



PUBLIC AGRICULTURAL EXTENSION AGENTS' KNOWLEDGE OF THE CONCEPT OF E-EXTENSION IN OGUN STATE, NIGERIA

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ABSTRACT

Agricultural extension practice worldwide has shifted towards the use of information communication technologies (ICTs) for agricultural information sourcing and delivery but its integration in this part of the world is still very minimal. This study assessed extension agents' knowledge of the concept of e-extension in Ogun State Agricultural Development Programme. A total of 51 agricultural extension agents were randomly selected from the sample frame 59 extension agents using Taro Yamane's formula. Primary data were obtained through a structured questionnaire from extension agents. Data were analyzed using descriptive statistics, Chi-square and linear regression. Results reveal that the mean age, years of work experience and monthly income of the respondents were; 36.6 years, 8 years and N88,137.25k respectively. Majority (74.5%) of the respondents were male, 72.5% were married while 64.7% had a Bachelor of Science. The main e-extension services the respondents were aware of were; short messaging service (96.1%), emails (88.2%) and farmers' contact center (86.3%). Most (86.3%) of the extension agents were knowledgeable about the concept of e-extension with meetings and training (\bar{X} = 1.82 respectively) being the major sources of information about e-extension. Sources of information on the concept of e-extension (β = 0.162, p = 0.019) and level of education of the extension agents (β = -0.578 p = 0.030) significantly influenced knowledge of the concept of e-extension. It was concluded that the respondents were knowledgeable about the concept of e-extension with a recommendation that the Nigerian agricultural technology transfer policy should emphasize the use of e-extension services coupled with more training on integrating this concept into the extension service delivery systems.

Keywords: Knowledge; E-extension; Agricultural Extension Agents.

INTRODUCTION

Agriculture has been the backbone of Nigeria's economy for decades and is still an important sector despite the boom witnessed in the oil sector. As a matter of fact, many countries depend solely on agriculture for sustenance and as the main source of revenue (World Bank, 2014). Challenges militating against agricultural development are numerous, not because of the lack of improved technologies but because of inadequate and untimely dissemination of information on these improved technologies (Sokoya, Onifade, and Alabi, 2012).

Omotayo (2005) observed that agricultural extension depends largely on information exchange between farmers and a broad range of other actors particularly the front line extension workers that are the direct link between farmers and other actors in the agricultural knowledge and information system (AKIS). Considering the importance of information towards agricultural development, the role of agricultural extension in agricultural development is pertinent and to improve agricultural extension, the traditional means of disseminating information such as face to face, farm visits, group discussions, personal letter and the use of contact farmers should be modified. Oladele (2006) opined that information communication technologies can enhance the integration and efficiency of agricultural systems by opening new communication pathways.

According to Omotayo (2005), the use of information communication technologies (ICTs) tools in extension has become necessary in view of users' demand for effective and appropriate

agricultural extension service delivery. The advent of ICTs has given rise to e-extension which Renwick (2012) described as the delivery of extension services using web tools, which allow online sharing, collaboration and networking. Ramjattan, Ganpat, and Chowdhury (2017) opined that e-extension, as a modern mode of communication, can be used to improve the effectiveness and efficiency of extension services. Farmers' access to reliable, timely and relevant information on improved technologies is often limited due to challenges in extension service delivery such as immobility of extension agents, low extension to farmer ratio, and poor funding which negatively impacts on extension activities. According to OGADEP (2017) the ratio of extension agents to farm families has drastically reduced to 1:1019 in Ogun State which is against the recommended 1:200-300 by the Ministry of Agriculture in 2002. Also, weak research-extension-farmers linkage another challenge faced by extension agents in delivering relevant and timely information to the would-be users. Eneyew (2013) reported that the lack of strong research-extension-farmers linkage causes disruption in technology flow and low adoption rates, increased time lags between development and adoption of new technology, reduced efficiency in the use of resources, unnecessary competition and duplication of efforts, and increased cost of agricultural research and extension activities.

In the light of these prevailing challenges that have constrained effective access of farmers to extension service, the use of e-extension could open up new opportunities in service delivery. This study



therefore assessed public extension agents' knowledge of the concept of e-extension services in Ogun State Agricultural Development Programme. The specific objectives of this study were to:

1. identify the types of e-extension services the agents were aware of;
2. ascertain respondents' level of knowledge on the concept of e-extension;
3. identify the sources of information on e-extension; and
4. ascertain the factors associated with respondents knowledge of the concept of e-extension.

The hypothesis of this study is stated in null form that: There is no significant relationship between selected socio-economic characteristics of extension agents and their knowledge of the concept of e-extension.

METHODOLOGY

This study was carried out in Ogun State, Nigeria. Ogun State is located in the Southwest zone of the country with a total land area of 16,980.55 square kilometers. It is situated between latitudes 7.0°N and 3.35°E, and predominantly inhabited by the Yoruba ethnic group. Public agricultural extension service is mainly provided in the state by Ogun State Agricultural Development Programme (OGADEP) which is segmented into four operational zones (Abeokuta, Ilaro, Ijebu and Ikenne.). The population of this study, therefore, comprised of extension agents in OGADEP. The sampling frame was 59 agricultural extension agents who were on the staff list of extension personnel in OGADEP at the time this study was conducted. Taro Yamane's formula adopted from Kalpana (2011) was used to sample 51 agricultural extension agents from the sampling frame. Sampling size computation using Taro Yamane formula is indicated as follow:

$$n = \frac{N}{1 + N(e)^2}$$

Where, n = Number of respondents, N = Population Size, e = Error (5%)

Primary data were obtained through a structured questionnaire administered to 51 extension agents in OGADEP. Awareness of e-extension services by the respondents' was measured using a dichotomous variable of aware (1) and not aware (0), knowledge about the concept of e-extension was measured using a dichotomous variable of true and false statements scored 1 and 0 respectively for positive knowledge statements and reverse scoring order for negative statements. Major sources of information about e-extension were measured using a 3-point rating scale of Always, rarely and never scored 2, 1 and 0, respectively. Hypothesis 1 was tested using Chi-square and Pearson's Product Moment Correlation while factors

associated with the use of e-extension was tested using linear regression.

Linear Regression: Linear regression analysis indicates the line of best fit between dependent variables and independent variables. According to Argyrous (2005), it is simply the task of fitting a straight line through a scatter plot of cases that "best-fits" the data.

The following equation shows the multiple linear regression model for this study:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + \dots + b_eX_e + \epsilon$$

Y = Respondents' knowledge of the concept of e-extension services.

b_0 = This is the value of Y when all of the independent variance equal to zero.

b_1 through b_7 = estimated regression coefficient (Each regression coefficient represents the change in Y relative to a unit change in the respective independent variables)

ϵ = The models' error term (Also known as residual)

X_1 = Age (Years)

X_2 = Sex (Male = 1 and female = 2)

X_3 = Religion (Christianity = 1, Islam = 2)

X_4 = Marital Status (Single = 1, engaged = 2 and married = 3)

X_5 = Years of work experience (Years)

X_6 = Awareness of e-extension services (Aware = 1, not aware = 0)

X_7 = Sources of information on the concept of e-extension services (Number of sources)

X_8 = Education level (NCE = 1, OND = 2, B.Sc = 3 and M.Sc = 4)

RESULTS AND DISCUSSION

Socioeconomic characteristics

Results in Table 1 reveal that the mean age, years of work experience and monthly income of the respondents were 36.60 ± 8.34 years, 8.17 ± 8.16 years and $N88,137.25k \pm N70,857.96k$ respectively. This indicates that many of the extension agents are middle aged which could influence knowledge of the concept of e-extension because of the associated technicalities with the concept. This result is in line with the findings of Adeola and Ayoade (2011) who reported that many of the extension agents in Oyo State Agricultural Development Programme (OYSADEP) were middle aged (27-41 years). Majority (74.5%) of the respondents were male, 72.5% were married, 66.7% were Christians, while all (100.0%) had tertiary education. This implies that extension agents in Ogun State Agricultural Development Programme (OGADEP) are predominantly male and literate. This result is in consonance with the findings of Thomas and Laseinde (2015), who reported that most of the extension agents in OYSADEP were male and literate.



Table 1: Distribution of extension agents by socio-economic characteristics (n = 51)

Variable	Frequency	Percentage	Mean±SD
Age(years)			
23 – 30	10	19.6	36.60±8.34years
31 – 38	28	54.9	
39 – 46	04	7.8	
47– 54	07	13.7	
55 and above	02	3.9	
Sex			
Male	38	74.5	
Female	13	25.5	
Marital status			
Single	12	23.5	
Engaged	02	3.9	
Married	37	72.5	
Religion			
Christianity	34	66.7	
Islam	17	33.3	
Educational level			
NCE	01	2.0	
OND	01	2.0	
HND	09	17.6	
B. Sc	33	64.7	
M. Sc	07	13.7	
Work experience (Years)			
1 – 8	37	72.5	8.17± 8.16 years
9 – 16	04	7.8	
17 – 24	07	13.7	
25 – 30	03	5.9	
Income (N)			
20000-90000	37	72.5	N88,137.25k±N70,857.96k
90001-160000	07	13.7	
160001-230000	02	3.9	
230001-280000	05	9.8	

Source: Field survey, 2019

Awareness of e-extension services by the respondents

Results in Table 2 reveal that short messaging service (SMS, 96.1%), emails (88.2%), farmers’ contact center (86.3%), and interactive voice response (IVR, 72.5%) were some forms of e-

extension services respondents were aware of. This implies that the aforementioned e-extension services are the prominent services the respondents were aware of and the reason might be attributed to their popularity in this part of the world (Nigeria).

Table 2: Distribution of the respondents by awareness of e-extension services (n=51)

S/N	E-extension services	Frequency	Percentage
1	Short Messaging Service (SMS)	49*	96.1
2	Emails	45	88.2
3	Farmers’ Contact Center	44	86.3
4	Interactive Voice Response (IVR)	36	72.5
5	Blogs	26	51.0
6	Teleconferences	25	49.0
7	Unstructured Supplementary Service Data (USSD)	24	47.1

Source: Field survey, 2019.

Note: * Multiple responses

Respondents’ knowledge of the concept of e-extension

Some of the test questions and percentages of the correct options are presented in Table 3. Furthermore, results in Table 4 reveal that 86.3% of

the respondents scored above the mean value (\bar{x} =7.5) thereby having high knowledge about the concept of e-extension while 13.7% scored below this mean value implying a low level of knowledge



about the concept of e-extension. This indicates that most of the respondents sampled were knowledgeable about the concept of e-extension and this could influence its possible integration into the agricultural extension service delivery system. This

result is similar with the findings of Isiaka, Lawal-Adebowale, and Oyekunle (2009) who reported that extension agents in Southwest Nigeria were knowledgeable about ICTs.

Table 3: Distribution of respondents by knowledge of the concept of e-extension (n=51)

Statements on the concept of e-extension	Right options (%)
A farmer using a mobile phone to make call or send text message to an extension agent or another farmer on how to apply fertilizer on his maize farm is an example of e-extension.	98.0
Accessing agricultural research papers and research blogs on the internet constitutes e-extension.	90.2
An extension agent using Skype to demonstrate artificial insemination method to a farmer is an example of e-extension	78.4
Using mobile phone as electronic dairy and reminders for monthly meetings and trainings constitutes e-extension.	94.1
Posters, transparencies, bulletins, magazines, newspapers and hand bills are all examples of e-extension.	43.1
E-extension maximizes the use of Information Communication Technologies (ICTs) to attain a modern agriculture.	90.2
Disseminating and receiving agricultural information via email is an example of e-extension.	92.2
Using agricultural related apps on mobile phones constitute e-extension.	98.2
E-extension creates an electronic and interactive bridge between agricultural stakeholders.	96.1
Examples of e-extension web tools include websites, networking software, online sharing tools such as emails, blogs, and surveys, video conferencing, instant messaging, community-based tele centers and mobile phone apps.	94.1
Face-to-face communication without any electronic device constitutes e-extension.	41.2
E-extension allows one to reach your client anytime, anyplace, and anywhere.	94.1
E-extension is the delivery of extension services using the internet or latest Information Communication Technologies (ICTs), which allow networking, online sharing and collaboration.	88.2
E-extension supports delivery of information in diverse styles such as text, audio, audio-visual, image, motion pictures, instant messaging and applications.	92.2
Mobile phone for sending and receiving SMS (short message service) among farmers and between farmers and extension agents is an example of e-extension.	92.2

Source: Field Survey, 2019

Table 4: Categorisation of respondents' knowledge of the concept of e-extension (n=51)

Categorisation	Frequency	Percentages
High Knowledge	44	86.3
Low Knowledge	07	13.7

Source: Field Survey, 2019

Mean = 7.5

Sources of information on e-extension by the respondents

The sources of information on e-extension as indicated by the extension agents in Table 5 were meetings and trainings ($\bar{x} = 1.82$ respectively) which

were ranked first, internet ($\bar{x} = 1.80$) which ranked third as well as social media ($\bar{x} = 1.76$). This implies that the aforementioned were the major sources of obtaining information on e-extension by the respondents.

Table 5: Distribution of respondents by sources of information on e-extension by the respondents (n=51)

Sources of information on e-extension	Mean	Rank
Meetings	1.82	1 st
Trainings	1.82	1 st
Internet	1.80	3 rd
Social Media	1.76	4 th
Seminars	1.66	5 th
Radio	1.66	5 th
Workshop	1.64	7 th
Colleagues	1.60	8 th
Television	1.60	8 th
Conferences	1.47	10 th
Newspaper	1.23	11 th

Source: Field Survey, 2019

Factors associated with respondents’ knowledge of the concept of e-extension

Result in Table 6 reveals that the F-value of 1.694 was not significant at 0.05% level and R² of 0.244 implies that the independent variables explained 24.4% contribution to respondents’ knowledge of the concept of e-extension service in the regression model. The Table further reveal that sources of information on the concept ($\beta = 0.162$, $p = 0.019$) and their level of education ($\beta = -0.578$ $p =$

0.030) had significant effect on their knowledge of the concept of e-extension. This implies that the respondents' sources of information and their level of education could predict respondents’ knowledge of the concept of e-extension service. There was a negative effect of education on knowledge which is contrary to a prior expectation which may be attributed to the skewed nature of the distribution as indicated in Table 1 as most of the respondents indicating that they possess bachelor degrees.

Table 6: Factors associated with the use of e-extension and respondents’ knowledge of the concept of e-extension

Variables	β	Standard Error	t-value	p-value
Age	-0.050	0.054	-0.936	0.355
Sex	-0.436	0.453	-0.961	0.342
Religion	-0.188	0.410	-0.458	0.649
Marital status	0.130	0.259	0.504	0.617
Years of working experience	0.034	0.050	0.676	0.503
Awareness of e-extension services	-0.079	0.129	-0.616	0.541
Sources of information on the concept	0.162	0.067	2.430	0.019*
Educational level	-0.578	0.257	-2.250	0.030*
Constant	14.550	2.356	6.175	0.000
R ² value	0.244			
F-value	1.694			
P-value	0.128			

Source: Field Survey, 2019

Note: * Significant at 5%

Test of relationship between socio-economic characteristics of the respondents and their knowledge of e-extension services

Results of Chi-square analysis in Table 7 reveals that there were no significant associations between sex ($\chi^2 = 1.288$, $p = 0.256$), marital status ($\chi^2 = 0.407$, $p = 0.816$), religion ($\chi^2 = 0.083$, $p = 0.774$), as well as educational level ($\chi^2 = 2.037$, $p = 0.729$) of the respondents and knowledge of the concept of e-extension services. This implies that respondents’ sex, marital status, religion and

educational level do not influence knowledge of the concept.

Correlation test as presented also in Table 7 reveals that there were also no significant relationships between respondents’ age ($r = 0.082$, $p = 0.570$), years of experience ($r = 0.087$, $p = 0.542$), annual income ($r = 0.071$, $p = 0.622$) and knowledge of the concept of e-extension services. This implies that irrespective of the respondents’ age, annual income and years of experience they were still knowledgeable about the concept of e-extension services.



Table 7: Test of relationship between socio-economic characteristics of the respondents and their knowledge of e-extension services

Socio-economic characteristic	Chi-square	df	p-value
Sex	1.288	1	0.256*
Marital status	0.407	2	0.816*
Religion	0.083	1	0.774*
Educational level	2.037	4	0.729*
	r-value		p-value
Age	0.082		0.570*
Years of work experience	0.087		0.542*
Income	0.071		0.622*

Source: Field Survey, 2019

Note: * Not Significant at 5%

CONCLUSION AND RECOMMENDATION

Extension agents in OGADEP were knowledgeable about the concept of e-extension. It is recommended that Nigerian agricultural technology transfer policy should emphasize the use of e-extension services and relevant stakeholders in agricultural extension delivery should facilitate an extension system that is ICT driven. Furthermore, public extension personnel should be exposed to more trainings on how to practically integrate the concept into the extension service delivery systems.

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