ISSN - 2277 - 078X

Journal of Humanities, Social Sciences and Creative Arts

AGRICULTURAL EXTENSION AGENTS' AWARENESS OF ICT POTENTIALS AND TRAINING NEEDS ON USAGE FOR IMPROVED EXTENSION SERVICE DELIVERY IN SELECTED SOUTHWEST STATES OF NIGERIA

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ABSTRACT

The study examined the agricultural extension workers' awareness of ICT potentials and training needs on ICT usage for improved extension service delivery in selected southwest states of Nigeria. A multistage sampling technique was used to select a total of 132 extension workers' from Lagos and Ogun States Agricultural Development Programmes (LADA and OGADEP). A validated and reliable questionnaire was used to obtain primary data on socioeconomic characteristics of the respondents, their awareness of ICT potentials and training needs on ICT usage for improved extension services delivery. Data collected were analysed using frequency counts, percentages and chi-square statistics. Result of the analysis showed that most of the respondents were the Village Extension Agents (78.8 %,), and about 34.1% of them were within the age range of 41 and 45years. About 72.7% the extension agents had first degree (HND/BSc) as the least educational qualification and about 57.6% of them have spent between 11 and 20 years in the extension services. The result also showed that all the extension agents were familiar with the Global System Mobile communication (GSM), 58.3% with the computer and 38.6% of them with the internet. About 43.2% of the extension workers were moderately aware of the ICT potentials for improved extension service delivery based on their mean awareness score of 8.5 (53.1%). The chi-square test of the relationship between the extension workers' socioeconomic characteristics (education: $\chi^2 = 45.5$, $df = 12$; professional rank: $\chi^2 = 38.7$, $df = 9$; working experience $\chi^2 = 65.2$, $df = 12$) and level of awareness of the ICT potentials showed a significant relationship at $p < 0.05$. Similarly, a significant relationship was observed between the extension agents' level of awareness of ICT potentials and their needs for training on usage for improved extension service delivery ($\chi^2 = 71.3$, $df = 18$) at $p < 0.05$. In the light of this, it was concluded that the extension workers had moderate level awareness of ICT potentials for improved extension services and were in need of training on usage in their extension activities. It was recommended that education on ICT potentials and training on usage for improved extension service delivery should be promoted and intensified among the extension workers.

Key words: ICT, extension workers, awareness of ICT, training needs, extension service delivery

INTRODUCTION

Agricultural extension services greatly depend on information for attainment of its functional goal of improving the farmers' production performance and quality of life. It plays the catalytic role of relaying farmers' information needs on farm production and farming systems to the researchers for use as information base for development of technologies that would meet the farmers' needs. Conversely, the extension subsystem consciously communicates information on appropriate implementation and sustenance of the technologies to farmers in order to make good use of the technologies. This task of information exchange, as indicated by Oladele (2001) and Yahaya (2003), is usually accomplished through various extension communication methods, among which are joint field tour, in-house review meetings and joint research activities; and individual, group and mass methods of information delivery.

Although these methods of information communication, excluding the mass method, give room for interactions and feedback between the extension agents and farmers, they are relatively expensive to run and maintain, especially where an extension agent needs to reach out to large number of farmers. In view of this, Kasibante *et al.* (2004) describes these conventional methods of information delivery as costly and extremely slow. On the other hand, the mass method, which has the advantage of reaching a large number of audiences simultaneously, lacks the opportunity for feedback and interactions between the extension agents and farmers. In the light of this, it becomes extremely difficult for extension agents to determine whether or not its extension message has been well received and interpreted in the right context by the farmers. To overcome these inherent shortcomings in the extension methods of information delivery, combined use of these methods in extension service delivery is generally recommended (van den Ban and Hawkins, 1996).

However, the cost of combined use of the methods may be too expensive to bear by extension agencies, especially in a developing country like Nigeria where extension services are poorly funded. In the light of this, it becomes imperative for the extension subsystem to adopt a cost effective approach that will allow, not only for interactions and feedback between the extension agents and farmers, but also for reaching a large number of farmers as quickly as possible. One of such approaches is the incorporation of Information and Communication Technologies (ICT) in the extension service delivery.

ICT, as described by Food and Agriculture Organisation (FAO, 1993), refers to technologies that allow for processing, storing, retrieving, disseminating and implementing data and information, using micro electronics, optics, telecommunication and computers. Greenidge (2003) defines the concept as those technologies that can be used to interlink information technology devices such as personal computers with communication technologies such as telephones and their communication networks. On a similar note, Centre for Agriculture and Rural Development (CTA, 2003) defines ICT as technologies that facilitate communication, and processing and transmission of information by electronic means. In the light of these definitions, ICT thus embraces such communication driven technologies as computer, internet, telephone (mobile- or fixed-line), television, radio, audio compact disc or cassette recordings, video tape or compact disc

(VCD/DVD) recordings, faxes, telex, etc. These electronic communication devices, not only have the capacities for facilitating effective communication, processing and transmission of information between sources and users, but also have the potentials for enhancing farmers' productivity and overall agricultural and rural development.

In view of these and several other ICT potentials for agricultural development, it becomes imperative to have the communication-driven technologies incorporated in the extension service delivery. The need for integration of ICT in the extension services would, however, depend on extension agents' realisation of the ICT potential merits for improvement of extension service delivery. In the light of this, the study was to determine whether or not the extension agents in the southwest Nigeria are aware of the ICT potentials for improved extension service delivery. To accomplish this, the following specific objectives were addressed:

- Describe the socioeconomic characteristics of the extension agents in Southwest Nigeria;
- Identify the ICTs which the Extension workers are exposed to;
- Identify the extension agents' level of awareness of the ICT potentials for improved extension service delivery;
- Identify training needs of the extension agents on ICT usage.

Study hypotheses

H_{01}: There is no significant relationship between the extension workers' socioeconomic characteristics and their level of awareness of ICT potentials for improved extension service delivery.

H_{02}: There is no significant relationship between the extension workers' level of awareness of ICT potentials, and their training needs on ICT usage for improved extension service delivery.

METHODOLOGY

Study area

The study was conducted in two selected states, namely Lagos and Ogun States, in Southwest Nigeria. The two states occupy a land area of about 19, 986 square kilometres and largely fall within the rainforest zone of the nation's agro-ecological belt, which has a mean annual rainfall of about 1800mm, relative humidity of about 78% and average temperature of about 32°C. The two states are largely dominated by the Yoruba speaking people who are engaged in one form of economic activities or the other. Although, Lagos State is a commercial city where commerce and industry dominate the economic activities, agriculture, which is the dominant economic activity in Ogun state, is not left out of economic activities of in the State. Commonly produced crops in the study area include maize, cassava, yam, spices and vegetables. Other farm enterprise includes fish and livestock production. The extension agencies responsible for agricultural activities in the two states are the Ogun State Agricultural Development Programme (OGADEP) and Lagos State Agricultural Development Programme (LASADEP). The extension agencies are owned and funded by their respective State Governments. To reach out to all the farmers in their respective states, the agencies structure their states into zones, blocks, cells and villages. The zones are managed by the zonal manager (ZM)/zonal extension officer (ZEO), blocks by block extension supervisor (BES)/block extension agents (BEA) and cells by village extension

agents (VEA). The VEAs relate with contact farmers (CF) (farmers' representatives) at the village level in the course of their extension message delivery.

Sampling procedure

Lagos and Ogun States were randomly selected out of the six states, namely Ogun, Osun, Oyo, Ondo, Ekiti and Lagos, that make up the southwest geopolitical zone of Nigeria. Out of the total seven (7) extension zones in the two states (Lagos State Agricultural Development Authority (LSADA) has 3 zones and Ogun State Agricultural Development (OGADEP) has 4 zones), 4 zones, constituting about 50%, were randomly selected to give a total 4 zones. Based on the available list of the 124 and 120 extension agents in LSADA and OGADEP, respectively, 50% of them were randomly selected across the four zones (during the zonal meetings in the two states) to give a total of 132 respondents used in the study.

Data collection

Structured questionnaire was used to collect primary data on socio-economic characteristics of the respondents, the specific ICTs to which they are exposed to, their level of awareness of ICT potentials and the ICT training needs for them on ICT usage for improved extension service delivery.

Scope of ICT in the study

Although, a number of electronic communication devices constituted the ICT (see the concept of ICT in the introduction), the scope of ICT in this study was limited to computer, internet, mobile phone and CD-ROM which are the relatively new ICT devices with the potentials for enhancement of agricultural extension message/ agricultural information service delivery in Nigeria.

Validity and reliability data of gathering instrument

The questionnaire was subjected to face and content validity with a view to ensuring that relevant questions are highlighted. A test-re-test method, in which the questionnaire was administered to a total 20 extension agents within the spate of two weeks, was used to establish the data gathering instruments' reliability. With the use of Pearson Product Moment Correlation (PPMC) test, the reliability coefficient value of 0.75 showed that the data gathering instrument was consistent enough to elicit the right kind of response from the extension agents.

Measurement of variables

The measured study variables consist of the dependent and independent variables. The independent variable consists of the extension workers' socio-economic characteristics while the dependent variable consists of the extension workers' training needs on ICT usage in extension activities. The extension agents' awareness of ICT potentials, however, served as dependent variable in relation to the socio-economic characteristics and served as independent variable in relation to the training needs.

The independent variables

- *Socio-economic characteristics of the respondents* such as age and working experience in extension services were measured in specific terms in years; professional rank was measured in terms of being an SMS, ZEO, BES and VEA; and education was measured by asking the extension workers to indicate the highest educational qualification they have obtained using ND/NCE, BSc/HND, MSc and PhD as indicators.

- *Specific ICT to which the respondents were exposed or aware of was* measured by asking the extension workers to indicate the new ICTs - computer, internet, GSM and CD-ROM which they are well familiar with.

The dependent variables

- *Extension workers' training needs on ICT usage* was measured by asking them to indicated areas of ICT functionalities they would like to be trained on for use in extension service delivery.

Dependent/independent variable

- *Extension workers' level of awareness of ICT potential* was measured by asking the extension workers to indicate "yes or no" to the listed 16 items (Table 4) considered ICT potentials for improved extension service delivery (Meera *et al.,* 2004). By this, a maximum of 16 and minimum score of 0 were obtainable by each of the respondents. Each of the respondents' score was later converted to percentage in order to categorise them into respective level of awareness as indicated in table 3. In view of this, scores between 100 and 76% were categorised high awareness level, between 51 and 75% as moderate awareness level, between 26 and 50% as slight awareness level and between 0 and 25% as poor awareness level.

Data analysis

Collected data were subjected to both descriptive and inferential statistics for sound interpretation of data and logical inference for the establishment of level awareness of ICT potentials among the extension agents in southwest Nigeria. While the descriptive statistics such as frequency and percentage were used to describe the socioeconomic data, inferential statistics such as chi-square was used to test the existing relationship between the respondents' socio-economic characteristics and their level of awareness of ICT potentials, and the relationship between their level of awareness and training needs on ICT usage.

Chi-square analysis of hypothesis one was done by cross-tabulation of the four level of awareness against the five groups of age and the working experience; and against the four ranked professional and educational statuses.

Chi-square analysis for hypothesis two was done by cross-tabulation of the four level of awareness against the seven itemised training needs on usage of ICT in extension activities.

RESULTS AND DISCUSSION

Socioeconomic characteristics of respondents

Table 1 shows the socio-economic characteristics of the extension workers surveyed in this study. Majority of them were within the age range of 41 and 45years. This is similar to Aderinto *et al.* (2008); observation among extension personnel in Ondo state. This implies that the state extension agencies in the southwest Nigeria must have taken the cognisance of the need for young extension workers who have the vigour and strength to reach out to the rural farmers in their remotely located villages. It was also observed that all the extension workers had one form of academic degree or the other. Majority of them, (72.7%), had first degree (Bachelor of Science or Higher National Diploma in agriculture) as their minimum level of education. About 15.2 and 1.5% of them had Masters and Doctoral degrees respectively. This observation implies that education, which is the means of manpower acquisition for effective performance, is a requirement for one to be an extension worker in Lagos and Ogun

states. This requirement might have stemmed out of the need for extension workers to have the competence for development and application of technological innovations or ICT for rural transformation and agricultural development. Without basic education and continuous in-service training, it may be difficult for the extension to make effective use of communication technologies for improved extension service delivery (Meenambigai and Setharaman, 2003).

All the extension workers surveyed in this study have spent between 5 and 20 years on the job. Majority of them, 56.1%, have spent between 11 and 15 years on the job. This suggests that the more experienced ones among the extension workers made up the thrust of those surveyed in this study area. Based on their job experience, the extension workers occupy various cadres of the extension personnel in the organisation echelon which cut across Subject Matter Specialists (SMS) occupied by 12.1%, Zonal Extension Officer (ZEO) 1.5%, Block Extension Supervisors (BES) 7.6% and Village extension agents (VEA) 78.8% of the respondents.

Extension Workers' ICT exposure/ awareness and usage

Table 2 shows the different ICT devices which the extension workers are familiar with in terms of functionalities and usage. All the respondents were familiar with the Global System Mobile Communication (GSM) and they all use it for making and receiving calls on related agricultural issues from either or both the researchers and farmers. In addition, about 65.2% of the respondents indicated that they use the telephone devices for sending and receiving agricultural text messages to and from agricultural researchers and fellow extension workers. The popularity of GSM among the extension workers is obviously due to its ready accessibility and relatively cheaper cost (CTA, 2008). About 58.3% of the extension workers were aware of computer by virtue of having it at home or having access to it in their offices and commercial centres where it is used for business purposes. Regarding its usage among the respondents, 31.8% of them indicated that they usually use computer for word processing and 19.7% indicated the use of CD-ROM for either documentation, reception or distribution of agricultural information. According to Lawal-Adebowale (2009), the use of CD-ROM enables agricultural information to be conveniently documented, take about and retrieved when needed, provided a computer or laptop is available. The Internet component of the ICT was known to about 38.6% of the extension workers. But only 26.5% of them use it for sending and receiving electronic mail to and from agricultural researchers and fellow extension workers and 17.4% of them use it for browsing needed for agricultural information to enhance their extension activities. The observed low level of the extension workers' exposure to the internet and usage in extension services may be due to high cost of its installation which of course, has streamlined its availability to specific areas such as public cyber café, private and government establishments. In the same vein, it may have accounted for why Adesope *et al.* (2005) opined that the use of ICT for related agricultural activities among the agriculture workers in Nigeria is at the early stage; and as indicated by Oladosu (2005), insignificant proportion of the extension workers used the ICT devices for their extension activities.

Table 1: Distribution of respondents' socioeconomic characteristics (N = 132)

Variables	Frequency	Percentage (%)
Age		
Below 30 years	16	12.1
31 – 35	29	22.0
36 – 40	32	24.2
41 – 45	45	34.1
Above 46	10	7.6
Education		
OND/NCE	14	10.6
HND/BSC	96	72.7
MSc	20	15.2
PhD	2	1.5
Working experience		
Below 5 years	8	6.1
6 – 10	46	34.8
11 – 15	76	57.6
16 – 20	2	1.5
Above 20	-	0.0
Professional rank		
SMS	16	12.1
ZEO	2	1.5
BES	10	7.6
VEA	104	78.8

Source: Field Survey (2007)

Extension workers' level of awareness ICT potentials

Table 3 shows the pooled awareness scores of the respondents on each item of the ICT potentials for improved extension service delivery. The extension workers had awareness score of less than 50% on ICT potentials items such as improved marketing of farm produce (23.5%), e-commerce for direct linkages between farmers and the market (30.3%), simultaneous provision of information on management of the varying farm enterprises (33.3%), online service for information (37.1%), accessibility to up-to-date and latest information on specific agricultural issue (46.2%), and question and answer service in which experts respond to agricultural issue of concern via the telephone (49.2%). This implies that most of the extension workers were not really conscious of the fact that ICT devices such as computer, internet and GSM can be used to efficiently accomplish these functions in extensions service delivery, and as indicated by Wijekon

Table 2: Extension workers' exposure to, and usage of ICT (N =132)

Variables	Frequency*	Percentage (%)
ICT exposed to:		
GSM	132	100
Internet	51	38.6
Computer	77	58.3
CD-ROM	63	47.7
ICT usage		
Phone calling and reception of agricultural message	132	100
Text messaging of agricultural information	86	65.2
E-mailing of agricultural message	48	26.5
Browsing of agricultural information	23	17.4
Agricultural information processing	42	31.8
Documentation/dissemination of agricultural information	26	19.7

Source: Field Survey (2007)

Summation of the frequencies results in multiple responses. The percentage for each frequency is, however, based on 132

and Newton (2000), without appropriate grounding in communication technology potentials, efficient utilisation among the extension workers may not be realised. They, however, had a high awareness score on ICT potentials in such areas as reduced cost and risk of frequent travels (80.3%), efficient data/information documentation and management (76.5%), enhanced information delivery system or information exchange (75.8%) and facilitation of interactions among researchers, extension agents and farmers (71.7%), timely supply of needed agricultural information to farmers (60.6%), improved system of obtaining feedback on communicated messages (59.1%), alertness of farm families about intending outbreak of pests and diseases in their farming environment (56.8%) and teleeducation and training of related agricultural workers (50.3%).

Categorisation of the extension agents' level of awareness ICT potentials

Categorisation of the extension workers' level of awareness as indicated in Table 4 shows that 12.1% of them, whose average score was 81.3%, were found to be highly aware of the ICT potentials in extension service delivery. About 43.2% with average score of 43.8%, were moderately aware of the ICT potentials; and 28.0%, with average awareness score of 68.8%, were found to be slightly aware of the ICT potentials. The remaining 16.7% of the respondents, with average score of 18.3%, were categorised as poorly aware of the ICT potential. The respondents' overall mean awareness score of 51.5% thus suggests that majority of the extension workers were moderately aware of the ICT potentials in extension service delivery. Although, this finding slightly differs from Adesope *et al.* (2006) observation of high level of awareness among the researchers in southeast Nigeria,

it suggests that the extension workers in Lagos and Ogun States had the prospect of making use of ICTs for improved extension services.

Table 3: Extension workers' awareness of ICT potentials for improved extension services

ICT (GSM, Computer, Internet) potentials	Frequency of awareness	Percent-age♦
Online service for information consultation and problem diagnosis	46	34.8
Tele-education and training of related agricultural workers	70	53.0
e-commerce for direct linkages between farmers and the market	40	30.3
Question and answer service in which experts respond to agricultural issue of concern via the telephone	65	49.2
Timely supply of needed agricultural information to farm-ers	80	60.6
Creation of data bases with details of the resources of lo-cal villages and villagers	47	35.6
Alertness of farm families about intending outbreak of pests and diseases in their farming environment	75	56.8
Facilitation of land records and online registration services	49	37.1
Simultaneous provision of information on management of the varying farm enterprises	44	33.3
Improved marketing of farm produce	31	23.5
Enhanced information delivery system or information ex-change	100	75.8
Improved system of obtaining feedback on communicated messages	78	59.1
Reduced cost and risk of frequent travels	106	80.3
Accessibility to up-to-date and latest information on spe-cific agricultural issue	61	46.2
Efficient data/information documentation and manage-ment	101	76.5
Facilitate interactions among researchers, extension agents and farmers	94	71.7
Total	**1087**	

* The respondents' total pooled score on each item of the 16 ICT potentials

♦ Percentage was based on the number responses to an item in relation the 132 respondents

Table 4: Categorisation of the extension agents' level of awareness of ICT potentials

Level of awareness	Frequency	Percentage	Actual and % scores*
Highly aware	16	12.1	13 (81.3)
Moderately aware	57	43.2	7 (43.8)
Slightly aware	37	28.2	11 (68.8)
Poorly aware	22	16.7	3 (18.8)
Total	132	100	8.5 (53.1%)

*Actual awareness score obtained by a group the respondents out of the obtainable score of 16 with the percentage score in parenthesis.
Overall mean score of all the respondents = 8.5 (53.1%)

Table 5: Extension agents' training needs on ICT usage (N = 132)

Variables	Frequency	Percentage
Computer appreciation	112	84.4
Website design	42	31.8
Uploading and downloading of information from the net	69	52.3
Sending and receipt of e-mail and attachment of files	97	73.5
Browsing the internet for information	101	76.5
Use of PowerPoint for presentation and/or teaching of agricultural messages	93	70.5
Use of CD-ROM for information documentation	117	88.6
Use of mobile phone for communication of agricultural information	00	00
Total	* 574	

*Multiple responses, with the percentage based on 132 responses

Extension agents' training needs on ICT usage

The extension workers' moderate awareness of the ICT potentials notwithstanding, Table 5 shows that they indicated the need for training on efficient utilisation of the ICT for improved extension services. In the light of this, majority of them, constituting 84.4%, hoped to be trained on computer appreciation such that they will be able to use it for word processing, documentation of information and graphic design of pictures. About 70.5% of them hoped to be able to use the PowerPoint component of the computer for information delivery or seminar presentation. Between 73.5 and 76.5% of the respondents wished to know how to use the internet for mailing and browsing information, respectively. However, a few of them, constituting about 31.8%, wished to know how website could be designed and hosted, and how to update the web information content as and when due. Training, as indicated by Oladosu (2005) and Wijekon and Newton (2000), is crucial to manpower development for competent and efficient operation ICT. In view of this, it implies that the extension workers need to be giving the necessary training on ICT usage so as be able to efficiently harness the technology potentials for improved extension service delivery. None of the respondents seemed to be interested in training on the use of telephone or mobile phone for communication of agricultural information. This may have been borne out of the fact that the communication device is relatively simple to use and more so, all of them are already using it conveniently for information communication either as voice phoning or sending of text messages.

Test of hypotheses

Test of hypotheses of the study as indicated in Table 6 showed that a significant relationship between the extension workers' selected socio-economic characteristics and level of awareness of ICT potentials for improved extension service delivery at $p< 0.05$ level. As observed by Adesope *et al.* (2005), the extension workers' level of education, professional rank and working experience are significantly related to their awareness of the ICT potentials for improved extension service delivery in Lagos and Ogun states.

Table 6: Chi-square test of relationship between the socioeconomic characteristics and level of extension agents' awareness of ICT potentials for improved extension service delivery

Extension workers' socio economic characteristics/awareness	χ^2	Df	p	Decision (α 0.05)
Age	32.83	12	0.811	NS
Level of education	45.45	9	0.023	S
Years of working experience	65.21	12	0.014	S
Professional rank	38.66	9	0.020	S

Similarly, Table 7 shows that there was a significant relationship between the extension workers' awareness of ICT potentials for improved extension service delivery and their training needs on ICT usage at $p< 0.05$ level. Since awareness does not imply usage, this observation suggests that irrespective of the extension workers' level of awareness of ICT potentials, they all need to be trained on the usage of communication-driven technologies for effective application in their extension activities.

Table 7: Chi-square test of relationship between the extension agents' level of awareness of ICT potentials and their training needs on usage for improved extension service delivery

Extension workers' levels of awareness/training needs	χ^2	Df	p	Decision (α 0.05)
Awareness/training needs	71.29	18	0.036	S

CONCLUSION

In view of the importance of information and its effective communication in agricultural extension services, it becomes imperative to explore all possible means with which agricultural messages can be quickly and efficiently communicated or exchanged between source and receivers. ICT such as internet, GSM, computers, etc, have proven to be effective communication tools with which information can be efficiently communicated and managed. Assessment of extension workers' awareness of the ICT potentials for improved extension service delivery in Lagos and Ogun states showed that they were familiar with the GSM, computer and to some extent, internet. Most of them, constituting 43.2%, had moderate awareness of the ICT potentials for improved extension service delivery. Based on the chi-square test of relationship between the extension workers' socioeconomic characteristics and their level of awareness of the ICT potentials, it implied that the observed moderate awareness of ICT potentials by the extension workers was influenced by their level of education, professional rank and years of job experienced. To enhance the extension workers' efficient use of the ICT for improved extension services, it becomes imperative to put ICT training in place for them.

RECOMMENDATIONS

In view of the above conclusion, it is therefore recommended that organised workshop or training scheme on ICT potentials and usage in extension services should be put in place for education and training of the extension workers

The training needs to appropriately ensure that the extension workers acquire the knowledge of ICT functionalities; develop capacity to explore its potentials and competence and flair for its usage in their extension activities.

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(Manuscript received: 24th June, 2008; accepted: 22nd April, 2009)