

AWARENESS, ACCESS AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES BY AGRICULTURAL EXTENSION PERSONNEL IN ABIA STATE, NIGERIA

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ABSTRACT

This study ascertained the awareness, access and use of information and communication technologies in extension service delivery by ADP extension personnel in Abia State, Nigeria. The study described the socio-economic characteristics of ADP extension personnel in Abia State; ascertained the extent of awareness, access and use of ICTs by ADP extension personnel in the study area; determined factors influencing the use of ICTS by the ADP extension personnel in the study area. Primary data were obtained with the aid of structured questionnaire from 96 extension personnel in the State. Data analysis involved the use of descriptive statistics, likert scale and probit regression model. Findings showed that majority (65.63%) of the respondents were males with a mean age and household size of 43.5 years and 5.3 persons respectively. About 56.25% of ADP extension personnel had Higher National Diploma Degree; and a mean working experience of 14.4 years. The mean monthly income of the respondents under study was ₦58,531.25. The findings also revealed that all the respondents were aware of ICTs resource availability since the mean responses derived were greater than the midpoint mean score (2.0). Similarly, majority of the extension personnel had accessed and used many ICT resources with special focus on radio (81.25%) and mobile phones (83.33%). The result of the probit regression analysis showed that the use of ICTs by extension personnel were influenced by age of extension personnel, marital status, level of education, years of working experience, income, household size and effectiveness of extension service delivery. In terms of policy, there is need for an upward review of the emoluments of extension officers. This is because an increased income would increase access to personal acquisition of ICT equipment and skills for the officers.

Keywords: Information Communication Technologies and Extension personnel

INTRODUCTION

Agriculture plays a vital role of providing food and fibre for the growing population. The most fundamental challenge facing the world today and Nigeria as a country is food insecurity (Ibezim, 2011). It is against this backdrop that the current drive of the Nigerian agricultural policy has been aimed at ensuring sufficient and sustainable agricultural production to feed the 150 million citizens and have some left for export. This goal will be achieved by targeting our agricultural research and extension programmes towards the resource-poor farmers who account for over 80.0% of the agricultural production in the country.

Communication is critical in finding solutions to problems of food production through facilitating Research-Farmer-Linkage through ICT usage. ICT is commonly used to embrace a multitude of media including telephone, television, video, telex, voice information systems and fax, as well as those requiring the use of personal computers fitted with a modern or supply technologies that facilitate

communication procession and transmission of information by electronic means ranging from radio and television to telephone fixed or mobile and the internet (CTA, 2003; Omotayo, 2005).

Davison et al., (2005) noted that from the perspective of agricultural knowledge and information systems (AKIS), ICTs can be seen as useful tools in improving linkages between the research and agricultural extension systems. The experience of rural tele-centers in developing countries shows that ICT can help in enabling rural development workers to gather, store, retrieve, adapt, localize and disseminate a broad range of information needed by rural families. ICTs in agricultural extension can lead to the emergence of knowledge workers that will result in the realization of a bottom-up, demand driven paradigm for technology generation, assessment, refinement and transfer.

One problem advanced to explain the ineffectiveness of the agricultural extension service delivery is inadequate awareness, access and use of information and communication technologies in disseminating Agricultural innovations. The number of farmers or farm families which the Extension Agent (EA) is capable of reaching at a particular time and period is limited. Unamma et al., (2004) gave the extension agent to farm family ratio in all states of Nigeria which are using the T & V extension management system as varying between 1 EA to 800 farmers and 1 EA to 1200 farmers. Ekong (2003) was of the opinion that the ideal farmer to EA ratio in the country should be 750 farm families or less to one full-time extension agent but regretted that as at the year 2000, the ratio remained at an average of 2,500 farm families to one EA. This shows that the Extension- Contact farmer/farm family approach introduced by Training and Visit (T&V) extension management system, though effective, is certainly not the most effective in terms of the cost of reaching a farmer or a farm family (Arokoyo, 2003).

Agricultural development in Nigeria and other developing countries has been hampered by low level of exchange of agricultural information Chadwick (2003). The problem lies in the fact that current research findings do not reach the farmers as at and when due. Extension agents employed after pre-service training in their areas of specialization need competence in the use of ICTs. Unfortunately, time, personnel and resources for training are limited (Adesoji, 2006). According to FAO (2000), the uptake and harnessing of information is limited by inadequacy of trained personnel and/or poor access to know-how, which are obvious in Abia state. It is against this background that the study tends to assess the level of awareness, assess and use of information and communication technologies by Extension personnel in Abia State, Nigeria.

METHODOLOGY

The study was conducted in Abia State, Nigeria which is made up of three Agricultural zones namely- Aba, Ohafia and Umuahia respectively. Ohafia and Umuahia Agricultural Zones are made up of five Local Government Areas (L.G.As) each, while Aba Agricultural zone is made up of 7 L.G.As. Abia State lies between longitudes $7^{\circ} 00^1$ and $8^{\circ} 10^1$ East of Greenwich Meridian and latitudes $4^{\circ} 45^1$ and $6^{\circ} 07^1$ North of the Equator. It is located east of Imo State, and shares common boundaries with Anambra, Enugu and Ebonyi States in the Northwest, North and North East respectively. To the east and south east, it is bounded by Cross River and Akwa Ibom States, respectively, and Rivers State to the South. It occupies a landmass of 5834 square kilometers (ASEPA, 1996). Abia State has a total population of 2,833,999, consisting of 930,268 males and 954,434 females with a relatively high density of 580 persons per square kilometer (NPC 2006). The State is located in the rainforest zone of Nigeria with a temperature of 20°C to 41°C and has a mean temperature of 27°C .

This study adopted a combination of Purposive and random sampling techniques. All extension cadre of ADP in the state was recognized. However, where it was necessary all personnel in a cadre were

purposively chosen in other instances, the ADP cadre found a frame from which a random sample was selected. Samples were selected from the extension personnel - (Extension Agents (EAs), Block Extension Agents (BEAs), Block Extension Supervisors (BESs), Subject Matter specialists (SMSs) Zonal Extension Officers (ZEOs), Deputy Director of Extension (DDE), Director of Extension Services (DESS)). The three agricultural zones (Aba, Umuahia, Ohafia) were covered in this investigation.

In the first stage, all the twenty four (24) Block Extension Supervisors (BESs) and Block Extension Agents (BEAs) in the 24 Blocks which make up the three agricultural zones were selected. The second stage consisted of the random selection of one circle each from each Block, bringing total of 24 circles. The third stage involved the selection of the Extension Agents (EAs) whose circles were selected, having a total of 24 EAs selected for the purpose of the study. All the 20 Subject Matter Specialists (SMSs) in the State were purposively selected for this study. The 2 ZEOs in the 3 agricultural zones were selected. The DES and the DDES were also used for the study. In all the samples for this study were 24 BESs + 24 BEAs + 24 EAs + 20 SMSs + 2 ZEOs + 2 DES = 96 extension personnel. Data was collected from the primary sources. The information was elicited by administering a structured questionnaire. The data were analyzed using descriptive statistics, 3 point likert scale (highly aware, aware and not aware) and probit regression analysis.

The reference mean for the level of awareness was computed by the number of points of the scale and further divided by 3 to obtain a midpoint value 2.0 which was regarded as the reference mean. Any mean response from each of the item less than 2.0 was regarded as non awareness of the availability of ICTs resources. This implies that 2.0 was the determined mean of awareness of the availability of ICTs resources among the respondents. The factors influencing the use of ICTs by agricultural extension personnel were captured using probit regression analysis. The model is appropriate when the response takes one of only two possible values representing presence or absence. The model was adopted as used by Gujarati (2003).The explicit form is stated below:

$$P_i [y=1] = [Fz_i]$$

Where,

$$Z_i = \beta_1 + \beta_1 X_1 \dots\dots\dots (1)$$

$$Y_1 = \beta_1 + \beta_2 X_2 + \dots\dots + \beta_k X_k \dots\dots\dots (2)$$

Y_i^* is unobserved but $y_i = 0$ if $y_i^* < 0$, 1 if $y_i^* \geq 0$

$$P(y_1 = 1) = P(y_i^* \geq 0) \\ = P(u_1 \geq -\beta_1 + \beta_2 X_2 + \dots\dots + \beta_k X_k) \dots\dots\dots (3)$$

$I = 1, 2, \dots, 98$

Where

Y_i = the observed use of ICTs

(Dichotomous variable; 1= if an extension personnel used ICTs in disseminating agricultural innovation; otherwise= 0)

β = A vector of unknown coefficients.

X_i = vector of characteristics of ith individual, and is the independent variables, which are defined as follows.

X_1 - gender: male or female; (dummy variable – male =1; female = 0)

X_2 = age, number of years supplied by the respondents

X_3 = marital status, (dummy variable; married = 1; otherwise = 0)

X_4 = educational qualification, number of years of formal education

X_5 = work experience, measured in years
 X_6 = house hold size, number of people living together in a house
 X_7 = income, measured in Naira from major occupation
 X_8 =effectiveness of ICT use (1 = effectiveness, otherwise = 0)
 e = error term

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

The socio-economic characteristics of ADP extension personnel in Abia State, Nigeria are shown in Table 1. The mean age of the respondents was 43.5 years. This is an indication that the extension personnel in the study area were mostly within the age of innovativeness and active productive work force. The table also shows that 65.63% of the respondents were males while 34.37% of the respondents were females. Meanwhile, all the respondents were literate possessing divers' formal educational levels that ranged from Ordinary National Diploma (OND) to Masters of Science degree. The mean years of working experience was 14.4. This means that majority of the respondents were well experienced in extension service delivery. The mean annual income and household size of the respondents were ₦58,531.25 and 5.3 persons respectively. The implication of this result is that majority of the respondents live above one dollar (160.00) a day when compared with daily income and expenditure pattern of World Bank requirement for an average worker. Inadequate income hinders the readiness and ability to access and use ICTs.

Table 1: Socioeconomics of ADP Extension Personnel in Abia State, Nigeria

Variables	Mean
Age (years)	43.5
Household size (number)	5.3
Working experience	14.4
Annual Income (₦)	58,531.25
Gender	Percentage
Male	65.63
Female	34.37
Education level	Percentage
Ordinary National Diploma (OND)	5.21
National Certificate Examination (NCE)	8.33
Higher National Diploma (HND)	56.25
Bachelor of Science Degree (B.Sc)	17.71
Masters of Science (M.SC)	12.50

Source: Field Survey data, 2013: Note 1 USD = ₦160

Extent of Awareness

The extent of awareness of ICTs by ADP Extension personnel in Abia State is presented in Table 2. The shows that all of the respondents were aware of ICT resource availability since the mean responses derived were greater than 2.0. The affirmative responses of the respondents could be due to the importance of information derived from audio-visual/ telecommunication/ computer based technologies that are very rampant. The table showed a high awareness level of respondents of Overhead Projector (\bar{x} = 3.03), Tv Camera (\bar{x} = 3.13), Mobile Cinema (\bar{x} = 3.47), Intercom/PABX (\bar{x} = 3.46), Fax (\bar{x} = 3.38), CD Rom (\bar{x} = 3.29), mobile Phones (\bar{x} = 3.33), Local Town Criers (\bar{x} = 3.05). In addition, Geographical information system (GIS) (\bar{x} = 3.63), intercom/PABX (\bar{x} = 3.46), radio (\bar{x} = 2.52) were

also ICTs resource used in facilitating communication and extension service delivery among the respondents.

Table 2: Extent of Awareness of ICT Resource Availability by Extension Personnel in Abia State, Nigeria

ICT Resources	Total response	Mean (\bar{x})	Remark
Overhead projector	195	3.03	A
Radio	146	2.52	A
Television	149	2.55	A
TV camera	204	3.13	A
Media van	190	2.98	A
Mobile cinema	237	3.47	A
Telephones	150	2.56	A
Intercom/PABX	236	3.46	A
Fax	228	3.38	A
E-mails	187	2.95	A
Internet	182	2.89	A
CD-ROM	220	3.29	A
Computers	182	2.89	A
GIS	252	3.63	A
Mobile phones	224	3.33	A
Newspapers	150	2.56	A
Research bulletins	164	2.71	A
Newsletters	159	2.66	A
Annual reports	162	2.68	A
Journals	155	2.61	A
Magazines	154	2.60	A
Leaflets/handbills	167	2.74	A
Posters	145	2.51	A
Calendar of work	146	2.52	A
Local town criers	197	3.05	A
Church announcements	189	2.97	A
Religious tracts	235	3.45	A

Source: Field Survey, 2013 Note: A =Aware

The popularity of GSM among the extension workers is obviously due to its ready accessibility and relatively cheaper cost (CTA, 2008). In the same vein, it may have accounted to why Oladosu (2005), opined that significant proportion of the extension workers used the ICT devices for their extension activities. This could be due to the reliabilities of these ICT resources and the fact that most of them are affordable and simply handled by the respondents. According to CTA (2001) audio-visual/telecommunication/computer based technologies have facilitated direct and indirect communication between extension agents and farmers. In addition, the use of audio-visual/telecommunication/computer based technologies have enhanced their knowledge capacity on current trends in agricultural development. The explanation for this is that the different ICT devices which the extension workers are familiar with in terms of functionalities and usage are helpful in extension service delivery.

Access and Use of ICTs Resource by Extension Personnel

Access and use of ICT resources by Extension personnel is presented in Table 3. The Table shows that the respondents had access and used the following ICT resources in extension service delivery. These include; Radio (81.3%), Television (60.4%), Telephones (63.5%), E-mails (54.1%), computers (52.1%), mobile phones (83.3%), Newspapers (65.6%), Journals (51.4%), Magazines (55.2%), Leaflets/handbills (50%), Posters (59.4%), Calendar of work (61.5%), Local town criers (51%), Church announcements (73.9%). This is so because some of the ICT resources are affordable, portable and could be moved from place to place with minimum spoilage. The implication of this result is that if the enabling environment is provided for contemporary ICT resources, it will also blossom and spread even to the rural areas as in the case of GSM (Adejo *et al.*, 2013). However, the table showed that, Overhead Projector, Tv Camera, Media Van, Mobile Cinema, Intercom/PABK, Fax, Internet, CD ROM, GIS, Research bulletins, Newsletters and Annual reports had low values. This could be due to inadequate funding. In addition, poor exposure, low knowledge of use and fear of trying may account for this (Ibezim, 2011).

Table 3: Access and Use of ICTs Resource by Extension Personnel in Abia State, Nigeria

ICT Resources	Access (n = 96)		Use of ICTs	
	Frequency	Percentage	Frequency	Percentage
Overhead projector	10	10.42	10	10.42
Radio	78	81.25	78	81.25
Television	58	60.42	58	60.42
Tv. Camera	25	26.04	25	26.04
Media van	10	10.42	10	10.42
Mobile cinema	22	22.92	22	22.92
Telephones	61	63.54	61	63.54
Intercom/PABK	5	5.21	5	5.21
Fax	13	13.54	13	13.54
E-mails	52	54.17	52	54.17
Internet	37	38.54	37	38.54
CD-ROM	13	13.54	13	13.54
Computers	50	52.08	50	52.08
GIS	5	5.21	5	5.21
Mobile phones	80	83.33	80	83.33
Newspapers	63	65.62	63	65.62
Research bulletins	45	46.87	45	46.87
Newsletters	45	46.87	45	46.87
Annual reports	37	38.54	37	38.54
Journals	49	51.04	49	51.04
Magazines	53	55.21	53	55.21
Leaflets/handbills	48	50.00	48	50.00
Posters	57	59.37	57	59.37
Calendar of work	59	61.46	59	61.46
Local town crying	49	51.04	49	51.04
Church announcements	71	73.96	71	73.96
Religious tracts	43	44.79	43	44.79

Source: Field Survey, 2013

**Multiple Responses recorded

Factors Affecting Use of ICTS by the ADP Extension Personnel in Abia State

The result of probit regression estimates of factors affecting the use of ICTS by the ADP Extension personnel in Abia State is presented in Table 4. The table shows that the coefficients of age was significant and negative while the coefficients of marital status, level of education, years of working experience, income, household size and effectiveness of extension service delivery were positive and significant at given levels. The coefficient of age (-0.004) of the respondents was statistically significant at 1.0% risk level and negatively related to the use of ICTs. This means that as age of the respondents increased, the use of ICTs decreased and vice versa. The decreased use of ICTs among the elderly respondents could be due to the fact that at old age, the respondents become very weary, conservative and less innovative on the use of ICTs and any other modern equipment. This result is in consonance with the findings of Salau and Saingbe (2008) that elderly people might be less interested in the use of hi-tech innovations.

Table 4: Probit Regression Estimate of Factors Affecting Use of ICTs by the ADP Extension Personnel in Abia State, Nigeria

Parameter	Coefficient	Std Error	Z score
Age	-0.004***	0.001	-3.386
Sex	0.003	0.011	0.276
Education	0.004**	0.002	2.551
Experience	0.008***	0.001	5.935
Income	0.000*	0.000	1.569
Marital status	0.053***	0.013	4.216
Household size	0.029***	0.004	8.162
Effectiveness	0.004*	0.002	1.789
Intercept	-3.399***	0.053	-64.054
Chi-square	3947.781***		

Source: Field Survey, 2013

Note: ***, **, * = Variables are statistically significant at 1.0%, 5.0% and 10.0% alpha levels respectively.

The coefficient of marital status (0.053) was significant at 1.0% level and positively related to ICTs use. This means that as more of the respondents get married, the use of ICTs increased. The increased use of ICTs in extension delivery will affect respondents' information gathering from their children who could be ICTs compliant. More so, respondents could interact with farmers even from their home. The responsibility of extension personnel and the stability in their homes is likely to reduce distractions in the execution of their extension duties (Ibezim, 2011). Aderinto *et al.*, (2008) however believe that the weight of family responsibilities may influence the use of ICTs by the respondents. The coefficient of level of education (0.004) was statistically significant at 5.0% alpha level and positively related to ICTs use. This means that as level of education increased, the use of ICTs also increased. Level of education increases the magnitude of respondents' perception of the benefits derivable from the use of ICTs in extension delivery. This result is in consonance with the findings of Salau and Saingbe (2008) that the higher the level of education, the higher the level of ICT utilization.

The coefficient of years of working experience (0.008) was significant at 1.0% risk level and positively influenced the use of ICTs. This means that as years of working experience increases, the use of ICTs also increases. The implication of this is that the respondents can give practical account of the effects of the use of ICTs on agricultural activities and such account can be worked on by researchers to provide strategies on which agricultural production can be increased. Omotesho *et al.*, (2012) stated that years

of experience may have positive implications on the effectiveness of training programs targeted at extension personnel with respect to extension service delivery. The coefficient of income (0.000) was significant at 10.0% risk level and positively influenced the use of ICTs. This means that as income increases, the use of ICTs also increases. The implication of this is that the respondents managed their financial resources in order not to be left out in the world of ICT especially with the purchase of GSM. This result is in consonance with the findings of Yekini and Hussein (2008) that extension personnel purchase more ICT resources as income level appreciates. The coefficient of household size (0.029) was significant at 1.0% level and positively related to the use of ICTs. This means that as household size of the respondents' increases, the use of ICTs also increases. Large household size could predispose members to varied sources of agricultural information (Anyoha *et al.*, 2010).

The coefficient of effectiveness (0.004) of the respondents on the use of ICTs was significant at 5.0% level and was positively related to ICTs use. This means that as the effectiveness of the respondents' increases, the use of ICTs also increases. The effectiveness of respondents could be due to the different type of in-service training and skill acquisition programme they regularly attend. More so, the adoption of Information and Communication Technologies (ICTs) by extension workers to transmit relevant information to farmers has efficiently increased their service delivery (Salau and Saingbe, 2008). The model posted a high chi-square value which was statistically significant at 99.0% confidence level indicating a good fit.

CONCLUSION

Based on the empirical evidence emanating from both descriptive and inferential statistics employed for this study, the research had shown that that all the respondents were aware of ICTs resource availability since the mean responses derived were greater than the midpoint mean score (2.0). Similarly, majority of the extension personnel had accessed and used many ICT resources with special focus on radio and mobile phones. The research revealed that the factors that influenced the use of ICTs by ADP Extension personnel were age, marital status, level of education, years of working experience, income, household size and effectiveness of extension service delivery. It was however recommended that training workshops on ICT usage and computer appreciation should be organized for all extension officers. This would bring the extension officers, irrespective of their educational status up to date on the use and application of ICT for improved extension service delivery in Abia State. Also, there is need for an upward review of the salary of extension officers. This is because an increased income would guarantee better chances of personal acquisition of ICT equipment for the officers.

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