*Full Length Research Paper*

# Knowledge and perception of extension agents on information and communication technologies (ICTs) use in extension service delivery in Ondo State, Nigeria

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**This study determined the knowledge and perception of Extension Agents (EAs) on information and communication technologies (ICTs) use in extension service delivery in the two Agricultural zones of Ondo State. Fifty EAs were randomly selected from each zone. Validated questionnaire was used for data collection and appropriate statistical tools were used to analyze the data collected. The results showed that half (50.0%) of the EAs were highly aware of the various ICT while 50.0% had high knowledge on ICT use. Furthermore, majority (72.0%) of the EAs had indifferent perception towards ICT use. The results also showed that there were significant association between EAs awareness on ICT and EAs membership of professional association ($X^2$=53.341: df=1: p≤0.05) and highest educational level ($X^2$=99.96: df=4: p≤0.05). Furthermore, significant relationship existed between EAs knowledge on ICT use (r=0.656: p≤0.01), their perception towards ICT use (r=0.301: p≤0.01) and their awareness on ICT. The results of this study show that programmes designed to improve EAs use of relevant ICTs should address their education and professional association participation.**

**Keywords:** Knowledge, perception, awareness, information communication technology.

## INTRODUCTION

Global attention directed at agriculture due to emerging challenges of food security in recent years, resulting partly from age long negligence of dissemination of appropriate technology. Increasing production is a major challenge facing present agriculture. Smallholder farmers which dominate the landscape of developing world need to improve farming by acquiring adequate knowledge and information (UN, 2005). The role of public agricultural extension service has traditionally been to provide the important link between agricultural research and farming communities, especially for technology transfer in support of agricultural and rural development (FAO, 2004). Several authors (Anderson and Feder, 2004; Anandajayasekeram et al., 2008; Aker, 2010) posited that public agricultural extension service over the years

has been working via different approaches, methodologies and programmes to ensure farmers adoption of improved technologies with little success. Agricultural Development Project is the agency charged with the responsibility of Agricultural Extension in Nigeria and it is no longer financed by World Bank (Omotayo, 2005).

Given the urgent need for current Agricultural Knowledge and Information System (AKIS) by farmers, the use of conventional communication channels such as farm/home visit, personal letters, and use of contact farmers, for disseminating agricultural information as entrenched in the T and V extension approach is becoming less effective in the face of changing government policies and dwindling financial resources as

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a result of the withdrawal of the World Bank funding. One way to address this is through encouraging the adoption of Information and Communication Technologies (ICTs) by both researchers and extension workers to transmit relevant information to farmers in a most efficient way (Salau and Saingbe, 2006). ICT has many potential applications in agricultural extension most especially in accessing required information and knowledge (Richardson, 1997; Chapman et al., 2004; Mcnamara, 2009). ICT can bring new information services to rural areas where farmers, as users, will have much greater control. It follows from the foregoing that ICT are information transmission technology built on the potential of electronic communication devices such as computers and telecommunication equipment, for connecting and accessing various ends in the information pathway (Aboh, 2008).

Recent happenings across the globe are testimonies to the tremendous influence of technology in various sectors such as health, communication, entertainment and so on. Global landscape has changed tremendously as a result of these technological innovations. The influence of technology in agriculture has been established over the years with the introduction of chemicals, fertilizers, labour saving equipment, improved seeds and better farming methods and systems. The introduction of various relevant ICTs in agricultural information dissemination could help farmers' access market information, land resources and services, management of pests and diseases, rural development programmes (Meera et al., 2004) and help in broadening the orientation of farmers in production activities thereby causing a major turnaround in the agricultural sector as it is doing in many other sectors. If extension agents are crucial to agricultural and rural development and use of various ICTs promises a boost for agricultural and rural development, then a study on the knowledge and perception of extension agents on ICTs use in extension service delivery is important.

## Objectives of the study

The specific objectives of the study are to:

1. Describe the socio-economic characteristics of extension agents in Ondo State;
2. Determine the level of knowledge of extension agents on ICT use in extension service delivery in Ondo State;
3. Determine the perception of extension agents on ICT use in extension service delivery in Ondo State; and
4. Determine the extension agents' awareness on ICTs in Ondo State.

## Hypotheses of the study

Three hypotheses were set in the null form to provide direction for the study. These are:

1. There is no significant relationship between ICT awareness and socio-economic characteristics of EAs.
2. There is no significant relationship between ICT awareness and the knowledge of extension Agent on ICT use.
3. There is no significant relationship between ICT awareness and the perception of Extension Agent on ICT use.

## METHODOLOGY

The study was conducted in Ondo State which is in the southwest geopolitical region of Nigeria. The state population according to 2006 census was 3,441,024 people, with an estimated land area of 15,500 km$^2$. Ondo state Agricultural Development Project (ODSADEP) divides the state into two zones namely, Owo and Ondo. The 60 Extension Agents in Owo zone and 63 Extension Agents in Ondo zone formed the sample population for the study with 50 extension agents being randomly selected from each zone.

### Data collection instrument

The instrument used for the study was questionnaire with five sections: Socio economic characteristics, awareness of various ICTs, knowledge on ICT use, perception towards ICT use, and the constraints on ICT use.

### Measurement of variables

Independent variable such as age, number of years of formal education, length of service, number of farm families/farmer they are responsible to, membership of professional association; monthly income and cosmopoliteness – the degree of external orientation were measured by direct questions. EAs knowledge on ICT use in extension service delivery as well as their perception on ICT use in extension service delivery were measured on a Likert scale and were categorized by using the mean plus or minus one standard deviation. The dependent variable was awareness on various ICTs. This was measured as the total awareness score on ICT use using the following divisions; have you heard about it; have you seen it; do you have skills to use it; have you used it; and do you have it. This was coded as 1 for yes and 0 for no in all the five categories. Data collected were summarized using frequency, percentage, mean and standard deviation while Pearson product moment correlation, chi square and regression analyses were used to test the hypotheses stated.

## RESULTS AND DISCUSSION

### Socio-economic characteristics of extension agents

Result in Table 1 shows that majority (71.0%) of Extension Agents were male. The average age of the Extension Agents was 41.31 years and the standard deviation was 6.67. The analysis shows that more than half (51.0%) of the respondents were between the active ages of 41 and 50 years. It further revealed that more

**Table 1.** Distribution showing the socio-economic characteristics of Extension Agents n=100.

| Socio-economic characteristics | | Frequency | Percentage | Central tendency |
|---|---|---|---|---|
| Sex | Male | 71 | 71.0 | |
| | Female | 29 | 29.0 | |
| | ≤30 | 8 | 8.0 | |
| Age(years) | 31-40 | 37 | 37.0 | X= 41.31 |
| | 41-50 | 51 | 51.0 | SD= 6.69 |
| | ≥51 | 4 | 4.0 | |
| Years of formal education | 11-15 | 25 | 25.0 | X= 16.89 |
| | 16-20 | 71 | 71.0 | SD= 1.93 |
| | ≥21 | 4 | 4.0 | |
| Length of service(years) | ≤25 | 97 | 97.0 | X=12.74 |
| | 26-30 | 2 | 2.0 | SD= 6.43 |
| | ≥31 | 1 | 1.0 | |
| | ≤300 | 63 | 63.0 | |
| Farmers/farm family covered | 301-500 | 16 | 16.0 | X= 296 |
| | 501-700 | 5 | 5.0 | SD= 283.98 |
| | ≥701 | 16 | 16.0 | |
| Membership of professional association | Executive | 4 | 4.0 | |
| | Committee | 6 | 6.0 | |
| | Ordinary | 24 | 24.0 | |
| | No | 66 | 66.0 | |
| | VEA | 58 | 58.0 | |
| | BEO | 27 | 27.0 | |
| Professional cadre | ZEO | 6 | 6.0 | |
| | SMS | 7 | 7.0 | |
| | WIA | 2 | 2.0 | |
| | ≤100,000.00 | 74 | 74.0 | |
| Monthly income(Naira) | 100,000.01-120,000 | 8 | 8.0 | X= N81,865 |
| | 120,000.01-140,000 | 6 | 6.0 | SD= N33,741 |
| | ≥140,000.01 | 12 | 12.0 | |
| | Biannually | 5 | 5.0 | |
| | Annually | 6 | 6.0 | |
| Cosmopoliteness | Monthly | 14 | 14.0 | |
| | Weekly | 64 | 64.0 | |
| | Daily | 11 | 11.0 | |
| | For other business | 39 | 39.0 | |
| Reason for cosmopoliteness | To visit friends | 17 | 17.0 | |
| | For conferences | 17 | 17.0 | |
| | To acquire more knowledge on ICT | 27 | 27.0 | |

Source: Field survey (2012).

than half of the agents are adults with requisite experiences which could be useful in dealing with fellow adults (farmers) in the course of their work. Only 4.0% of the respondents were 51 years and above. The average year of formal education was 16.9 years with a standard deviation of 1.9. The analysis shows that majority

**Table 2.** Distribution of extension agent on their awareness of various ICTs.

| List of ICTs | Heard | | Seen | | Used | | Have | | Skills | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage |
| Television | 100 | 100.0 | 100 | 100.0 | 100 | 100.0 | 81 | 81.0 | 77 | 77.0 |
| Radio | 100 | 100.0 | 100 | 100.0 | 100 | 100.0 | 93 | 93.0 | 94 | 94.0 |
| Video recorder | 77 | 77.0 | 78 | 78.0 | 29 | 29.0 | 21 | 21.0 | 32 | 32.0 |
| Digital camera | 81 | 81.0 | 75 | 75.0 | 53 | 53.0 | 27 | 27.0 | 47 | 47.0 |
| Print media | 80 | 80.0 | 64 | 64.0 | 35 | 35.0 | 25 | 25.0 | 21 | 21.0 |
| Video player | 84 | 84.0 | 75 | 75.0 | 65 | 65.0 | 61 | 61.0 | 78 | 78.0 |
| Telegram | 58 | 58.0 | 35 | 35.0 | 2 | 2.0 | 1 | 1.0 | 11 | 11.0 |
| Projector | 70 | 70.0 | 55 | 55.0 | 25 | 25.0 | 9 | 9.0 | 34 | 34.0 |
| Web camera | 64 | 64.0 | 45 | 45.0 | 34 | 34.0 | 20 | 20.0 | 38 | 38.0 |
| Mobile phone | 100 | 100.0 | 100 | 100.0 | 100 | 100.0 | 89 | 89.0 | 83 | 83.0 |
| Global positioning system | 63 | 63.0 | 44 | 44.0 | 27 | 27.0 | 14 | 14.0 | 35 | 35.0 |
| Fax | 61 | 61.0 | 36 | 36.0 | 20 | 20.0 | 3 | 3.0 | 9 | 9.0 |
| Computer | 100 | 100.0 | 100 | 100.0 | 72 | 72.0 | 55 | 55.0 | 62 | 62.0 |
| Internet | 83 | 83.0 | 59 | 59.0 | 56 | 56.0 | 49 | 49.0 | 56 | 56.0 |

(71.0%) of the respondents had between 16 and 20 years of formal education while only 4.0% of the respondents had formal education greater than or equal to 21 years.

Also 40.0% of the respondents had Agricultural Extension as their major area of study while 4.0 percent had soil science but all areas of agriculture was ably represented. The average length of service was 12.7 years with a standard deviation of 6.4. The analysis shows that majority (97.0%) of the respondents had been in service for less than or equal to 25 years. Most (63.0%) of the respondents were responsible to less than 300 farmers/farm family and the average farmer/farm family responsible to was 296. Only 34.0% of the respondents belonged to professional associations with 24.0% as ordinary members, 6.0% as committee members and only 4.0% as executive members.

Many (58.0%) of the respondents were Village Extension Agents while 2.0% were in charge of Women in Agriculture. Most (74.0%) of the Extension Agent earned less than or equal to ₦100,000 monthly with their average monthly income put as ₦81, 865 with a standard deviation of ₦33, 741. Many (64.0%) of the Extension Agents travel out of their community weekly and 39.0% of the Extension Agents left their community for fortnightly training meetings.

**Awareness of various ICTs**

Result in Table 2 shows that all of the Extension Agents had heard of television while all of them had seen television. Also, majority (81%) had television set while all had used a television set. Furthermore, 77.0% of the Extension Agent had skills on how to operate television set. However, all of the Extension Agents had heard of Radio while all had seen Radio. Furthermore, all had used Radio while 93.0% had Radio and 94.0% of the Extension Agents had skill on how to operate Radio. Also, 81.0% of Extension Agents had heard about Digital camera, 75.0% had seen digital camera while 53.0% had used digital camera, 27.0% had digital camera and 47.0% had skills on how to operate digital camera.

Result in Table 2 also revealed that majority (64.0%) of the Extension Agents had heard about web camera while 45.0% had seen web camera and 34.0% had used web camera. Furthermore, 20.0% had web camera while 38.0% had skills on how to operate web camera. All of the Extension Agents had heard about mobile phone, had seen mobile phone and had used mobile phone respectively. Also, 89.0% had mobile phone while 83.0% had skills on how to operate mobile phone. Furthermore, all of the Extension Agents had heard about and seen computer respectively while

**Table 3.** Mean score of extension agents on knowledge of ICT use.

| Statements | Mean | Standard deviation | Ranking |
|---|---|---|---|
| GSM for making calls or text messages to colleagues or farmers | 4.45 | 1.10 | 1 |
| GSM use as electronic diary and reminders for meetings and events | 4.30 | 1.16 | 2 |
| Receiving and disseminating information through email | 3.62 | 1.52 | 3 |
| Computer for word processing | 3.32 | 1.39 | 4 |
| Membership of social networks on internet | 3.25 | 1.83 | 5 |
| Assessing information for research on the internet | 3.19 | 1.52 | 6 |
| Computer for data processing | 3.17 | 1.44 | 7 |
| Power point preparation and presentation | 2.97 | 1.46 | 8 |
| Use of projectors in lecture and seminar | 2.92 | 1.39 | 9 |
| Organizing and setting up various ICT equipments | 2.45 | 1.34 | 10 |
| Presenting television programme | 2.35 | 1.15 | 11 |
| Presenting Radio Programme | 2.20 | 1.11 | 12 |
| Scripting of radio programme | 2.07 | 1.27 | 13 |
| Scripting of television programme | 2.04 | 1.13 | 14 |
| Documenting events through digital camera | 1.96 | 1.21 | 15 |
| Documenting events through video recording | 1.83 | 1.12 | 16 |

72.0% had used computer. Also, 55.0% had computer while 62.0% had skills on how to operate computer. The awareness of Extension agents on other ICTs were also presented in Table 2.

Extension Agents' awareness score was further analyzed and the summary presented in Table 5. Results in Table 5 reveals that half (50.0%) of the Extension Agents had high awareness on various ICTs with a score range of ≥54.96 while 12.0% had moderate awareness with a score range of 54.96 to 21.82 and 38.0% had low awareness with a score range of ≤21.82.

## Knowledge on ICT use

Result in Table 3 shows that the knowledge of Extension Agents was highest in using Global System of Mobile communication (mobile phones) for making calls or text messages to colleagues or farmers with a mean score of 4.45. This was followed by GSM use as electronic diary and reminders for meetings and events with a mean score of 4.30. Also the Extension Agent had moderate knowledge in using computer for word processing with a mean score of 3.32 and accessing information for research on the internet with a mean score of 3.19. However, the result in Table 3 also shows that the Knowledge of the Extension Agents was lowest in documenting events through video recording with a mean score of 1.83. This showed that Extension Agent had more knowledge on the use of mobile phone, e-mail and computer which is in line with Adesope et al. (2005) whose finding showed that mobile phone, computer for word processing and electronic mail were the commonest information technology used by extension agents.

Extension Agents' knowledge score was further

Analyzed and the summary presented in Table 5. Result in Table 5 reveals that half of the Extension Agents had high knowledge on ICT use with a score range of ≥60.76 while 14.0% of the Extension Agent had moderate knowledge on ICT use with a score range of 60.76 to 31.42 and 36.0% of the Extension Agents had low knowledge on ICT use with a score range of less than or equal to 31.42.

## Perception towards ICT use

Result in Table 4 shows that the mean values of the various perceptional statements used to measure the perception of Extension Agents about ICT use. The statement "knowledge of ICT use has a great significance in Agricultural development" ranked highest with mean score of 4.47. This was followed by the statement "it's a waste of time bringing ICT into agriculture" with a mean score of 4.39. However, the statement "infrastructural facilities to support ICT use are not available" ranked lowest with a mean score of 2.60. This signifies that Extension Agent perception towards the use of ICT in Agriculture was mostly influenced by statements "knowledge of ICT use has a great significance in agricultural development, it's a waste of time bringing ICT into agriculture, ICT use influences rate of adoption and extension work can be greatly enhanced by ICT".

Extension Agents' perception score was further analyzed and the summary presented in Table 5. Result in Table 5 shows that majority (72.0%) of the Extension Agent had indifferent perception towards ICT use with score range of 45.59 to 35.97 while 15.0% of the Extension Agent had unfavourable perception towards ICT use with a score ≤ 35.97. However, 13.0% of the

**Table 4.** Mean score of extension agents on perception towards ICT use.

| Perceptional statements | Mean | Standard deviation | Ranking |
|---|---|---|---|
| Knowledge of ICT use has a great significance in Agricultural development | 4.47 | 0.66 | 1 |
| It's a waste of time bringing ICT into agriculture | 4.39 | 1.06 | 2 |
| ICT use influences rate of adoption | 4.38 | 1.09 | 3 |
| Extension work can be greatly enhanced by ICT | 4.21 | 0.98 | 4 |
| The benefits of ICT use outweigh the financial burden involved | 3.85 | 0.90 | 5 |
| ICT removes a lot of cost, barriers and saves time | 3.80 | 0.93 | 6 |
| ICT is a cost effective and practical tool for facilitating extension service delivery | 3.61 | 0.93 | 7 |
| ICT use is good but not necessary in extension service delivery | 3.55 | 1.33 | 8 |
| The financial burden of using ICT is unbearable | 3.01 | 1.04 | 9 |
| ICTs are too complicated and hard to use | 2.91 | 1.16 | 10 |
| Infrastructural facilities to support ICT use is not available | 2.60 | 1.16 | 11 |

**Table 5.** Distribution showing the awareness level, knowledge level and perception level towards the use of ICT (n=100).

| Levels on ICT use | Frequency | Percentage |
|---|---|---|
| **Awareness** | | |
| High(≥54.96) | 50 | 50.0 |
| Moderate (54.96-21.82) | 12 | 12.0 |
| Low(≤21.82) | 38 | 38.0 |
| **Knowledge** | | |
| High (≥60.76) | 50 | 50.0 |
| Moderate (60.76-31.42) | 14 | 14.0 |
| Low (≤31.42) | 36 | 36.0 |
| **Perception** | | |
| Favourable (≥45.59) | 13 | 13.0 |
| Indifferent (45.59-35.97) | 72 | 72.0 |
| Unfavourable (≤35.97) | 15 | 15.0 |

Source: Field survey 2012.

Extension Agents in the study area has a positive perception towards ICT use with a score of greater than 45.59.

**Correlation analysis**

The variables studied were subjected to correlation analysis using Pearson product moment correlation to find out the relationship between the dependent variable (awareness on various ICTs) and independent variables studied. Result in Table 6 reveals that there was no significant relationship between the age of Extension Agents, length of service, and number of years of formal Education, number of farmer/farm family covered, monthly income and Awareness on various ICTs but there was positive and significant correlation between Knowledge of various ICT (r=0.656, p≤0.01) and awareness level of various ICT as well as Perception towards ICT use (r=0.301, p≤0.01) and awareness on various ICT. This implies that the higher the Knowledge of extension agents on ICT use, the higher their awareness on it and also, the better their perception towards ICT use, the higher their awareness on various ICTs.

**Chi square analysis**

The Chi square analysis carried out presented the following results. There is significant association between membership of professional association ($X^2$=53.341, df=1, p≤0.05), highest educational level ($X^2$=99.96, df=4, p≤0.05), frequency of leaving the community ($X^2$=196, df=4, p≤0.01), reason for leaving the community ($X^2$=149.1, df=3, p≤0.01) and awareness level of various

**Table 6.** Correlation analysis showing the relationship between some independent variable and awareness level score.

| Independent variable | Correlation coefficient (r) | Coefficient of determination ($r^2$) |
|---|---|---|
| Age | 0.051 | 0.002601 |
| Length of service | -0.52 | 0.2704 |
| Number of years of formal education | -0.063 | 0.003969 |
| Number of farmer/farm family covered | 0.017 | 0.000289 |
| Monthly income | 0.089 | 0.007921 |
| Knowledge on ICT use | 0.656** | 0.430336 |
| Perception towards ICT use | 0.301** | 0.090601 |

* = 0.05; **= 0.01; Source: Field survey 2012.

**Table 7.** Chi square analysis showing association between some socio-economic characteristics and awareness level of various ICTs.

| Characteristics | Chi square ($X^2$) | Df | Level of significance |
|---|---|---|---|
| Major Area of study | 205.7 | 6 | 0.206 |
| Membership of professional Association | 53.341 | 1 | 0.050* |
| Professional cadre | 157.9 | 3 | 0.354 |
| Gender | 41.661 | 1 | 0.314 |
| Highest educational level | 99.960 | 4 | 0.034* |
| Frequency of leaving the community | 196.0 | 4 | 0.009** |
| Reason for leaving the community | 149.1 | 3 | 0.015** |

*= 0.05; ** = 0.01; Source: Field survey, 2012.

**Table 8.** Regression analysis of some independent variables and awareness level of various ICT.

| Parameter | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. error | (Beta) | | |
| (Constant) | -2.639 | 16.891 | | -0.156 | 0.876 |
| Age in years | -0.181 | 0.293 | -0.073 | -0.617 | 0.539 |
| Number of years of formal education | 0.029 | 0.762 | 0.003 | 0.038 | 0.970 |
| Length of service | -0.034 | 0.321 | -0.013 | -0.105 | 0.916 |
| Number of farmer/ farm family | -0.006 | 0.005 | -0.097 | -1.214 | 0.228 |
| Monthly Income | 0.000 | 0.000 | 0.205 | 2.066 | 0.042 |
| Knowledge total | 0.752 | 0.104 | 0.666 | 7.265 | 0.000 |
| Perceptional total score | 0.177 | 0.304 | 0.051 | 0.581 | 0.563 |

R = 0.682; $R^2$= 0.466; Adjusted $R^2$ = 0.425; Standard error of estimate = 12.56; F value =11.455; Sig. = 0.000. Source: Field survey, 2012.

ICT (Table 7). This implies that being a member of a professional association, being literate, frequency of leaving the community and the major reason for leaving the community contributes to extension agents' awareness of various ICT.

**Regression analysis**

Result in Table 8 shows the result of the multiple regression analysis carried out. The Adjusted R-square was 0.425, which implies that the significant independent variables accounted for about 42.5% of the variation in the extension agents' awareness of various ICTs. Hence, the result shows a positive and significant relationship between awareness of various ICT and Knowledge on ICT use (b = 0.666, p≤0.01) and monthly income (b= 0.205, p≤0.05). This implies that any programme designed to improve the awareness of Extension Agents on ICT use should be planned with emphasis on the two

variables. This is because, the more extension agents become knowledgeable on various ICTs, the better their interest and desire that will eventually improve their awareness on these ICTs. Furthermore, the more income available to the extension agents, the easier it becomes to acquire these ICT and use them. In addition, the analysis of variance for the regression analysis yields an F – value of 11.455, which is significant at $p < 0.01$ level of significance.

## CONCLUSIONS AND RECOMMENDATIONS

Although the extension agency in Nigeria cannot be said to be gender biased, yet majority of the agricultural extension agents were males. This might be due to the nature of the job – the stress and rigours involved. The average age of the extension agent is 41.31 years. This established that extension agents are still in their active years and can still cope with the nature of the work. Agricultural extension was the major area of study of the Extension Agents in the study area. This is expected since most of the knowledge and skill required for success in extension delivery are taught as part of the curriculum for a degree in agricultural extension. The agents studied have spent an average of 12.74 years in service and are responsible to an average of 296 farmer/farm family. Majority of the Extension Agent does not belong to professional association despite the many benefits they stand to gain and they earn an average of ₦81, 865 monthly. There was high level of awareness of ICT among the agricultural extension agents, especially in computer, mobile phone, radio, television and video player. These ICTs are relatively the cheapest on the list of the ICTs listed and some of these are household items.  Mobile phones are everywhere in the nation and personal laptop is gaining prominence among civil servants because of its various uses. The Extension Agent perception of ICT use in extension service delivery was mostly indifferent. This might be due to the cost implication of ICT use, the complicated nature of the ICTs and the needed infrastructural facilities not available.

The study recommends that adequate information on various relevant ICT suitable for extension service delivery should be given to extension agents so that they can improve their knowledge on it and also help them to develop more positive perception that will enhance the future use of these ICT in extension service delivery. Also, the study recommends that anytime programme that will enhance the awareness about utilization of various ICTs by extension agents is being planned, variables  such as knowledge on ICT, monthly income and perception towards ICT use that showed significant relationship with extension agents' awareness in the study  should  be given preference. The policy implication

of this study therefore is that government needs to reorient its policies in order to harness ICT potential for contribution to agricultural development in the country.

## REFERENCES

Aboh LC (2008). Assessment of the frequency of ICT tools usage by agricultural extension agents in Imo State, Nigeria. J. Agric. Social Res. (JASR) 8:2.

Aker JC (2010). Dial 'A' for Agriculuture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries. Tuft University, Economics Department and Fletcher School, Medford MA02155.

Anderson JR, Feder G (2004). Agricultural extension: Good intentions and hard realities. The World Bank Research Observer 19(1):41-60.

Anandajayasekeram P, Puskur R, Workneh S, Hoekstra D (2008). Concepts and practices in Agricultural extension in Developing countries: A source book. IFPRI (International Food Policy Research Institute), Washington, DC, USA, and ILRI (International Livestock Research Institute), Nairobi, Kenya. p. 275.

Chapman R, Slaymaker T, Young J (2004). Livelihoods Approaches to Information and Communication in Support of Rural Poverty Elimination and Food Security. Overseas Development Institute, UK Department of International Development and Food and Agricultural Organisation.

Food and Agriculture Organization of the United Nations (2004). *Institute building to strengthen agricultural extension*. 27th FAO regional conference for Asia and the pacific Beijing, china, May, 17th – 21st.

McNamara K (2009). Improving Agricultural Productivity and Markets: The Role of Information and Communication Technologies. Agriculture and Rural Development Notes, Issue 47, April, The World Bank, Washington DC.

Meera SN, Jhamtani A, Rao DUM (2004). Information and Communication Technologies in Agricultural Development: A Comparative Analysis of three Projects from India. Network, p. 135. Agricultural Research and Extension Network.

Omotayo AM (2005). Information and Communication Technology (ICT) and Agricultural Extension: Emergency issues in transferring Agricultural Technology in Developing countries. In: S.F. Adedoyin (Eds.): Agricultural Extension in Nigeria. Ilorin: Agricultural Extension Society of Nigeria.

Richardson D (1997). The Internet and Rural and Agricultural Development: An Integrated Approach. Rome: FAO.

Salau ES, Saingbe ND (2006). Access and utilization of ICTs among Agricultural Researchers and Extension workers in selected institutions in Nassarawa State of Nigeria. http://patnsukjournal.net/vol4No2/pl.pdf, pp. 1-6.

United Nations (2005). Global E-government Readiness Report: From E-Government to E-Inclusion. UNPAN/2005/14, United Nations, New York.