

Assessment of Information and Communication Technology Usage among Agricultural Extension Workers in South Western Nigeria

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Abstract

The study assessed the usage of Information and Communication Technologies among agricultural extension workers in Southwestern Nigeria. A multi-stage sampling procedure was employed to select 120 extension workers for the study. Structured questionnaire was used to elicit information from the respondents. Data collected were analysed using descriptive statistics such as percentages, frequency counts, mean and ranking. In addition, inferential statistics such as Chi-Square and regression analysis were used to determine the relationship between the respondents' socio-economic characteristics, extension workers cadres, and the usage of ICTs. The results of the study showed that the mean age of extension workers was 44.7 years, and 73.3% were males while 26.7% were females.

The average household size of the respondents was found to be 7, and majority (75%) of the respondents earned between ₦ 450,000 and ₦ 600, 000. The most frequently used ICTs were mobile phones (100.0%) and radio services (98.3%), while the sparingly used ICTs by the respondents were Ipads and Projector (6.7%). The results of the regression analysis shows that age and sex of the respondents were significant at 5%. In addition, educational status had positive and significant relationship with the usage of ICTs by the extension workers at 1%. The Chi-square analysis shows that cadres of extension workers ($\chi^2=6.78$, $P \leq 0.05$) had significant relationship with the ICTs' usage. It was therefore recommended that government should assist extension workers in acquisition of skills through training and re-training. In addition, efforts should be made by the government to ensure regular power supply to facilitate the usage of ICTs in the study area.

Key Words: *ICT Usage, Extension workers, Southwestern Nigeria,*

INTRODUCTION

There is scarcely any field of human endeavours today that has not been touched by the dramatic changes in Information and Communication Technology (ICTs) that have taken place in the last few decades. ICT is defined as consisting of electronic and digital means of capturing, processing, sharing, storing and retrieving information for broadcast, using radio and television, and transmission of speeches, data and images, using telephone, faxes, e-mails and internet through fixed, wireless, and/or satellite networks (Zappacosta, 2001). According to CTA (2003), information and communication technologies are technologies, which facilitate communication and, thus, the process and transmission of information electronically. In essence, information technologies are all applications that are computer-based for sharing ideas, data and other relevant information for the improvement of the status quo. The development and proliferation of electronically communicated information has accelerated economic and social change in all areas of human activity worldwide and it continues to do so at a rapid pace (Anil, 2009).

The use of ICTs in agricultural extension and rural

development is significant, especially now that its use has witnessed an expansion in almost all areas of rural life in the African continent. In certain countries, ICTs have been a medium to offering adequate access to agricultural information despite the persisting problems of access, connectivity, literacy, content and cost (CTA, 2003). In this respect, Omotayo (2005) observed that agricultural extension depends largely on information exchange between and among farmers, and a broad range of other actors. Frontline extension workers who serve as the direct link between farmers and other actors in the agricultural knowledge and information system (AKIS) are well positioned to make use of ICTs to access expert knowledge or other types of information that could facilitate the accomplishment of their routine activities. Modern agricultural extension system encourages the development of positive attitude in the sciences to appreciate the knowledge, experience and capacities of the local people in research development process (Amalu, 1998). ICTs as extension tools will enhance flow of information in the application of agricultural extension services. Arokoyo (2005) reported that to date, the radio and television have been the major ICTs used in agricultural extension delivery in Nigeria. Despite

the importance of these channels, they are principally owned and controlled by government. This means that only programmes that are government owned are often featured. The information context of these channels is more provider-driven than user-driven and this has serious implications for extension delivery.

Although most of the organizations in the National Agricultural Research and Extension System (NARES) now have computers for information and data management. Most of the computers have neither telephone nor internet access (Arokoyo, 2005). Consequently, a substantial number of research Institutes and Extension organizations have no e-mail contacts. If mainstream Nigerian agricultural system does not adopt modern information and communication technologies, there is likely to be stagnation of agricultural information for purposeful development of the system.

Meera et al. (2004) had noted that because of the emerging paradigms of agricultural development,

old ways of delivering important services to citizens are being challenged; and traditional societies are being transformed into knowledge societies all over the world. Information and communication technology has been a tool for achieving meaningful societal transformation. This transformation is a function of reliable agricultural research network. A network is a group of individuals or institutions linked together because of commitment to collaborate in solving a common agricultural problem and to use existing resources more effectively. The use of computers enhance research network in various ways, among which are electronic mail forwarding, electronic conferencing, etc. Through these means, scientists, administrators and information personnel are provided with rapid and reliable information while increasing productivity and decreasing communication cost by reducing the means of communication channels (Adebayo and Adesope, 2007).

Statement of the Problem

The consumption of ICTs (cell phones and internet facilities) in Africa, and in Nigeria specifically, has steadily progressed over the last ten years. The number of people connected to the Internet via fixed or mobile devices is increasing rapidly. African farmers, especially the youth, have not been left out of this ICTs adoption. The percentage of individuals using the internet grew from 10% in 2010 to almost 20% in 2014 (ITU, 2016).

Dissemination of agricultural information is very crucial to agricultural productivity of farmers because it is only through this means that they can learn about innovations, which can improve their productivity. Namaseb (1999) in corroborating this assertion noted that the messages (agricultural information) passed by the media enhance agricultural productivity of farmers when they have access to it but in disseminating this information, it is imperative that the specific information needs of the large audience are taken into consideration so as to ensure that their needs and aspirations are met. The need for relevant and current information by the farmers on new agricultural practices is a vital issue that needs to be considered seriously by every nation, especially developing countries like Nigeria.

Studies have shown that agricultural development

in Nigeria and other Africa countries have been hampered by low level of agricultural information exchange. Arokoyo (2003) reported that in Nigeria, the National Extension Service is based on Training Delivery System, traditionally supported by mobile cinema, video, television, radio and telephone being the only information and communication technology used by majority of extension workers. However, telephone use in extension delivery even with the launch and explosion of the global system of mobile communication (GSM) is very limited, as most ADPs even at the headquarters do not have functional lines (Agwu and Chah, 2007). The serious limitation of access to reliable telephone line makes even ordinary intra and inter organization networking for information exchange a harrowing and frustrating experience. The vision of the public agricultural extension system in Nigeria is that there should be media sub-units within agricultural sub programmes equipped with modern communication facilities for effective communication both within the organization and to link research institutes, related agencies and farmers.

The Training and Visit (T &V) system of agricultural extension relies mostly on personal contact with minimal Radio and Television programmes throughout the southwestern states

of Nigeria. Thus, programmes are slowly propagated, small in scale, and limited in coverage. However, ICT enables interactive communication that is unhindered by distance, volume, medium and time. It therefore becomes imperative to assess ICTs' usage among agricultural extension workers in southwestern Nigeria. To unravel this, this study specifically aims at:

- i. examining the socio-economic characteristics of agricultural extension workers in south western Nigeria;
- ii. ascertaining the accessibility of the respondents to ICTs;

- iii. establishing the frequency of use of ICTs by the respondents;
- iv. determining the constraints to the use of ICTs in agricultural development process as perceived by extension workers;
- v. correlating extension workers' years of education and their level of ICT usage.
- vi. discovering the relationship between socio-economic characteristics and ICTs' usage among agricultural extension workers.
- vii. determining the relationship between extension workers' cadres and their use of ICTs.

Methodology

The study was conducted in the southwestern Nigeria. A multi-stage sampling technique was employed to select the respondents for the study. Southwestern Nigeria comprises six states, out of which two States (Ekiti and Oyo) were randomly selected. The second stage involves random selection of five ADP zones from each of the two States selected. The final stage involves systemic sampling of twelve extension workers from each of the ADP zones using extension workers' registers as sampling frames. A total of 120 agricultural extension workers were selected for the study. Validated and pre-tested questionnaire was used to collect relevant quantitative data from the agricultural extension workers. Data collected were analysed using descriptive statistics tools such as frequency counts and tables, percentages, mean, etc, and inferential statistics such as Chi-Square (X²) and regression analyses to determine the relationships between variables involved in the study.

Results and Discussion

Table 1 shows that only 13 (10.8%) respondents were below the age of 30 years, while majority (63.0%) of the respondents were between the ages of 31 and 50 years. Only 20% of the respondents fell between the age bracket of 51 and 60 years while just 5 percent of the respondents were above 60 years of age. The implication of this finding is that majority of the respondents were still active in government service.

Majority of the respondents (73.3%) were male while 26.7 percent were female. This shows that male dominated the work of technology transfer and agricultural development. Majority of the respondents (85.0%) were married while 15.0 percent were single.

The average number of years spent in service was 17.3 years, which implies that they have acquired adequate experience on the field. Majority of the respondents (70.0%) had HND/BS.C certificates, and the least certificate was OND, which was possessed by 10.8 percent of the respondents. This shows that respondents can skillfully use any of the ICTs available to them because their levels of education would assist them in the applications.

About 80.0 percent of the respondents had between 5 and 10 members in their households, while 12.5 percent of the respondents had less than or just 5 household members. The mean household size was 7 members. Majority of the respondents (75.0%) earn between 451,000 naira and 600,000 naira per annum, while just 1.7 percent earn above 600,000 naira per annum. This may be a major constraint to their usage of ICT for information dissemination, as many of them might be unable to acquire cellphones from their meagre incomes. Majority (90.8%) of the extension workers have travelled to other states, while 9.2 percent of them have travelled to other countries. The implications of this is that all of them had exposures and must have had inservice trainings and experience through this. Some of the agricultural extension workers (30%) were members of agricultural and allied workers union of Nigeria, and majority (70.0%) were non-members.

Table 1: Socioeconomic Characteristics of Respondents

Variables	Frequency	Percentage Mean
Age		
≤30	13	44.7%%
31-40	33	27.5%
41-50	44	36.7%
51-60	24	20.0%
>60	6	5.0%
Sex		
Male	88	73.3%
Female	32	26.7%
Marital Status		
Single	18	15.0%
Married	102	85.0%
Educational Years		
OND (13 years)	13	10.0%
HND/B.Sc. (17-18yrs)	84	70.0%
M.Sc. (20-25yrs)	23	19.2%
Length of Service		MEAN 17.26
< 10 years	88	73.3
11 – 20 years	26	21.7
21 – 30 years	04	3.3
≥31 years	02	1.7
Household Size		
< 5	15	7.0%
5-10	96	80.0%
11-15	9	7.5%
Income per annum in ₦		
< ₦300,000	2	1.7
Btw ₦300,000 – 450,000	26	21.7
Btw ₦451,000 – 600, 000	90	75.0
> ₦600,000	02	1.7
Cosmopoliteness		
Another town	--	--
Outside the Local Govt.	--	--
Another State	109	90.8
Outside the country	11	9.2
Membership of Professional Org		
Yes	36	30.0
No	84	70.0
Computer Knowledge		
Yes (1)	46	38.3%
No (0)	74	61.7%

Source: Field Survey, 2016

Accessibility to ICT Devices

The results from Table 2 show that majority of the agricultural extension workers had access to Radio Service (98.3%), Television Service (82.5%) and Mobile Phones (100.0%). It was found that all these devices were owned by the respondents, and this actually engendered their accessibility to the devices.

Constrastingly, majority of the agricultural extension workers did not have access to Ipads

(91.7%), Projector (91.7%), Scanner (86.7%), Printer (80.8%), Digital Camera (79.2%), and Internet (77.5%). Inaccessibility of the extension workers to these devices was probably because of the high cost of the items. This finding is in line with Richardson (2006) who submitted that access to ICT in Nigeria is still highly inadequate when compared with countries in Europe.

Table 2: Distribution of Respondents Based on ICT Devices Accessibility

ICT Devices	Very Accessible	Accessibl e	Less Accessible	Not Accessible
Computers/Laptops	22 (18.3)	32 (26.7)	60 (50.0)	6 (5.0)
Radio Service	118 (98.3)	102 (1.7)	--	--
Television Service	99 (82.5)	21 (17.5)	--	--
Mobile Phones	120 (100.0)	--	--	--
Audio Cassettes	04 (3.3)	66 (55.0)	24 (20.0)	26 (21.7)
Compact Discs (CD)	03 (2.5)	11 (9.2)	30 (25.0)	76 (63.3)
Video Compact Disc/Digital V.D	06 (5.0)	19 (15.8)	33 (27.5)	62 (51.7)
Ipads	2 (1.7)	3 (2.5)	5 (4.2)	110 (91.7)
Internet/e-mail	3 (2.5)	5 (4.2)	19 (15.8)	93 (77.5)
Projector	2 (1.7)	4 (3.3)	4 (3.3)	110 (91.7)
Digital Camera	2 (1.7)	12 (10.0)	11 (9.2)	95 (79.2)
Printer	3 (2.5)	5 (4.2)	15 (12.5)	97 (80.8)
Scanner	2 (1.7)	6 (5.0)	8 (6.7)	104 (86.7)
	89 (74.2%)		31(25.8%)	

Source: Field Survey, 2016. Percentages are in Parentheses

Frequency of ICT Devices Usage

Table 3 indicates that among the ICTs being employed by the agricultural extension workers in the study area, all the respondents are making use of Mobile Phones to disseminate agricultural information, which ranked it 1st in position. This was followed by Radio Services for information/knowledge sharing between the respondents and the farmers with (98.3%) responses ranked the 2nd position. Television

Services (82.5%) ranked the 3rd, while Audio Cassette (58.3%) ranked the 4th. However, the results revealed no usage of Ipads and Projector (6.7%) that ranked 12th in position, Scanner (11.7%) ranked the 11th probably because of lack of access and knowledge of their usage. This finding nearly agreed with Agwu and Adeniran (2009) who found out in their study that Radio ranked the most appropriate medium used by arable crop farmers in Isale Osun farm settlement.

Table 3: Respondents' Distribution Based on Frequency of ICT Devices Usage

ICT Devices	Frequency	Percentage	Rank
Mobile Phones	120	100.0	1 st
Radio Services	118	98.3	2 nd
Television Services	99	82.5	3 rd
Audio Cassette	70	58.3	4 th
Computer/ Laptops	54	45.0	5 th
Video Compact Disc/ Digital Video Disc	52	43.3	6 th
Compact Disc	44	36.7	7 th
Internet/ E-mail	27	22.5	8 th
Printer	23	19.2	9 th
Digital Camera	23	19.2	9 th
Scanner	14	11.7	11 th
Projector	08	6.7	12 th
Ipads	08	6.7	12 th

Source: Field survey, 2016

Constraints to the use of ICTs

The result in Table 4 reveals that 90.0 percent of the respondents lack access to ICT materials ranked 1st; 84.2 percent submitted that lack of regular power supply to facilitate learning, training and the use of ICT ranked 2nd. High cost ICT materials (80.0%) ranked 3rd, while lack of ICT skills (70.0%) ranked 4th. Inadequate technical support was the submission of 62.5 percent of the

respondents, while poor installations of ICTs (i.e. poor internet services) was the major challenge of 56.7 percent of the respondents. This confirmed the findings of Arokoyo (2011) which stated that constraints to ICTs used for extension communication was characterised by inadequate infrastructure, unstable power supply and low literacy levels of farmers.

Table 4: Respondents Distribution Based on Constraints to ICT Usage

Constraints	Frequency	Percentage	Rank
Lack of access to ICT materials	108	90.0	1 st
Lack of regular power supply to facilitate learning	101	84.2	2 nd
High cost of ICT materials	96	80.0	3 rd
Lack of ICT skills	84	70.0	4 th
Inadequate technical support	75	62.5	5 th
Poor installation of ICTs (i.e. poor internet services)	68	56.7	6 th

Source: Field Survey, 2016

Correlation of Extension Workers' Years of Education and Their Level of ICTs Usage
From Table 5, the Pearson correlation below shows that there is a significant relationship between the extension workers years of education and their level of ICT proficiency. The result is significant at

0.01 level. It however implies that, the higher the years spend acquiring formal education, the more they are proficient in the use of computers.

Table 5: Correlation Analysis of Extension Workers' Years of Education and Their Level of ICT Usage

	Education	ICTs
Spearman's rho	Education coefficient 1.000 correlation	0.003***
	Significance 0.00	0.000
	N 120	120
	Computer proficiency correlation 0.004***	1.000
	Significance 0.000	0.000
	N 120	120

***** Significant at 1%**

Relationship between Socio-economic Characteristics and ICTs' Usage among Agricultural Extension Workers

The results of the regression analysis on the socio-economic characteristics and the usage of ICTs among agricultural extension workers were presented in Table 6. The coefficients of multiple determinants (R²) value of 0.61 indicates that about 61% variation in the socio-economic characteristics could be explained by explanation variable while the remaining 39% was due to other factors not specified in the model. F-value ratio of 2.27 in the regression results indicates that

variables such as age and sex had positive coefficients and were significant at 5%. This implies that the older an extension worker becomes, the more he finds himself using more of the ICTs. In addition, sex (male/female) has a good role to play in ICTs usage.

In addition, educational status of an agricultural extension worker had positive coefficients and was significant at 1%. However, years of working experience of an extension worker (-0.055) and annual income (-0.006) had negative coefficients and significance at 1% level of probability.

Table 6: Regression analysis of the relationship between socio-economic characteristics and ICTs usage by Agricultural Extension workers

Variables	Coefficients	Std. errors	t-values
Constant	-0.386	0.952	-0.210
Age	0.0430	0.036	1.162***
Sex	0.787	0.506	1.556***
Working experience	-0.055	0.029	-1.651**
Educational status	1.010	0.123	4.652**
Annual income	-0.0061	0.000	-0.652**
Computer literacy	0.257	0.393	-0.651

Source: Field survey, 2016. R-square=0.510; R-square adjusted=0.61; F-value=2.27; ** Significant at 1%; * Significant at 5%**

Chi-Square Analysis of the Relationship between Extension Workers' Cadres and ICTs Usage
Table 7 shows that a significant relationship existed between cadres of extension workers and usage of ICTs ($X^2=6.780$, $P \leq 0.05$). Relationship of cadres of agricultural extension workers and usage of ICTs

shows an indication of more responsibilities as the respondents advance in professional cadre. This probably influenced the more usage of ICTs for innovation dissemination.

Table 7: Chi-Square Analysis of the Relationship between Extension Workers' Cadres and ICTs Usage

Variable	X ²	df	P-value
Cadres of extension workers	6.780	4	0.021

Source: Field survey, 2016. *P $\leq$ 0.05

Conclusion and Recommendation

The study revealed that all agricultural extension workers were making use of one ICT or the other, ranging from the use of Mobile Phones to Ipad and/or Projector. The study also showed that accessibility to ICT materials and irregular power supply were the major challenges hindering the usage of ICT. The results of regression showed that age and sex had positive significant relationship with the usage of ICTs. Furthermore, educational status of the respondents had positive and significant relationship with the usage of ICTs. The different cadres of extension workers also

influenced the use to which ICTs were put. The study therefore recommends that extension workers equip themselves with skills needed to put to use ICT materials. Government should also endeavor to work on providing steady and regular power supply. In addition, all agricultural training institutions, research stations and extension organisations in Ekiti and Oyo States must be well equipped with all necessary ICT facilities to increase access by extension workers.

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