AWARENESS ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) AMONG AGRICULTURAL EXTENSION AGENTS IN NORTH - EASTERN NIGERIA

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Abstract

The study assessed the awareness on the use of ICTs by agricultural extension agents in North east, Nigeria. The specific objectives include describe the socio-economic characteristics of the agricultural extension agents and ascertain agricultural extension agents' awareness of ICTs use in their works Primary data was used for the study and were collected through the administration of questionnaires. A multistage-stage random sampling technique was employed to select 254 agricultural extension agents from north eastern Nigeria proportionately using Taro Yamane's formula. Data collected were analyzed using descriptive. 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. All (100%) of agricultural extension agents were aware in the use of one form of ICTs or another in performance of their duties. As a matter of policy, all agricultural scientists and extension agents must possess proven skills in the utilization of ICT facilities like computer and Internet.

Key words: *agricultural extension agents, awareness, information and communication technologies*

INTRODUCTION

Agricultural Extension is the most important public service with the widest range of responsibilities for agricultural and rural development (Adeyanju *et al.*, (2015) [1]. Therefore, availability of agricultural information among its users for agricultural and rural development cannot be over emphasized. Agricultural information creates awareness among farmers about agricultural technologies for adoption which is needed for overall development of agriculture and for the improvement of living standard of farmers (Bello *et al.*, 2012) [6].
However, according to Ozowa, (1999) cited in Uganneya *et al.* (2012) [17] the extents to which information services actually satisfy users and contribute to agricultural development are subject of controversy and debate. This is so because the diffusion and adoption of any given information to a large extent depends on the means through which the information is disseminated and invariably the perception, knowledge and understanding of the users on the channels through which the information is disseminated. Adequate awareness on any given innovation or technology is a key to the success in adoption and utilization of the technology. With regards to this, Ekumankma *et al.*, (2002) [8] in Agwu *et al* (2009) [4] note that poor awareness or exposure of farmers to appropriate agricultural information and channels of communicating this information is one of the major reasons for low yield recorded by many Nigerian farmers as well as performance of agricultural extension agents in their duties. Therefore, for human performance to be effective and efficient some

knowledge is needed on how, why and when certain things have to be done. The provision or availability of such knowledge is as important as its application to daily life. Agricultural extension agents as well as farmers need to get aware of the necessary information in order to improve methods in activities, increase productivity and performance. However, awareness to effective channels of acquiring information can improve and enable individuals in knowledge which would also enable them to confront their predicaments. Agriculture being a discipline requires the awareness and access for information that its users would adopt in anticipation of the improvement in its various activities. Kwadwo et al., (2012) reported that "the advent of ICTs namely personal computers, the internet and mobile telephone during the last two decades has provided a much wider choice in collection, storage, processing, transmission and presentation of information in multiple formats to meet the diverse requirement and skills of people". Similarly, Durojaiye et al. (2013) [7] reported that, the awareness creation and availability of an ICT-enabled agriculture centre (IAC) in villages (e.g. adopted villages) in Nigeria by NAERLS using internet, made farmers to be more informed on the development made through the utilization of the internet and other related ICT facilities in in the country. Consequently, Seepersad (2003) [16] reported that cell phones are fairly common among extension employees in Trinidad and Tobago, but added that cell phones have not been used in an organized way by agricultural organizations. However Agwu et al. (2008) [5] cited in Mabe et al., (2012) [12] that, agricultural extension agents in Enugu State, Nigeria had high level of awareness of the major ICT tools. This finding is similar to Adesope et al. (2007) [3]who noted that in the Niger Delta area of Nigeria, about 98 percent of the extension agents in the region indicated they were aware of information communication technologies.This means that most of the agricultural extension agents in the southeast and south- south of the country are aware of information technologies especially as they concern Agricultural

Extension work but In North–East Nigeria however, little of such work was conducted..
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)Are the agricultural extension agents aware of use of ICTs in their activities?

MATERIALS AND METHODS

The Study Area
The study was conducted in North-Eastern Nigeria. This comprises of six states namely; Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe states respectively. The area is located between latitude 6° 20" to 13° 00" from the north and longitude 9° 00" to 14° 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) [2].

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) [10]and used by Usman (2014) [18]. The formula is given by

the formula:

$$n = \frac{N}{1 + N\,(e)^2}$$ (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
Descriptive was employed in the analysis of data. The descriptive statistics involved the use of mean, frequency distribution and percentage.
Mean: For grouped data,

$$\ddot{x} = \frac{\sum f X1}{N}$$

where: $\ddot{x}$= mean
$\sum FX1$=sum of variance
N=sample size

RESULTS AND DISCUSSIONS

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) [13] 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) [11], 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) [20] 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) [15] 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) [11] 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) [13]. 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.

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

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) [14]reported low annual income of agricultural extension agents would affect their ability to afford information and commination technologies.

Income of the respondents
The distribution of the income of agricultural extension agents is shown in Table 2. The results 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.

Agricultural extension agents' awareness of ICTs use in their performance of duties
Awareness of ICTs use in performance of agricultural extension activities by agricultural extension agents could instigate the desire and decision for use of ICTs in their activities. Table 3 shows that all the agricultural extension agents were aware of use of ICTs in performance of their duties. The table 4 further reveals that, 100% of the agricultural extension agents in the study area show awareness of use of GSM mobile phone in their activities.
Table 4 further reveals the distribution of agricultural extension agents on the basis of awareness of specific ICTs; it shows that, all (100%) of the agricultural extension agents in the study area show awareness of use of GSM mobile phone in their activities, 46% were aware of the use of computer and about 32% shows awareness for the use of internet in performance of their duties Similarly, majority about (92%), 85% and 92% showed unawareness for the use of CD-ROM, GIS and webcam respective in performance of their duties. The result is in line with the findings of Umar *et al.,* (2015) and Yakubu *et al.* (2013) [19] in their separate studies.

Table 3. Distribution of respondents' by awareness of use of ICTs in performance of duty

ICTs	Frequency	Percentage
Aware	254	100
Not aware	0	0.0
Total	254	100

Source: Field Survey, 2015

Table 4. Distribution of respondents' by awareness on specific ICTs

ICTs	Frequency		Percentage		
	Aware	Not aware	Aware	Not aware	Total %
Computer	117	137	46.06	53.94	100
Internet	80	174	31.49	68.51	
GSM-phone	254	0	100	0.0	
CD – Rom	21	233	8.26	91.74	
GIS (geographical information system)	38	216	14.96	85.04	
Webcam	21	233	8.26	91.74	
Others (specify)	7	247	2.75	97.25	

Source: Field Survey, 2015

CONCLUSIONS

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. All of the agricultural extension agents were

aware of the use of one form of ICTs or another in performance of their duties. Based on these findings, the study recommends; as a matter of policy, all agricultural scientists and extension agents must possess proven skills in the utilization of ICT facilities like computer and Internet. This calls for in-service training on ICTs applications for all staff in agricultural organizations; Agricultural institutions should establish their websites and link up with others for sharing of information and tailor-made in-service trainings on the use of ICTs for agricultural extension agents should be encouraged.

REFERENCES

[1]Adeyanju Agbelemoge, A., Akinwumi, D. M., 2015, Utilization of Extension Information among Pig Farmers in Oke-aro Farm Settlement in Ogun State of Nigeria. American Journal of Humanities and Social Sciences 3(1): 1 - 6

[2]Adebayo, A. A., Umar, A. S., 1999, Hydrology and Water Resources. In: Adebayo, A. A. and Tukur, A.L. (eds.) Adamawa State in Maps. Paraclete Publishers, Yola Nigeria pp.101-123.

[3]Adesope, O, M., Asiabaka, C, C., Agumagu, A, C., 2007, Effect of Personal Characteristics of Extension Managers and Supervisors on Information Technology Needs in the Niger Delta Area of Nigeria, International Journal of Education and Development using ICT, 3 (2):11 – 19

[4]Agwu, A. E., Adeniran, A. A., 2009, Sources of Agricultural Information Used by Arable Crop Farmers in Isale Osun Farm Settlement, Osogbo Local Government Area of Osun State. Journal of Agricultural Extension 13 (1): 24 – 34

[5]Agwu, A, E., Uche-Mba, U, C., Akinnagbe, O, M., 2008, Use of Information Communication Technologies (ICTs) among Researchers, Extension Workers and Farmers in Abia and Enugu States: Implications for a National Agricultural Extension Policy on ICTs, Journal of Agricultural Extension: 12 (1): 37 – 49.

[6]Bello, M., Obinne, C. P. O., 2012, Problems and Prospects of Agricultural Information Sources Utilization by Small Scale Farmers: A Case from Nasarawa State of Nigeria. J Communication 3 (2): 91 - 98

[7]Durojaiye, L. O., Abubakar, S. Z, Omeneza, Z. E, Muhammed, S., Wahab, A. A, Ismail, F.O., Musa, R.A., 2013, An ICT-Based Agricultural Extension Service Delivery for Nigeria. Journal of Agricultural Extension 17 (2): 16 - 22

[8]Ekumankama, O. O., Nwankwo, G., 2002, Radio Farm Broadcast: A Study of Adoption of Agricultural Innovations in Umuahia Zone, Abia State. Journal of Agricultural Extension 6 (1): 17 – 23.

[9]Idrisa, Y. L., Ogunbameru, B. O., Shehu, H., 2013, Use of Information and Communication Technology (ICT) among Extension Workers in Borno State, Nigeria. Journal of Agricultural Extension 17 (1): 69 - 77

[10]Kalpana, C., 2011, How Many People Do I Need for My Survey, Survey Monkey Blogs. www.blog.surveymonkey.com. Accessed 28th October, 2014.

[11]Kehinde, A. T., Ayobami, A. L., 2015, Training Needs Assessment on the Use of Social Media among Extension Agents in Oyo State, Nigeria. Journal of Agricultural Informatics 6 (1):100 - 111

[12]Mabe, L. K., Oladele, O. I., 2012, Awareness Level of Use of Information Communication Technologies Tools among Extension Officers in the North- West Province, South Africa. Life Science Journal. 9(3): 440 - 444

[13]Ndaghu, A. A., 2011, Use of Information and Communication Technologies (ICTs) among Women Farmers in North-Eastern Nigeria. An unpublished doctoral thesis, University of Ibadan, Nigeria.

[14]Omotesho, K. F., Ogunlade, I. O., Muhammad, L., 2012, Assessment of Access to Information and Communication Technology among Agricultural Extension Officers in Kwara State, Nigeria, Asian Journal Agriculture and Rural Development. 2 (2): 220 – 225

[15]Purnomo,S. H., Lee, Y., 2010, An Assessment of Readiness and Barriers towards ICT Programme Implementation: Perceptions of Agricultural Extension Officers in Indonesia. International Journal of Education and Development using Information and Communication Technology 6 (3): 19 - 36.

[16]Seepersad, J., 2003, Case study in ICTs in Agricultural Extension in Trinidad and Tobago. In CTA ICTs – Transforming Agricultural Extension? The 6th Consultative Expert Meeting of CTA's Observatory on ICTs, Wageningen, 23- 25 September, 2003.

[17]Uganneya, S., Ape, R., Ugbagir, N., 2012, Information Services Provision and User Satisfaction in Agricultural Research Libraries in Nigeria. International Journal of Library and Information Science 3(6): 88 - 93

[18]Usman, I. S., 2014, Analysis of Utilization of Indegenious Desease and Parasites Control Methods among Cattle Harders in Adamawa State, Nigeria. An Unpublished Doctoral Thesis Department of Agricultural Economics and Extension University of Maiduguri, Nigeria.

[19]Yakubu, D. H., Abubakar, B. Z., Atala,T. K., Muhammed, A., 2013, Use of Information and Communication Technologies among Extension Agents in Kano State, Nigeria. Journal of Agricultural Extension 17 (1): 162 – 173

[20]World Bank, 2011, Social development in east Asia Indonesia Kecamatan Development, www.worldbank.org. Projects & Programs