the area. These included non- utilization of ICT for extension work, due to poor infrastructure, electricity problems, high cost of broadcast equipment, poor connectivity, high cost of access, high charges for radios /Tv programmes, non-interactive communication and preponderance of provider driver not user- driven information. Others, were poor enabling environment, lack of access and dissemination of non- relevant information among others. Similarly, Chukwu *et al* (2008) revealed that extension – farmer ratio in Abia State was 1: 1490 as

against 1 : 800 as recommended by World Bank. This high extension – farmer ratio results to many of the grass root small-scale farmers not being reached by extension agents. In like manner, Nneoyi *et al* (2008) reported that the extension gap among female farmers and the socio-economic and cultural barriers imposed on women in traditional African societies have posed severe limitations on the use of individual extension teaching method, such as personal contacts, face- to face discussion, and home visit. Therefore, it is only the use of ICT in extension teaching if effectively integrated that can bridge these gaps. On the other hand, Sanusi *et al* (2010) reported that there has been a noticeable trends in the use of ICTs in almost all spheres of rural life in developing countries, Nigeria inclusive, in the recent past despite persisting problems of access, connectivity, literacy content and costs. In the same manner, Scholars Namaseb, (1999) and Sanusi, *et al* (2010)) have opined that dissemination of agricultural information is very crucial to agricultural productivity of farmers because it is only through this means that they can learn innovations which can improve their productivity. Arokoyo (2005) observed that in most developing countries, extension agents have used different types of traditional information communication technologies which included radio, drama and video/ televisions. He further added that presently, both the extension service and other service providers and their clients were experimenting with new digital opportunities that could be effectively used to exchange, process, manage, and communicate information and knowledge. Lobo (2007) affirmed that multimedia communication campaign were among the most effective methods of informing, teaching,

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and diffusing appropriate technologies to farmers. It was on the strength of the above, that Yekini et al (2012) stated that developing countries have recognized the benefits of using ICT in various public services for enabling the community to get quality and affordable services easily. Therefore, the important task of extension is the exchange and sharing of information, knowledge and skills. It was based on the foregoing that the study sought to assess improving extension delivery service through the use of ICT in Abia State. The specific objectives of the study were to:

- examine the socio – economic characteristics of the respondents in the study area,
- identify the current use of ICT tools in extension delivery services in the study area,
- identify and examine the key constraints to the use of ICT in the study area,
- and to make recommendations on ways of overcoming the constraints.

One null hypothesis was tested:  $H_{01}$ : There is no relationship between the perception of the Farm Respondents (FRs) and that of the Extension Agents (EAs) on the constraints hindering access and use of ICT in the study area.

## 2. METHODOLOGY

The study was conducted in Abia State, Nigeria. The state is situated in the South-Eastern part of Nigeria. It is located on latitude  $40^{\circ}$  -  $70^{\circ}$  N and  $7^{\circ}$  -  $8^{\circ}$  E of the Equator and Greenwich Meridian respectively (NRCRI, 1990). The state has a total landmass of about 5833.77 square kilometers with a population of 2,833,999 out of which 1,434,193 were males and 1,399,806 were females (NPC, 2007). By this population figure Abia State has an average population density of 486 persons per square kilometers (NPC, 2007). About 49.3% of Abians were actively employed out of which 42.6% were in agriculture or agriculture related, 62.25% dwelled in the rural areas While, 37.75% dwelled in the urban (Ekong, 2010). Abia State is divided into three major agricultural zones namely: Ohafia, Umuahia, and Aba agricultural zones respectively. The study purposively chose Umuahia agricultural zone, since, the Agricultural Development Programmes (ADPs) headquarters is situated in Umuahia. Multi stage sampling method was adopted in generating the sample size. Firstly, through a simple random sampling method five agricultural blocks were selected out of 13 agricultural blocks in Umuahia Agricultural zone. Secondly, four circles each were selected from the 5 selected agricultural blocks to give a total of 20 circles. Thirdly, through simple randomized method 10 respondents each were selected from the 20 circles to give a total of 200 farm respondents that were used for the study. Also, given the fact that one extension agent oversees one circle in Abia State, therefore, the 20 Extension Agents who were in charge of the 20 selected

circles were purposively selected for the study. Finally, a total of 220 respondents were used for the study (200 Farm Respondents and 20 Extension Agents). Primary data for the study were generated by administering questionnaire to these 220 respondents. Data generated were analyzed using descriptive statistics such as means, frequencies, tables and percentages. In addition, Spearman's correlation coefficient was used to determine relationship that existed between the perceptions of the Farm Respondents and that of the Extension Agents over constraints of the use of ICT tools in the delivery of extension services in the study area. Formula for Spearman's correlation coefficient

$$r_s = 1 - \frac{6 \sum D^2}{n(n^2 - 1)} \dots\dots\dots (1)$$

where

$r_s$  = spearman's correlation coefficient  
 $D$  = Difference between ranked pairs  
 $n$  = number of observations

## 3. RESULTS AND DISCUSSION

### 3.1 Socio-economic Characteristics of the Respondents

Table 1 revealed that 90% of the farm respondents and all (100%) of the Extension agents (EAs) interviewed were within the age brackets of 18 – 65 years of age. About 60% of the farm respondents (FRs) and 80% of the EAs were males, while 40% and 20% respectively of the FRs and EAs were females respectively (Table 1). About 70% of the FRs and all (100%) of the EAs had at least secondary school education. Eighty percent of the FRs were married as against 90% of the EAs (Table 1). Furthermore, table 1 revealed that 75, 45, 98 and 50% respectively of the FRs belonged to cooperatives, Age Grades, Development Unions and others respectively as against, zero, 80, 90 and 75% respectively of the EAs who also belonged to the above mentioned organizations (Table 1). Equally, Table 1 revealed that 50, 40 and 10% respectively of the FRs had their primary occupation as farming, trading, and Civil service respectively and all (100%) of the EAs were Civil servants. About 40, 30 and 30% respectively of the FRs had household size of 1 – 3 persons, 4 – 6 persons 7 and above persons respectively (Table 1). About 80% of the FRs had a monthly income of between ₦16, 000 and above as against all (100%) of the EAs (Table 1). Furthermore, Table 1 revealed that 20% of the FRs were computer literate as against 60% of EAs, while 10% of the FRs owned computers as against 30% of the EAs. Similarly, Table 1 revealed that 98% of the FRs owned mobile phones as against all (100%) of the EAs.

The implications of the socio-economic characteristics of the respondents as revealed by Table 1 were that the respondents were literate enough as to acquire and understand any ICT Information dissemination tools. Secondly, 80% of the respondents being within the age

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range of 18 – 65 years of age indicates that the respondents were still young and able to undertake any training in computer skill acquisition.

Thirdly for the fact that about 99% of the respondents owned mobile phones indicated that the respondents were better disposed for the use of mobile phones in extension message delivery service. All these collaborate with Arokoyo (2005) who stated that in developing countries both the extension service and other service providers and their clients were experimenting with new digital opportunities that could be effectively used to exchange, process, manage and communicate information and knowledge.

### 3.2 Availability, Access and Use of ICT Tools in Extension Delivery Services

Table 2 revealed that 80% of the farm respondents as against 90% of Extension Agents (EAs) respondents indicated radio broadcast to be available, accessible and used for extension delivery services in the study area. Similarly, 75, 60, 50, 95, 100 and 75% respectively of the farmer respondents indicated digital cameras, video cameras, television, viewing centres, projectors, printed materials and books and news papers respectively as against 45,70,0,100,100 and 90% respectively of the EAs who indicated the above mentioned ICT tools as being available, accessible and used for extension delivery service in the study area (Table 2). On the contrary, all the respondents indicated that ICT facilities such as CD ROMs, VCD and DVD, modems, Flash drives, E-mails, Video Conferencing, Social Media facilities and animated images were not available, accessible and used in extension delivery services in the study area (Table 2). These findings collaborate with that of Busagala and Kawano (2013) which stated that developing countries have recognized the benefits of using ICT in various public services, which enabled community to get quality and affordable services easily but that ICT situation in African countries differed from country to another.

### 3.3 Constraints to Access and Use of ICT Facilities

Table 3 revealed that Farm Respondents (FRs) indicated seven factors out of ten to be significant as against six by the Extension Agents (EAs) as constraints to access and use of ICT facilities in the study area. Equally, Table 3 further revealed that FR scored lack of ICT training 2.7, inadequate ICT infrastructure 2.95, fear for change 2.55, lack of funds 3.4, inadequate ICT Skills 3.25 and unreliable electric power supply 3.5 respectively as against 2.8, 3.2, 2.5, 2.4, 3.3, 3.25, and 3.5 respectively by the EAs. This implies that both the FRs and EAs were in agreement over factors that hinder access and use of ICT facilities in the study area. The above findings confirmed by the spearman's correlation coefficient ( $r_s = -0.88$ ) which indicates that there was relationship between the perception of the FRs and that

of EAs in the study area. Since the spearman's correlation coefficient is negative implies that as the perception of the FRs increased that of the EAs decreased

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**Table 1:** Distribution of the Respondents According to their Socio-economic Characteristics

s/no	Variables	Farm Respondents n=200		Extension agent n=20	
		Frequency	Percentage %	Frequency	Percentage %
<b>01</b>	<b>Age</b>				
	18 – 29	10	5	1	5
	30 – 41	30	15	3	15
	42 – 53	80	40	8	40
	54 – 65	60	30	6	30
	66 – 77	20	10	-	-
<b>02</b>	<b>Gender</b>				
	Male	120	60	16	80
	Female	80	40	4	20
<b>03</b>	<b>Educational level</b>				
	Primary	60	30	-	-
	Secondary	100	50	2	10
	Tertiary	40	20	18	90
<b>04</b>	<b>Marital Status</b>				
	Single	20	10	1	5
	Married	160	80	18	90
	Divorced/separated	10	5	1	5
	Widowed	10	5	-	-
<b>05</b>	<b>Membership to Organization</b>				
	Cooperatives	150	75	-	-
	Age-grades	90	45	16	50
	Development unions	198	98	18	90
	Others	100	50	15	75
<b>06</b>	<b>Primary occupation</b>				
	Farming	100	50	-	-
	Trading	80	40	-	-
	Civil servant	20	10	20	100
<b>07</b>	<b>Household size</b>				
	1 – 3 persons	80	40	8	40
	4 – 6 persons	60	30	12	60
	7 and above	60	30	-	-
<b>08</b>	<b>Monthly income</b>				
	₦10,000 – ₦15,000	40	20	-	-
	₦16,000 – ₦21,000	60	30	-	-
	₦22,000 – above	100	50	20	100
<b>09</b>	<b>Computer literacy</b>				
	Yes	40	20	12	60
	No	160	80	8	40
<b>10</b>	<b>Computer ownership</b>				
	Yes	10	5	6	30
	No	190	95	14	70
<b>11</b>	<b>Mobile phone ownership</b>				
	Yes	196	98	20	100
	No	4	2	-	-

Source: Field survey, 2014

**Table 2:** Distribution of Respondents According to Availability, Access and Use of ICT Tools in Extension Delivery Services in the Study Area

s/no	Variables	n = 200		n = 20	
		Farm Respondents		Extension Agents	
01		Frequency	Percentage %	Frequency	Percentage %
	Mobile Phone Calls				
	Yes	20	10	8	40
	No	180	90	12	60
02	<b>Mobile Phone Text Messages</b>				
	Yes	5	2.5	4	20
	No	195	97.5	16	80
03	<b>Radio Broadcast</b>				
	Yes	160	80	18	90
	No	40	20	2	10
04	<b>Tape Recording</b>				
	Yes	30	15	9	45
	No	170	85	11	55
05	<b>Digital Cameras</b>				
	Yes	50	25	9	45
	No	150	75	11	55
06	<b>Video Cameras</b>				
	Yes	120	60	14	70
	No	80	40	6	30
07	<b>Television Viewing Centres</b>				
	Yes	100	50	-	-
	No	100	50	20	100
08	<b>CDs, VCD and DVD</b>				
	Yes	-	-	-	-
	No	200	100	20	100
09	<b>Modems</b>				
	Yes	-	-	-	-
	No	200	100	20	100
10	<b>Flash Drives</b>				
	Yes	-	-	-	-
	No	200	100	20	100
11	<b>E-mails</b>				
	Yes	-	-	-	-
	No	200	100	20	100
12	<b>Video Conferencing</b>				
	Yes	-	-	-	-
	No	200	100	20	100
13	<b>Social Media</b>				
	Yes	-	-	-	-
	No	200	100	20	100
14	<b>Projectors</b>				
	Yes	190	95	20	100
	No	10	5	-	-
15	<b>Printed Materials and Books</b>				
	Yes	200	100	20	100
	No	-	-	-	-
16	<b>News papers</b>				
	Yes	150	75	18	90

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	No	50	25	2	10
<b>Animated Images</b>					
	Yes	10	5	2	10
	No	190	95	18	90

Source: Field survey, 2014

**Table 3:** Distribution of the Respondents According to Constraints to Access and Use of ICT Facilities

s/n	Factors	n = 200							n = 20						
		Farm Respondents (FRs)							Extension Agents (EAs)						
		S/A	A	D/A	S/D	Total	Mean	Rank	S/A	A	D/A	S/D	Total	Mean	Rank
01	Lack of ICT training	40	60	80	20	540	2.7	4 <sup>th</sup>	6	6	6	2	56	2.8	5 <sup>th</sup>
02	Inadequate ICT Infrastructure	60	50	50	10	590	2.95	3 <sup>rd</sup>	8	8	4	-	64	3.2	3 <sup>rd</sup>
03	Fear of Change	50	60	40	50	510	2.55	6 <sup>th</sup>	5	4	6	5	49	2.5	7 <sup>th</sup>
04	Lack of Govt. Support	40	60	60	40	500	2.5	7 <sup>th</sup>	6	8	4	2	52	2.4	4 <sup>th</sup>
05	Lack of Funds	90	100	10	-	680	3.4	2 <sup>nd</sup>	8	10	2	-	66	3.3	1 <sup>st</sup>
06	Inadequate ICT skills	50	70	40	40	530	2.65	5 <sup>th</sup>	-	12	8	-	52	2.6	6 <sup>th</sup>
07	Uncontrollable Change in technology	-	-	150	50	350	1.75	10 <sup>th</sup>	-	-	10	10	30	1.5	9 <sup>th</sup>
08	Unreliable Electric power Supply	100	100	-	-	700	3.5	1 <sup>st</sup>	8	6	5	1	61	3.25	2 <sup>nd</sup>
09	Inadequate/Poor Technical support	30	40	70	60	440	2.2	9 <sup>th</sup>	-	8	6	6	42	2.1	8 <sup>th</sup>
10	Inadequate ICT Skills of EAs	-	80	120	-	480	2.4	8 <sup>th</sup>	-	-	8	12	28	1.4	10 <sup>th</sup>

Source: Field Survey, 2014

\* S/A = Strongly Agree Scored 4 points

\* A = Agreed Scored 3 Points

\*D/A = Disagree Scored 2 points

\*S/D = Strongly Disagree Scored a point

\* Decision Rule: Any Score that is  $\geq 2.5$  is regarded as significant while any score that is  $< 2.5$  is regarded not significant.**SPEARMAN'S CORRELATIONS COEFFICIENT**

n=10

	FR Scores	Ranks	EAs Scores	Ranks	D	D <sup>2</sup>
01	2.7	4 <sup>th</sup>	2.8	5 <sup>th</sup>	- 1	1
02	2.95	3 <sup>rd</sup>	3.2	3 <sup>rd</sup>	0	0
03	2.55	6 <sup>th</sup>	2.5	7 <sup>th</sup>	-1	1
04	2.5	7 <sup>th</sup>	2.9	4 <sup>th</sup>	3	9
05	3.4	2 <sup>nd</sup>	3.3	1 <sup>st</sup>	1	1
06	2.65	5 <sup>th</sup>	2.6	6 <sup>th</sup>	-1	1
07	1.75	10 <sup>th</sup>	1.5	9 <sup>th</sup>	1	1
08	3.5	1 <sup>st</sup>	3.25	2 <sup>nd</sup>	-1	1
09	2.2	9 <sup>th</sup>	2.1	8 <sup>th</sup>	1	1
10	2.4	8 <sup>th</sup>	1.4	10	-2	4
						$\Sigma D^2 = 20$

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$r_s$  = Spearman's Coerrelation Coeff.

$n = 10$  = number of variables

$D$  = Difference between ranked pairs

Spearman's ranking coefficient

$$r_s = 1 - \frac{6 \sum D^2}{n(n^2 - 1)}$$

$$r_s = 1 - \frac{120}{10(100 - 1)} = -1.42$$

$$r_s = -1.42$$

Therefore,  $r_s$  calculated equals -1.42

$r_s$  calculated equals to -1.42 approximately -1 which implies that there is relationship between the responses of the farm respondents (FR) and that of the Extension Agents EAs).

Therefore the Hull (HO) hypothesis, which states that there is no relationship between the responses of the FRs and EAs is rejected)