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Awareness and Use of Information and Communication Technologies among Extension Agents in Kaduna State of Nigeria

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Abstract

This study assessed awareness and use of information and communication technologies among extension agents in Maigana Zone of Kaduna State A.D.P. All extension personnel in the zone (70) were interviewed through the use of structured questionnaire. Descriptive statistics and multiple regression analysis were used to analyze the study. It was found that 60.15% of the respondents were aware of at least one ICT in the study area. The multiple regression analysis of the relationship between ICT usage and level of training, membership of professional association, marital status and educational level were positively significant ($p < 0.05$). It was concluded that socioeconomic characteristics of the extension agents in the study area influence their level of use of ICT. It was recommended that provision of ICT facilities and stable power, as well as capacity building on ICT usage should be promoted among extension personnel. This would enhance effective communication with farm families for improved productivity.

Keywords: Awareness, Extension, ICT, Maigana

Introduction

The main purpose of agricultural extension activities is to communicate relevant and useful information to the end users to persuade them to adopt that which will eventually lead to increase in agricultural production (Okunade and Oladosu, 2006). Communication is not just the mechanical transfer of facts and figures as the mathematical model of communication would appear to indicate. It is an interactive process that works in a circular, dynamic and ongoing way. This implies freedom, equality and shared interest. Communication is done mainly to determine the needs of the people and the provision of sufficient feedback on their conditions to the extension agency in order to find possible solutions to them, provision of relevant information to the farmers, support for specific development projects and social services, raising people's awareness of development projects and opportunities and helping to foster attitudes and motivation that contribute to development (Egerton *et al.*, 1994).

Technology simply implies the application of knowledge to meet the goals, goods and services desired by people. It is the innovation, change or modification of the natural environment to satisfy

perceived human needs and wants (Ekwujuru 2006). Meera *et al.*, (2004) stated that agricultural extension has to escape from the narrow mindset of transferring technology packages to transferring knowledge or information packages. If this can be achieved, with the help of Information and Communication Technology (ICT), extension will become more diversified, more knowledge-intensive, and more demand driven, and thus more effective in meeting farmers' information needs. For agricultural extension in Nigeria to be effective extension personnel, must acquire the requisite knowledge and skills necessary for using modern ICTs in the discharge of their job functions.

Information and communication technology, according to Unagha (2006) is an omnibus term that encompasses computer and telecommunications technology. ICTs can be broadly interpreted as technologies that facilitate communication and the processing and transition of information by electronic means. Wirsiy and Shafack (2002) see it as a broad based term that encompasses the gathering (acquisition), organization (packaging), storage and retrieval (dissemination) of information that can be in textual or numeric (books and documents), pictorial and vocal forms (audio-visual), using combination of all the above (multimedia) including computers and telecommunications (telephones). This definition encompasses the full range of ICTs from radio and television to telephones (fixed and mobile), computers and the internet. ICTs have the potentials of bridging the existing communication gap among the extension workers on one hand and between the extension workers and the farmers on the other (CTA, 2003).

According to CTA (2003), ICTs have the potentials to enhance farmers' ability to collate demands; collaborative learning; exchange of time sensitive information, for example, market prices and disease outbreaks; make extension systems and structures more efficient; engage farmers in assessing own needs, solutions; facilitating multi-stakeholder brainstorming; exploring alternative production technologies; facilitating access to markets and credits; training and demonstration; community learning; search, select and compile information for individual clients; early warning for disasters, weather forecast; and peer to peer sharing and exchange among extension. The importance of ICTs in development process was long recognized and access to ICTs was even made one of the targets of the Millennium Development Goal No. 8, which emphasizes the benefits of new technologies, especially ICTs in the fight against poverty. The same report also observed "connectivity – whether the Internet or mobile phones -- is increasingly bringing market information, financial services, and health services to remote areas, and is helping to change people's lives in unprecedented ways" (Asenso-Okyere and Mekonnen, 2012).

The use of ICT in agricultural extension and rural development is significant, especially now that its use has witnessed an upsurge in almost all areas of rural life in several African countries. However, the persisting problems of connectivity, literacy, content, and accessibility have continued to hinder expansive utilization of these facilities for agricultural information. In this respect, Omotayo (2005) observed that agricultural extension depends largely on information exchange between farmers and 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).

The specific objectives of this study were to: describe the socio-economic characteristics of the extension agents in the study area; ascertain the level of awareness of ICTs among the respondents; identify the types of information and communication technologies used by extension agent in the study area; determine the factors influencing the use of ICTs among extension agents; and identify the constraints to the use of ICTs among extension agents.

Methodology

The study was conducted in Maigana Zone (B) of Kaduna State Agricultural Development Project (KADP). Maigana is the largest agricultural zone in Kaduna State consisting of eight (8) Local Government Areas namely: Giwa, Sabon Gari, Zaria, Soba, Makarfi, Kudan, Kubau and Ikara LGA. The target sample for the study is the entire population of extension agents under Maigana Zone of Kaduna State Agricultural Development Project (KADP). All the 70 extension personnel in the zone were interviewed, through the use of structured questionnaire. Descriptive and inferential statistics were used to analyze the data collected from the respondents.

Results and Discussion

Results in Table 1 show that 42.7% of the respondents were within the ages of 31-40, 30.1% of the respondents were within the ages of 41-50 years and only 21.4% were within 21-30 years. The mean age was 35.5 years. This indicates that most of the extension agents were in their middle ages and are therefore old enough to take decision on the use of ICTs. This trend may have significant implication for ICT usage, since the elderly might be less interested in using hi-tech communication devices and prefer oral and printed information channels which are less efficient (Agwu and Chah, 2007). Sheik *et al.*, (2003) found that the age of individuals affects their mental attitude toward new ideas and hence influence adoption in several ways. Majority (80%) were males this indicates that the extension agents in the study area were predominantly males. This may be connected with gender disparity found in the public service in Nigeria. It also agrees with Adedoyin *et al.*, (1999) who reported that males dominated the agricultural workforce in Nigeria. Also, it was found that 7.1% of the extension agents had only Secondary School Certificate, 37.1% had Ordinary National Diploma (OND), 25.7% had Higher National Diploma (HND) and 15.7% had Postgraduate Diploma / Bachelor's Degree or its equivalent, 11.4% had Master's degrees, and 2.9% had other qualifications as their highest educational level attained. This indicates that the entire respondents had one educational qualification or the other and were therefore literates and could utilize ICTs to improve their work. Arokoyo (2005) identified high level of illiteracy as a serious constraint to ICT utilization among extension service workers and farmers.

Table 1: Distribution of respondents based on socio-economic characteristics

Variables	Percentage(n= 70)
Age	
21-30	21.4
31-40	42.7
41-50	30.1
51-60	5.7
Sex	
Male	80
Female	20
Marital Status	
Married	77.1
Single	22.9
Educational level	
Secondary certificate	7.1
OND	37.1
HND	25.7
B.A/B.Sc	15.7
M.Sc/M.A	11.4
Others	2.9
Professional rank	
SMS	22.9
ZEO	1.4
Sub-ZEO	2.9
AEO	11.4
BES	11.4
VEA	50

Based on job experience and educational attainment, the extension personnel attained various positions in the extension organization according to civil service rules and regulations. The respondents consisted of 16 (22.9%) Subject Matter Specialists (SMS); 1 (1.4%) Zonal Extension Officer (ZEO); 2 (2.9%) Sub- Zonal Extension Officers (sub-ZEO), 8 (11.4%) Area Extension Officers (AEOs), 8 (11.4%) Block Extension Supervisors (BESs) and 35 (50%) Village Extension Agents (VEAs) in the study area.

With regards to awareness of information and communication technologies, Table 2 shows that majority of the extension agents were aware of radio 95.7%, television 94.3% and 91.4% were aware of mobile phones as ICT tools. More than half of the extension agents were aware of Internet (67.1%), web browser (64.3%), computer (64.3%), storage devices (58.6%), electronic mail (58.6%), and search engines (55.7%). Meanwhile, less than half were aware of E-library (41.4%), computer peripherals (37.1%) and computer software (31.4%). Ani, (2007) recognized awareness as the first stage in adoption process; while Agwu and Chah, (2007) observed that it is important

to recognize that awareness among policy makers on the potentials of ICTs is a critical element for its development. However, the findings of this study suggests that the extension agents in the study area were more aware of conventional ICTs than contemporary ones; hence, more need to be done in educating them on the existence of contemporary ICTs for improving extension service delivery. Isiaka *et al.*, (2009) reported that extension workers were moderately aware of the existing ICTs potential in extension service delivery.

Table 2: Distribution of respondents according to their level of Awareness on ICTs

ICTs	Percentage (n= 70)
Radio	95.7
Television	94.3
Mobile phones	91.4
Internet	67.1
Video conferencing	51.4
Chat room	54.3
Web browser	64.3
Computer	64.3
Storage device	58.6
Desktop	51.1
Computer software	31.4
GIS	50.0
Search engines	55.7
Computer peripherals	37.1
E-library	41.4
Electronic mail	58.6

*Multiple responses

In terms of usage of ICTs, Table 3 shows that the majority of extension agents use mobile phone (90%), while 84.3% use radio and 77.1% use television because of high level of awareness and easy accessibility. Meanwhile, only few of them use modern and sophisticated ICT gadgets: 41.4% use storage device, 38.6 % use search engines, 36.6% use GIS and only 31.4 % use E-library.

Table 3: Distribution of respondents according to types of ICT facilities used

ICTs	Percentage (n=70)
Radio	84.3
Television	77.1
Mobile phones	90.0
Internet	54.3
Video conference	31.4
Chat room	41.4
Web browser	42.9
Computer	42.9
Desktop	33.4
Computer software	42.9
Storage device	41.4
GIS	36.6
Search engines	38.6
Computer peripherals	40.0
E-library	31.4
Electronic mail	41.4

* Multiple responses.

This is due to low level of awareness and poor access, lack of training and high purchasing power of the items. It can be inferred that the majority of extension agents had adopted one ICT or the other.

Gelb *et al.*, (2009) observed that adoption of ICTs as one instance of technological innovation dramatically improved the transfer and management of information, production chain efficiencies and integration within and without the agricultural sector. The internet has proved to be an invaluable resource for obtaining information and providing new dimensions to existing areas of business; it enhances marketing of agricultural products through strengthening social networks and expansion of rural-urban linkages (Elijah, 2010). However, according to Kiplangot (2003) the impact of the use of ICTs in extension remained minimal as confirmed by his study to determine the diffusion of ICTs in communication of agricultural information among researchers and extension workers in Kenya.

Table 4, presents certain factors influence the use of ICTs among extension agents. Among the variables, level of training on ICT and membership of professional associations showed a positive correlation and therefore significantly ($p < 0.01$) related to ICT use. The implication is that the more training the extension agents have the more they can make the most appropriate and creative use of traditional media and new ICTs. Among the benefits of training, Asiabaka (2002) noted that it helps to reduce the time it takes extension workers to reach acceptable levels of performance in their jobs and also their participation in professional associations would increase their usage of ICT. The higher the number of associations belonged to, the more the information technologies exposed to and vice versa. This suggests that belonging to more associations enhances interaction with others and therefore more exposure to the use of ICT. Adetunji, Oladeji and Olowu (2002) while supporting the establishment of professional association opined that this will increase mutual scientific collaboration and also academic interaction. Extension agents in professional associations may have access to finance and could be more sensitized about the importance of ICT in accessing information on farming activities.

Similarly, entries in Table 4 revealed that educational level and marital status of the respondents had a positive significant relationship with the utilization of ICTs ($p < 0.05$). This underscores the importance of education in the access to and utilization of ICTs by extension worker. The result implies that the more educated the extension agents are the more likely there are to adopt the use of ICTs in their professional work. Moreover, education increases access to useful information. This finding agrees with Fagbohunge and Longe (2009) that perception modifies in terms of people's behavior. People are able to interpret situations, synthesize and integrate series of new information in the light of what they know to make a meaning out of it. Marital status implies that the extension agents have family responsibilities and this affects their decision making process, level of experience and rate of adopting the use of ICT. According to Kwapong, (2005) the combined income effect of married couples is likely to encourage their willingness to acquire private information delivery technology. Age, professional rank and income level were positive however these variables were not significant in influencing the use of ICT.

Table 4: Factors influencing the use of ICTs among extension agents

Variables	Coefficients	Standard Error	t-value
Age	0.034	0.083	0.41
Gender	-0.802	1.562	-0.51
Marital status	2.970	1.421	2.09*
Educational level	1.030	0.420	2.45*
Working experience	-0.164	0.186	-0.88
Professional rank	0.301	0.342	0.88
Income level	8.64e-07	5.08e-06	0.17
Level of training on ICTs	0.465	0.069	6.70**
Membership of association	0.443	0.048	9.20**

** Significant at 1%; * Significant at 5%

The leading constraint to effective utilization of ICTs (Table 5) was inadequate power supply (94.3%); followed financial constraints (90%) which inhibit acquisition of technologies. Other constraints to the utilization of ICTs among extension agents are dearth of ICT facilities especially at workplace (85.7%), lack of technical know-how (78.6%), lack of supportive government policies (77.1%) and problem of connectivity (71.4%). These findings support the views of Omotayo (2005) that many rural areas of developing countries had no access to the basic telecommunication services that support key ICTs like the telephone and internet. Furthermore, in Nigeria, electricity is a major problem thwarting the use of ICTs. Arokoyo (2005) found that the major constraints affecting the use of ICTs were erratic and unstable power supply, problem of connectivity, low level readiness of research and extension organizations to embrace the use of ICTs, high costs of telephone services, limited access to computers, lack of communication policy, high level of rural poverty and illiteracy, limited access to world wide databases on CD-Rom or DVD due to foreign exchange constraints.

Table 5: Distribution of respondents according to constraints to the use of ICTs in extension services

Constraints	Percentage (n=70)
Inadequate power supply	94.3
Unavailability of ICTs	85.7
Financial constraints	90.0
Lack of technical knowhow	78.6
Lack of supportive govt. policies	77.1
Problem of connectivity	71.4

Conclusion

Information and Communication Technologies have great potentials in improving agricultural extension delivery. Marital status, educational level, level of training and membership of professional associations were significant factors influencing the use of ICT in the study area. It implies that the more training the extension agents have the more they can make the appropriate and effective use of ICTs. Majority of the extension agents do not belong to any association which would have enhanced their interaction with others and therefore give them more exposure to the use of ICTs. Likewise, educated extension agents were more likely to adopt the ICTs for finding solutions to their professional and other problems. To enhance efficient use of ICTs among the extension personnel, it becomes imperative to put ICT training in place for them. The ICT devices available in the study area were not adequate, thereby, limiting its access to the extension workers.

The following recommendations are made to improve the rate of awareness and effective use of ICTs among extension personnel in the study area:

1. Kaduna State Ministry of Agriculture should adequately equip KADP – its extension outfit – with ICT facilities to enhance information delivery, thereby improving the livelihoods of farm families.
2. Also, there should be in place, a policy of continuous training and re-training of extension personnel on the use of modern ICTs for improved job performance and delivery.
3. Relevant government agencies should make effort at ensuring that there is steady power supply to increase the effective use of ICT facilities by the extension agents. Meanwhile, Maigana Zone should explore the use of alternative sources of power for ICTs.

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