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Factors Influencing e-Readiness of Agricultural Extension Agents in Adamawa, Gombe and Taraba States Nigeria

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ABSTRACT

The study assessed the factors influencing e-readiness of agricultural extension agents in Adamawa, Gombe and Taraba States, Nigeria. The specific objectives include describe the socio-economic characteristics of the agricultural extension agents and assess factors influencing agricultural extension agents' use of ICTs in the performance of their duties. Primary data was used for the study and were collected through the administration of questionnaires. A multistage-stage random sampling technique was employed to proportionately select 254 agricultural extension agents from Adamawa, Gombe and Taraba States Nigeria using Taro Yamane's formula. Data collected were analyzed using descriptive and the inferential statistics. The results of the analysis revealed that majority of agricultural extension agents were between the ages of 41 – 50 years and non below the age of 20 years. A large proportion of the agricultural extension agents about 70% were male with only 30.71% female. Majority (91.34%) were married all (100%) of the agricultural extension agents in the study area had one form of formal education or the other with 45.7% and 1.57% of them had Degree/Higher National Diploma (HND) and Masters Degrees respective. Majority (77%) of the agricultural extension agents have been in service above 21 years with a mean working experience of 6.5 years was. 61.42% had grade levels of between 10 and 15 with 67.71% had an estimated average annual income of between ₦20, 000.00 – ₦ 60, 000.00 only. The factors influencing e-readiness of agricultural extension agents as shown by the McFadden R^2 in the Logit regression analysis explained about 92% of the variation of independent variable with age, marital, education status, years of experience, monthly income, number of ICT trainings and number of ICTs available significant at 1%, 5% and 10% levels of significance. The study recommends that, government should develop a mechanism to encourage agricultural extension agents to improve access or ownership to ICT facilities for their professional as well as personal uses.

INTRODUCTION

The Electronic Readiness (e-Readiness) of the human society is mostly based on the objective to which it desire to achieve. Hence, e-readiness means different things to different people, in different contexts, and for different purposes. As a result, a large gap exists between ideas and concepts, on the one hand, and practical applications and implications on the other hand. However, according to spore (2013) the concept of e-readiness is used in many areas such as e-Infrastructure, e-Commerce, e-Economy, e-Governance, e-banking, e-Agriculture and so on. E-Infrastructure in this case focuses on institutions, hardware and software. According to Rezai-Rad (2012) nowadays, many countries use e-commerce as a solution to some of their problems, and as internet connections come into use this e-commerce increase and become a part of business activities around the world. The e-readiness in this case looks at computers, access, and the economy. Again, e-Society is concern with the entire population having the knowledge and access to the use of computers and computer based facilities to address the issues of basic literacy, poverty, health and other social related matters in their day to day activities. On the another hand, e-Governance is concern with the access, and effective usage of computers on government process in reengineering, faster and transparent means of delivering government services to the citizens. This can be done through extensive training programs, locally relevant content, and a local ICT sector meant for improvement. Consequently, according to Spore (2013) e- Agriculture is a field of activity related to the use of modern information and communication tools and technologies that increases agricultural productivity and make available information that is relevant to agricultural research, planning, extension, production, monitoring, marketing and trade while FAO (2013) in Spore (2013) states that, e-agriculture is an emerging field in the intersection of agricultural informatics, development and entrepreneurship.

To this therefore e- Readiness of agricultural extension agents is a deliberate attempt to determine the level and extent to which ICT is access and use in various activities of agricultural extension service delivery. It is no doubt also that, e-readiness assessments are meant to guide development efforts by providing benchmarks for comparison and gauging progress. In Nigeria, the government, researchers and research institutions, agricultural extension agents, farmers and input suppliers among other related stakeholders in agricultural information dissemination require efficient and fast means through which information on particular innovation would be made available and accessible to the end users. This is evidently seen in the recently introduced e-wallet agricultural input supply and distribution system by the Federal Government of Nigeria in 2013. In the e-wallet input supply and distribution system, the farmers are given supply vouchers in which they are to bear 50% of the cost of the input while the government takes responsibilities for the balance 50% of the cost.

Hence, adequate availability of information on these improved technologies is an important ingredient for both agricultural and rural development Ndaghu (2011). Aagricultural extension agents who are the direct tools bridging the communication gap between farmers and other stakeholders in the agricultural information dissemination framework, in order to perform this role effectively and efficiently must have sufficient access to relevant and up to date agricultural information. This brings to fore the need for a comprehensive and well-articulated agricultural extension programme which ensures adequate and timely delivery of extension services to farmers, if meaningful growth that is desired in the agricultural sector is to be achieved. Thus, access to ICTs and use which is the centre of e-readiness is capable of playing significant roles in agricultural extension service delivery.

It is in this regards that this study is intended to fill this gap and answer the following research questions;

i. What are the socio-economic characteristics of the agricultural extension agents?

ii. What are the factors influencing agricultural extension agents' use of ICTs in the performance of their duties?

METHODOLOGY

The Study Area

The study was conducted in Adamawa, Gombe and Taraba states Nigeria. The area is located between latitude 6^{o} 20" to 13^{o} 00'' from the north and longitude 9^{o} 00" to 14^{o} 00'' east of the Greenwich Meridian. The area has an annual rainfall of between 700 mm and 1550 mm and has between three and six months of rainfall a year, with August and September as the wettest months, while the driest months are February and March with relative humidity of about 13 percent (Adebayo and Umar, 1999).

Sources of Data

Primary data was used for the study. These were collected through the administration of questionnaires to sampled agricultural extension agents in the study area.

Sampling Procedure and Sample Size

Multistage-stage random sampling technique was employed to select respondents for the study thus:

Stage I: Three out of the six states in the region were purposely selected for the study.

Stage II: All the agricultural extension agents in the three states were eligible to be included in the sample for study. A list was obtained from the headquarters of the various state ADPs. In all, a total of 323 agricultural extension agents from the three states served as the sample frame (Table 1).

Stage III: A total of 254 agricultural extension agents which served as the sample size was proportionately selected from the sample frame using Taro Yamane's formula as adopted from Kalpana (2011) and used by Usman (2014). The formula is given by;

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

Where,
n = Number of respondents

N = Population Size
e = Error (5%)

Table 1: Distribution and Selection of Respondents

S/No	State	No. of AEAs	No. of AEAs Sampled
1.	Adamawa	123	94
2.	Gombe	106	84
3.	Taraba	94	76
	Total	323	254

Source: Field Survey, 2015

Analytical Tool

Both descriptive and inferential statistics were employed in the analysis of data. The descriptive statistics involved the use of mean, frequency distribution and percentage while the inferential statistics that was Logit regression analysis.

Factors influencing e-readiness of agricultural extension agents

Logit regression analysis was used to determine the extent to which each of the independent variables has contributed in explaining the variance in the e-readiness of agricultural extension agent. The regression equation is represented as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_6X_6 + b_6X_6 + U \quad (2)$$

Where

Y = E- readiness (Dependent variable) (1 if e-ready otherwise 0)

X_1 = Sex
X_2 = Age in years
X_3 = Marital status
X_4 = Educational level in years
X_5 = Years of experience
X_6 = Rank (grade level)
X_7 = Income in Nigerian naira
X_8 = Awareness of use of ICTs in performance of their duties
X_9 = No. of trainings received
X_{10} = No. of ICTs facilities available
X_{11} = No. of ICT facilities accessed
a = Regression constant
b = Regression coefficient or slope
U = unexplainable variable

RESULTS AND DISCUSSION

Socio-economic characteristics

The socio-economic characteristics of respondents studied include, age, gender, marital status, educational status and duration in service. Estimated income and grade level of the respondents was also considered (Table 2).

Age of the respondents

Age according to Ndahgu (2011) is an important factor in the study of individuals' use or non-use of ICTs because it reflects the physical strength to perform a task and the psychological disposition for imbibing behavioural change or otherwise. The results shows that, majority of the agricultural extension agents were between the ages of 41 – 50 years and non below the age of 20 years. About 1.2% of the agricultural extension agents were between the ages of 20 – 30 years, 7.5% were within the age range of 31 – 40 years while 7.1% were above 60 years of age (Table 2) .

The results is in line with the findings of Kehinde *et al.*, (2015), who reported that, none of the agricultural extension agents is below the age of 20 and majority (41 – 50 years) constituting the active work force in study

conducted on the training needs assessment on the use of social media among extension agents in Oyo state, Nigeria. Age may influence the use of ICTs because older persons including agricultural extension agents especially those living in rural areas may have the tendency of adhering to their already practiced old methods.

Gender of the respondents

Gender is the society's constructions of men and women. According to World Bank (2011) it is the socio-cultural differences or ascribed roles between men and women in a given society. The results of gender in Table 2 reveals that, majority (69.69%) of the composition of agricultural extension agents in the study area consist of male with about 30.31% female. The results is in consonance with the findings of Purnomo *et al.* (2010) in their study on the assessment of readiness and barriers towards ICT programme implementation: perceptions of agricultural extension officers in Indonesia Kehinde *et al.* (2015) further noted that, the dominance of agricultural extension service work by male gender is not good for gender equality in extension services.

Marital status of the respondents

Marriage is a respected institution; it bestows on people social status, recognition and makes persons to be considered responsible (Ahmed, 2000). Marital status of agricultural extension agents in Table 2 indicates that, majority (91.34%) of agricultural extension agents were married, 5.51% single and 3.15% widowed. This findings lends credence to the works of Yakubu, *et al.,* (2013) in their study on use of information and communication technologies among extension agents in Kano state, Nigeria who reported that the entire (100%) agricultural extension agents in the area were married implying that most of them are responsible and can be respected, trusted and be committed to their duties especially on the genueity of the information they would provide on the course of their extension service provision.

Educational status of the respondents

Education has been identified as a catalyst in agricultural and other productive activities this is because it a variable that broadens the mental horizon, influences the totality of the mind and predisposes individuals to new ideas (Ndaghu, 2011). Adequate education therefore could enhance agricultural extension agents' understanding of use of ICTs and sources of information on improved innovation for agricultural practises. Table 2 indicates that majority about 45.7% and 1.57% constituting 47.27% of agricultural extension agents had Degree/Higher National Diploma (HND) and Masters Degrees respectively. The finding of this study is in line with that of Strong *et al.* (2014) in their study on exploring the use of information communication technologies by selected Caribbean extension officers, they reported that education levels of extension officers played a part in technology acceptance.

Duration of service of the respondents

Duration in service is the length of time measured in years that an individual had been in a particular profession or related activity that lead to his/her increase in knowledge or skill. In other words, it is the active involvement of an individual in an activity or exposure to events or people over a period of time that leads to an increase in knowledge or skill. Duration in service of agricultural extension agents in years is presented in Table 2. It shows that, majority (76.8%) of the agricultural extension agents have been in service above 21 years with mean years of 6.5 years. About 1.96% falls between the age range of 0 and 5 years, 4.7% between the age range of 6 and 10, 9.44% between the age range of 11 and 15 while those between the age bracket of 16 and 18 had 7.1%. Idrisa *et al.* (2013) in their study on use of information and communication technology (ICT) among extension workers in Borno state, Nigeria who reported that majority of agricultural extension agents in the area had above 20 years' experience in service therefore such years of experience could enable the extension agent to save enough money to purchase the ICT facilities for their own personal use and also to enhance their performance in their duties.

Grade level of the respondents

Based on Table 2, shows the grade level of agricultural extension agents in the study area. It reveals that majority about 61.42% had grade levels between 11 and 15 with only 1.96% falls between the grade levels of 16 and above. Also, about 6.7% and 29.92% had grade levels between 3 and 5 as well as 6 and 10 respectively. The grade level in any structure of service determine the amount of wage/salary and individual gets as reward for services rendered , it therefore implied that, agricultural extension agents with high grade levels would receive high salaries than those with lower grade levels. However, Omotesho, *et al.* (2012) reported low annual income of agricultural extension agents would affect their ability to afford information and commination technologies.

Income of the respondents

The average monthly income of the agricultural extension agents would determine their financial status which is directly associated with the strength to afford the purchase of personal computers and other ICTs. The distribution of the income of agricultural extension agents shown in Table 2 reveals that about 67.71% of the agricultural extension agents in the study area who are the majority had an average monthly income of between ₦20, 000.00 to ₦ 60, 000.00 only. 20.08% fall within the average monthly income range of between ₦

61, 000. 00 and ₦ 80, 000.00, about 3.94% fall within an income bracket of ₦ 81, 000.00 and ₦ 100, 000.00 while only few 8.27% had above N100, 000.00 as their average monthly income. The implication of these results is that agricultural extension agents were not comfortable enough financially to acquire and maintain most of the ICTs, especially computers and their accessories.

Table 2: Socio -economic characteristics of respondents

Variable	Frequency	Percentage
Age (in years)		
20 – 30	3	1.2
31 – 40	19	7.5
41 – 50	214	84.2
51 – 60	0	0.0
60 Above	18	7.1
Total	254	100
Mean	27	
Gender		
Male	177	69.69
Female	77	30.31
Total	254	100
Marital Status		
Single	14	5.51
Married	232	91.34
Widow	8	3.15
Divorce	0	0.0
Total	254	100
Educational Status		
Primary Education	8	3.13
Secondary Education	4	1.57
Certificate	26	10.23
Diploma	96	37.8
Degree/HND	116	45.7
M.Sc.	4	1.57
Total	254	100
Duration in Service (Years)		
0 – 5	5	1.96
6 – 10	12	4.7
11 – 15	24	9.44
16 – 20	18	7.1
21 Above	195	76.8
Total	254	100
Mean	6.5	
Grade Level		
3 – 5	17	6.7
6 – 10	76	29.92
11 – 15	156	61.42
16 Above	5	1.96
Total	254	100
Income (₦)		
20000 - 40000	87	34.25
41000 – 60000	85	33.46
61000 – 80000	51	20.08
81000 – 100000	10	3.94
101000 and Above	21	8.27
Total	254	100

Source: Field Survey, 2015

Factors influencing the e-readiness of agricultural extension agents

Logit regression analysis was carried-out in order to determine the specific contribution of each independent variable in explaining the variance in agricultural extension agents' e-readiness. Table 3 shows that agricultural extension agents' e-readiness with the independent variables is explained by the McFadden R^2 0.917458 implying that about 91.74% of the variation in e-readiness of agricultural extension agents is explained by the variables included in the model. Accordingly, it shows that availability of ICT facilities ($\rho \leq 0.01$) is the highest predictor compared to other variables included in the model. This underscores the importance of availability of ICT facilities in the access to and utilization by agricultural extension agents. The finding implies that the higher the number of ICT facilities, the higher would

be the level of ICT utilization by agricultural extension agents and vice versa. In the same vein, the results further reveals that age with coefficient of 0.687701, years of experience (coefficient of 0.752937), monthly income (coefficient of 0.283372), number of trainings received (coefficient of 0.001164) and number of ICTs available were significant at 1% level of significance whereas marital status and education were significant at 10% and 5% levels of significance with coefficients of 1.816832 and 2.412456 respectively. The implication of the result is that with an active age range, more years of working experience, higher income and adequate number of trainings an extension agent is expected to developed positive attitude, acquire more personal capital and purchasing power; hence, more capacity to use the ICT facilities. The more educated extension agents are, the more likely to adopt the ICTs for finding solutions to their professional and other problems. Marital status also affect the use of ICTs, lesser family sizes improves the ICT purchasing power of the agricultural extension agents. This assertion lend credence to the findings of Yakubu *et al* (2013) who reported same in their study on agricultural extension agents in Kano state, Nigeria

Table 3: Logit Regression Analysis of independent variables on e-readiness of agricultural extension agents

Variable	coefficient	Std. Error	z-Statistic	Prob.	Decision
Sex	0.127257	0.173933	0.731645	0.4644	NS
Age	0.687701	0.242791	2.832487***	0.0046	S
Marital status	1.816832	0.964654	1.883402*	0.0596	S
Educational status	2.412456	1.224163	1.970699**	0.0488	S
Years of experience	0.752937	0.264270	2.849115***	0.0044	S
Grade level	0.504936	0.650840	0.775822	0.4379	NS
Monthly income	0.283372	0.099688	2.842600***	0.0067	S
No. of ICTs aware	0.008462	0.382664	0.022112	0.9824	NS
No, of training	0.001164	0.000390	2.983636***	0.0045	S
No. of ICTs available	0.084797	0.027217	3.115598***	0.0032	S
No. of ICTs accessed	0.019440	1.462040	0.013297	0.9894	NS
Constant	28.18609	17.46805	1.613579	0.1066	
McFadden R-squared	0.917458	Mean dependent var		0.964286	
S. D. dependent var	0.185946	S. E. of regression		0.140137	
Akake info criterion	0.243934	Sum squared resid		4.713195	
Schwarz criterion	0.412002	Log likelihood		-18.73572	
Hannan-Quinn criter.	0.311561	Deviance		37.47145	
Restr. Deviance	77.65436	Restr. log likelihood		-38.82718	
LR statistic	40.18291	Avg. log likelihood		-0.074348	
Prob(LR statistic)	0.000033				
Obs with Dep=0	11	Total obs		254	
Obs with Dep=1	243				

Source: Computed from Field Survey, 2015

*** 1% significance level

** 5% significance level

*10% significance level

NS = Not significant

S = Significant

CONCLUSION

Based on the empirical evidence of the study, the following conclusions were drawn.

Majority of agricultural extension agents were young and active and non below the age of 20 years. A large proportion of the agricultural extension agents in the study area were male. Majority were married with almost all of them having one form of education or another. Working experience of above 21 years is observed among the majority of agricultural extension agents, with more than half had grade levels of between 11 and 15 years. Similarly, age, years of working experience, higher income and number of trainings influences the use of e-readiness of agricultural extension agents. It is therefore recommended that, government should develop a mechanism to encourage agricultural extension agents to improve access or ownership to ICT facilities for their professional as well as personal uses. This can be done through sharing of cost between the agricultural extension agents and the government as loan and adequate trainings should be provided to agricultural extension agent and other stakeholders in the information dissemination framework in the operation and use of ICTs in their activities.

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