

## ASSESSMENT OF INFORMATION AND COMMUNICATION TECHNOLOGIES USED FOR DISSEMINATING INNOVATIONS BY EXTENSION AGENTS IN OGUN STATE, NIGERIA.

### ABSTRACT

This research work was carried out to investigate the crop farmers' assessment of information and communication technologies (ICT) used for innovation dissemination by extension agents in Ogun State, Nigeria. A multi-stage sampling technique was employed to select 105 crop farmers from two agricultural zones: Ikenne and Ilaro. The data collected in June and July 2013 were analyzed using descriptive statistical tools such as means, frequency and percentage distributions; while inferential statistical tool-chi-square was used to determine the relationship between the variables selected. The study showed that crop farmers were between the ages of 41 and 60 years, and their mean age was 47 years, 74.3% were males, 83.8% were married, 84.8% were literate, 59.0% were members of cooperative societies, 80.9% attended extension programmes, 56.2% cultivated between 2 - 6 acres of farmland, and majority (56.2%) were earning between ₦10, 000.00 – ₦30, 000.00 monthly and a mean of ₦16,939.39K. Radio, landline telephone, television, slides, DVD and overhead projectors were the most used information and communication technologies by extension agents. Also, there was a significant relationship between age ( $X^2=74.075$ ), educational background ( $X^2= 55.774$ ), area of specialization ( $X^2= 86.517$ ), number of agricultural shows attended ( $X^2= 27.989$ ) and ICT used ( $X^2= 377.323$ ). The problem faced by crop farmers were inability of farmers to use ICT ( $X^2=93.971$ ), inability of farmers to perceive its benefits ( $X^2=108.524$ ), lack of technological infrastructure ( $X^2=292.095$ ), high cost of technology ( $X^2=191.114$ ), Not enough time to spend on technology ( $X^2=138.592$ ), no understand of the value of ICT ( $X^2=66.848$ ), lack of training ( $X^2=189.057$ ), and lack of supporting facilities ( $X^2=209.248$ ) of farmers in usage of information and communication technologies; and adoption levels of farmers. Hence, it was recommended that efforts should be directed towards improving the level of utilization of ICTs by organizing training workshop for extension agents.

*Keywords: Assessment, information communication technology, innovation dissemination. Extension Agent, Crop farmer*

### INTRODUCTION

Agriculture remains the bedrock of Nigeria's economic and nutritional development with an estimated 70% of the country's over 140million populace living in rural areas and engaging in agricultural-related activities[1][2][3]. Thus, agriculture provides employment for a large percentage of the nation's population, food for the populace and raw materials for agro- based industries. However, despite the involvement of large percentage of the population in agriculture, the country continues to spend the lean foreign reserve on importation of food. The perpetual food shortage is often blamed on ineffective agricultural research, lack of continuity in agricultural policies and programmes, poor implementation by administrators, low quality of extension and poor linkage system between research, extension and farmers[4].

However, the role of public agricultural extension service has traditionally being to provide the important link between agricultural researches and farming communities, especially for technology transfer in support of agriculture and rural development. However, strong criticism of public agricultural extension services has circulated in recent years [5]. According to[6] this criticism is due to its top-down approach, which has been supply-driven, technically weak, catering only for large farmers (progressive farmers) and providing insufficient coverage of the small-scale farmers, who are the producers of the bulk of food crops in Nigeria.. This implied that proven agricultural technologieswhich are needed to ensure higher productivity and food security, do not reach the millions of small-scale farmers scattered in the rural areas. Consequently, these farmers have managed to obtain information from sources such as other farmers, inputs dealers, produce buyers and NGOs.

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 was counterproductive. This calls for 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[7].Agricultural Extension, which depends largely on information exchange between and among farmers and a broad range of other actors, is an area in which ICT can have significant impact.

Research Scientists can relate directly with the farmers through ICTs. Frontline extension workers, who are the direct link between farmers and other actors in the agricultural knowledge and information system, are well positioned to make use of ICT to access expert knowledge or other types of information that could be

beneficial to the farmers. It was noted that ICT can bring new information services to rural areas where farmers (end users) will have much greater control, than ever before, over current information channels[8]. Access to such new information sources is a crucial requirement for the sustainable development of the farming systems. They added that ICT can be of immense help by enabling extension workers to gather, store, retrieve and disseminate a broad range of information needed by farmers, thus transforming them from extension workers into knowledge workers (KW). Agricultural development in Africa and Nigeria in particular, has been hampered by low level of agricultural information exchange. It was reported that in Nigeria, the national extension service is based on the Training and Visit (T and V) delivery system; traditionally supported by mobile cinema, video, television, radio and telephone being the only ICTs used by majority of extension workers[9]. During the last two decades, the world has witnessed an unprecedented growth in the area of ICT [10]. In spite of the rapid improvement in information and communication brought about in recent times, by science and technology, most of the extension workers in Nigeria in particular, still rely on the T and V system. Majority of the population in the developing world live in rural areas and has little or no access to agricultural information[11]. This study therefore assessed the Information and Communication Technologies used by extension agents in disseminating innovations to crop farmers in Ogun state. These research questions were addressed in this study.

- i. What are the personal and socio economic characteristics of crop farmers in Ogunstate?
- ii. What are the types of information and communication technologies used by extension agent in Ogunstate?
- iii. What are the farmer's levels of adoption of these innovations?
- iv. What are the problems faced by crop farmers on the use of information and communication technologies while adopting the innovations disseminated by extension agent?

## **Objectives of the study**

The general objective of the study was to assess the type of information and communication technologies used by extension agents in Ogun state. The specific objectives were to:-

- i. describe the personal and socio economic characteristics of crop farmers in Ogun state.

- ii. identify the types of information and communication technologies used by extension agents in Ogun state.
- iii. assess the farmer's level of adoption of these innovations
- iv. investigate the problems faced by crop farmers in adopting the innovations disseminated by extension agents.

## Hypotheses of the study

- Ho 1: There is no significant relationship between the information and communication technologies used by extension agents and selected personal and socio economic characteristics of farmers such as age, gender, education, social status, and economic status in Ogun state.
- Ho 2: There is no significant relationship between the problem of farmers in usage of information and communication technologies and adoption levels of farmers.

## METHODOLOGY

### Study area

The study was conducted in Ogun state, Nigeria. It lies within 20° 45'E and 3° 55'E longitude and 7° 01'N and 7° 8'N latitude in the tropics. Ogun State is bounded in the west by Benin Republic, in the south by Lagos State and the Atlantic Ocean, in the east by Ondo State and in the north by Oyo state. Ogun State covers a land area of 16,409.28 square kilometers and represents less than two percent of Nigeria's landmass. The natural vegetation ranges from fresh-water swamp with mangrove forest in the southwest and diverse forest to the woody Guinea savannah in the northwest. The rainy season starts around the middle of March and continues till late October, while the dry season starts in November and lasts until February, in most locations. Rainfall ranges between 900 and 1600mm annually. The area is warm throughout the year with an average temperature ranging between 28°C and 35°C. Humidity is between 85 and 95% [12]. Agriculture is the major occupation of the people of Ogun State. The state is divided into four

118 agricultural zones namely Abeokuta, Ikenne, Ijebu and Ilaro by Ogun State Agricultural  
119 Development Program (OGADEP). Ogun state has a population of 3,751,014 [13], while its GDP  
120 as at 2007 was \$10.47billion with a per capita income of \$2,740[14].

## 121 **Sampling technique and sample size.**

122 A multi-stage sampling technique was used to select the respondents for the study. Firstly, from  
123 these four zones 50% of the zones were selected which were Ikenne and Ilaro. There were four  
124 blocks in Ikenne zone and four blocks in Ilaro zone. Therefore, the selection was 2 blocks from  
125 each zone. Secondly, 10% of existing cells in each zone were selected, this led to the selection of  
126 two cells in Ikenne and Ilaro in an alphabetical order. Thirdly, based on the structure of OGADPEP,  
127 a cell consists of 80 contact farmers, hence from the selected cells, 25% of the contact farmers  
128 were selected and this resulted into the selection of 41 and 64 contact farmers from Ikenne and  
129 Ilaro zones. The research instrument was administered to the respondents in an interview section.  
130 The questions were read by the interviewer who helped the crop farmers to record their options  
131 immediately. Data collected were subjected to both descriptive and inferential statistics. The  
132 descriptive statistics include frequency counts, percentages and means. Inferential Statistical tool  
133 used was chi-square analysis.

## 134 **RESULTS AND DISCUSSION**

### 135 **Personal and socio-economic characteristics of the crop farmers.**

#### 136 **Age and Gender of farmers**

137 Majority (61.9%) of sampled respondents were between the ages of 41 and 60 years. The mean  
138 age of the crop farmers was 47 years and at this age they were considered highly productive and  
139 active to undertake the strenuous tasks associated with farm work. This is in line with the  
140 assertion that farming should not be left to the aged only as most people think [15]. The ratio of the  
141 male to female crop farmers in this study was found to be 78:27. This is, however, against gender

studies which seem to suggest that women participate more than men in most farming activities[16]

## **Marital status and Education.**

Majority (83.8%) of the respondents were married, only 5.7% were singles and 9.5% widowed. The high percentage of married respondents signified the importance attached to marriage in most rural societies in Nigeria. Marriage is paramount to the continuous existence of man and the sustenance of the society since members of a society have to form families through procreation. n education, about 50.5% of respondents attended primary schools while 15.2% had secondary education. In all, about 84.8% respondents had formal education. This is in line with the assertion that most of the respondents were literate[17]. This is highly expected to enhance extension work and adoption of new ideas and technologies.

## **Secondary occupation**

Majority (34.3%) of the respondents did not have other occupation apart from farming, 33.3% were private business owners, 26.7% were traders. This implied that most of the farmers do not have other sources of income apart from farming, unlike those with private businesses, trading, bricklaying and farming. This distribution generally revealed the relative importance of farming in southwestern Nigeria and Nigeria in general because agriculture is the largest employer of labour in the country. In fact, those that are not directly engaged in farming (growing crops and raising livestock) are indirectly engaged through marketing of agricultural produce [18](See Table1)

## **Membership of cooperative societies**

Majority (59.0%) of the respondents were members of one form of cooperative societies or the other while 41.0% do not belong to any form of cooperative societies at all, majority (45.7%) of the crop farmers did not contribute their monthly due to cooperative society and are not better than

168 non-members since they cannot ripe the advantages of membership. This is in line with another  
 169 study which concludes that Cooperative Society membership distribution of the respondents  
 170 showed that majority of the farmers sampled did not belong to cooperative societies[19]

171 **Table 1: Personal characteristics of the crop farmers (N=105)**

| Age-group in years       | Frequency | Percentage |
|--------------------------|-----------|------------|
| 21-30                    | 5         | 4.8        |
| 31-40                    | 29        | 27.6       |
| 41-50                    | 34        | 32.4       |
| 51-60                    | 31        | 29.5       |
| 61-70                    | 6         | 5.7        |
| <b>Mean</b>              | 47years   |            |
| <b>Total</b>             | 105       | 100        |
| <b>Gender</b>            |           |            |
| Male                     | 78        | 74.3       |
| Female                   | 27        | 25.7       |
| <b>Total</b>             | 105       | 100        |
| <b>Marital Status</b>    |           |            |
| Married                  | 88        | 83.8       |
| Single                   | 6         | 5.7        |
| Widowed                  | 10        | 9.5        |
| Divorced                 | 1         | 1.0        |
| <b>Total</b>             | 105       | 100        |
| <b>Educational Level</b> |           |            |
| No formal education      | 16        | 15.2       |
| Adult Education          | 11        | 10.5       |
| Primary education        | 53        | 50.5       |
| Secondary education      | 16        | 15.2       |
| Tertiary                 | 9         | 8.6        |
| <b>Total</b>             | 105       | 100        |
| <b>Other Occupation</b>  |           |            |
| None                     | 36        | 34.3       |
| Trading                  | 28        | 26.7       |
| Bricklayer               | 4         | 3.8        |
| Tailoring                | 2         | 1.9        |
| Private Business         | 35        | 33.3       |
| <b>Total</b>             | 105       | 100        |

172 Source: Sample survey, 2013.

## 173 Attendance of extension programmes

174 About 77.1% of the crop farmers attended one form of extension programme or the other while  
 175 22.9% did not attend extension programmes. Also majority (36.2%) of the crop farmers attended  
 176 extension programme sometimes, 29.5% attended often, 19.0% never attended, while 15.2%

attended very often. This indicated a poor performance in attendance of extension programmes by the respondents as asserted by [20].

## **Farm Size**

Majority (56.2%) of the crop farmers cultivated between 2 and 6 acres of farmland, though about 35% cultivated between 7 and 26 acres while 1.9% of the crop farmers cultivated between 0.1–0.5 acre of farmland. The average farm size of the crop farmers were 6.7 acres. The implication of this is that majority (56.2%) of crop farmers had high usage level of their farm size. Therefore high usage of farm size might result into a larger crop produced. This is in line with the assertion of [19] that farm sizes owned by respondents were mostly in small and medium scale. (See Table 2)

## **Monthly Farm Income**

Monthly estimated farm income showed majority (56.2%) earned between N10,000–N30,000. The mean of the monthly farm income was N16,939.39k. The implication of this was that majority (56.2%) earned average income from their respective farms. This is in line with the assertion of [19] that respondents' income distribution were of low income group who might not be in position to readily afford or access new ICT facilities. Also, about 37.1% of the crop farmers did not have other source of farm income apart from farming. The mean of non-farm income was N10,742.80. The implication of this was that 33.3% of the crop farmers fall to the medium level of the non-farm income, while the majority (37.1%) did not have other sources of income apart from farming.

**Table 2. Socio-economic characteristics of the crop farmers (N=105)**

| Membership of Cooperatives | Frequency | Percentage |
|----------------------------|-----------|------------|
| Yes                        | 62        | 59.0       |
| No                         | 43        | 41.0       |

## Monthly contribution

|                |    |      |
|----------------|----|------|
| None           | 48 | 45.7 |
| Less than 1000 | 13 | 12.4 |
| 1000 – 3000    | 27 | 25.7 |
| 3001 – 5000    | 15 | 14.3 |
| 5001 and above | 2  | 1.9  |

## Attend Extension Program

|            |    |      |
|------------|----|------|
| Very often | 16 | 15.2 |
| Often      | 31 | 29.5 |
| Sometimes  | 38 | 36.2 |
| Never      | 20 | 19.0 |

## Farm Size

|                 |    |      |
|-----------------|----|------|
| 0.1 – 0.5 acres | 2  | 1.9  |
| 0.6 - 1 acres   | 6  | 5.7  |
| 2 - 6 acres     | 59 | 56.2 |
| 7 - 11 acres    | 24 | 22.9 |
| 12 – 16 acres   | 8  | 7.6  |
| 17 – 21 acres   | 3  | 2.9  |
| 22 – 26 acres   | 3  | 2.9  |

**Mean** **6.7 acres**

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## 199 Farm produce

200 About 87.6% of maize farmers harvested less than 5000kg from their farm, and 48.6% of cassava  
 201 farmers got between 1001 and 5000kg. The mean of maize farm was 3947.62kg, while that of  
 202 cassava farm was 5078.10kg. The implication of this was that majority (87.6%) earned medium  
 203 level of output from their maize farm while majority (48.6%) earned below the average output of  
 204 the cassava farm. This indicated that most of the crop farmers that benefited from extension

programme made less than 5000kg from their maize farm and 5001-10000kg from their cassava farm (See Table3).

**Table 3.Economic characteristics of the crop farmers(N=105)**

| <b>Farm Income (Monthly)</b>    | <b>Frequency</b> | <b>Percentage</b> |
|---------------------------------|------------------|-------------------|
| None                            | 24               | 22.9              |
| Less than ₦10000                | 11               | 10.5              |
| ₦10000 – ₦30000                 | 59               | 56.2              |
| ₦30001 – ₦50000                 | 3                | 2.9               |
| ₦50001 – ₦60000                 | 8                | 7.6               |
| <b>Mean</b>                     | ₦ 16,939.39      |                   |
| <b>Non-farm Income(Monthly)</b> |                  |                   |
| None                            | 39               | 37.1              |
| Less than ₦10000                | 23               | 21.9              |
| ₦10000 – ₦30000                 | 35               | 33.3              |
| ₦30001 – ₦50000                 | 6                | 5.7               |
| ₦50001 and Above                | 2                | 1.9               |
| <b>Mean</b>                     | ₦ 10,742.80      |                   |
| <b>Maize farmoutput (kg)</b>    |                  |                   |
| Less than 5000                  | 92               | 87.6              |
| 5001 – 10000                    | 8                | 7.6               |
| 10001 – 15000                   | 2                | 1.9               |
| Greater than 15001              | 3                | 2.9               |
| <b>Mean</b>                     | 3,947.62kg       |                   |
| <b>Cassava farm output (kg)</b> |                  |                   |
| Less than 1000                  | 23               | 21.9              |
| 1001 – 5000                     | 51               | 48.6              |
| 5001 – 10000                    | 25               | 23.8              |
| 0001 – 15000                    | 2                | 1.9               |
| 15001> 20000                    | 4                | 3.8               |
| <b>Mean</b>                     | 5078.10kg        |                   |
| <b>Total</b>                    | <b>105</b>       | <b>100.0</b>      |

208

## Types of information and communication technologies used by extension agents

Information and communication technologies used by extension agents revealed that radio was the most used information and communication technology used by the extension agents having 51.6%, followed by the use of slides having 45.2%, telephone landline having 30.1%. Also, 29.0% utilized DVD, 25.8% utilized computer, 24.7% utilized overhead projector as well as 21.5% utilized mobile phone in information dissemination among the crop farmers. This however shows that there are low levels of utilization of various forms of information and communication technologies by the extension agents. This may lead to low adoption of innovations by the crop farmers as they

are not adequately educated on the use of information and communication technologies(See Table4).

**Table 4: Types of Information and communication technologies used by Extension Agents**

| ICT                   | Used | Percentage |
|-----------------------|------|------------|
| Telephone landline    | 28   | 30.1       |
| Television            | 16   | 17.2       |
| Slides                | 42   | 45.2       |
| Radio                 | 48   | 51.6       |
| Mobile Phone          | 20   | 21.5       |
| Audio cassette player | 17   | 18.3       |
| Overhead projector    | 23   | 24.7       |
| DVD                   | 27   | 29.0       |
| Print media           | 6    | 6.5        |
| Computer              | 24   | 25.8       |

SOURCE: Sample Survey, 2013.

## Hypotheses testing

Ho<sup>1</sup>: There is no significant relationship between the information and communication technologies used by extension agents and selected personal and socio economic characteristics of farmers such as age, gender, education, social status, and economic status in Ogun state.

The results showed that there was a significant relationship between the information and communication technologies used by extension agents and selected personal and socio economic characteristics (suchas: age ( $X^2=74.075$ ), educational background ( $X^2=55.774$ ), area of specialization ( $X^2=86.517$ ), previous experience as extension agents ( $X^2=57.301$ ) and number of

agricultural shows attended by extension agents ( $X^2=27.989$ ). Therefore, the null hypothesis which states that there is no significant relationship between the information and communication technologies used by extension agents and selected personal and socio economic characteristics of farmers in the study area was rejected and the alternative hypothesis accepted that: There was a significant positive relationship between information and communication technologies used to teach crop farmers and Agents` personal and professional characteristics such as age, education, specialization, previous experience as extension agents, number of agricultural shows attended by extension agents and ICT used (See Table 6).

**Table 6: Summary of relationship between the information and communication technologies used by extension agents and selected characteristics of Extension Agents**

| Extension Agents characteristics               | N  | Df | $X^2_{\text{Cal}}$ | P-level | Decision |
|------------------------------------------------|----|----|--------------------|---------|----------|
| Age                                            | 93 | 4  | 74.075             | 0.000   | S        |
| Educational Background                         | 93 | 3  | 55.774             | 0.000   | S        |
| Religion                                       | 93 | 1  | 1.301              | 0.254   | NS       |
| Area of Specialization                         | 93 | 6  | 86.517             | 0.000   | S        |
| Working with Organizations as Extension Agents | 93 | 1  | 57.301             | 0.000   | S        |
| Number of Agricultural Shows Attended          | 93 | 3  | 27.989             | 0.000   | S        |
| ICT Used                                       | 93 | 19 | 377.323            | 0.000   | S        |

**Source: Field Survey, 2013.**

$H_o^2$ : There is no significant relationship between the problem of farmers in usage of information and communication technologies and adoption levels of farmers.

The data showed that there was a significant relationship between the problem (such as: Inability of farmers to use ICT ( $X^2=93.971$ ), Inability of farmers to perceive its benefits ( $X^2=108.524$ ), Lack

of technological infrastructure ( $X^2=292.095$ ), High cost of technology ( $X^2=191.114$ ), Not enough time to spend on technology ( $X^2=138.592$ ), Do not understand the value of ICT ( $X^2=66.848$ ), Lack of training ( $X^2=189.057$ ), and Lack of supporting facilities( $X^2=209.248$ )of farmers in usage of information and communication technologies and adoption levels of farmers. Therefore, the null hypothesis which states that there is no significant relationship between the problem of farmers in usage of information and communication technologies and adoption levels of farmers in the study area is rejected and the alternative hypothesis is accepted that: There was a positive relationship between the problems faced by farmers while using information and communication technologies adoption level of farmers in the study area.(See Table7)

**Table 7.Summary of Chi-squareanalysis between the problems of farmers in usage of information andcommunication technologies and adoption levels of farmers**

| Problems                                      | N   | df | $X^2_{\text{Cal}}$ | P-level | Decision |
|-----------------------------------------------|-----|----|--------------------|---------|----------|
| Inability of farmers to use ICT               | 105 | 3  | 93.971             | 0.000   | S        |
| Inability of farmers to perceive its benefits | 105 | 3  | 108.524            | 0.000   | S        |
| Lack of technological infrastructure          | 105 | 4  | 292.095            | 0.000   | S        |
| High cost of technology                       | 105 | 3  | 191.114            | 0.000   | S        |
| Not enough time to spend on technology        | 105 | 4  | 138.592            | 0.000   | S        |
| Do not understand the value of ICT            | 105 | 3  | 66.848             | 0.000   | S        |
| Lack of training                              | 105 | 3  | 189.057            | 0.000   | S        |
| Lack of supporting facilities                 | 105 | 3  | 209.248            | 0.000   | S        |
| Adoption levels if ICT by farmers             | 105 | 5  | 142.943            | 0.000   | S        |

## CONCLUSION

The study concluded that the crop farmers were mostly males, married, educated, members of cooperative societies, and attended extension programmes, while most of the extension agents were adults, Christians, possessed formal education, and specialized in agronomy. Radio, slides, landline telephone, DVD and film projectors were mostly used by both the extension agents and

the crop farmers. The study further concluded that the problems associated with lack of technical infrastructure, high cost of technology, lack of supporting facilities, and lack of training, hinders the crop farmers in adopting innovation disseminated to them by the extension agents while problems associated with inability of farmers to use ICT, high cost of technology, and lack of training were perceived mostly by the extension agents as the problems hindering the crop farmers in adopting innovations disseminated to them by the extension agents.

## RECOMMENDATION

Based on the findings, the following recommendations were made:

- To disseminate the information and communication technology to the crop farmers, the government should strengthen the media agencies, extension agents, privates NGO's and non-private NGO's to disseminate agricultural information and technologies among the rural community, particularly among the crop farmers.
- Efforts should be directed towards improving the level of awareness of these practices (i.e.utilization of information and technologies) by organizing training workshop for crop farmers by extension agencies.

## REFERENCES

- [1] Farobode H.F.B; Laogun E.A Research – Extension – Farmer – Input Linkage System in Agricultural Extension. A comprehensive treatise.inAkinyemiju and Torimiro (eds). ABC Agricultural system Ltd.Ikeja, Lagos,Nigeria,2008; pp1-5..
- [2] Koyenikan M.J Issues of Agricultural Extension Policy in Nigeria *J. Agric. Ext.* 2008;. **12**(2),pp1
- [3]ChiadidiCF Analysis of the contributions of Agriculture to National Development Nig. J. Prod. Econs.2009;**20**101-104.
- [4] Adesoji S A ;Aratunde T Evaluation of the linkage system of Research-Extension-Farmers in Oyo State, Nigeria: Lesson for Agricultural Extension Administrators. *Journal of Agricultural Extension and Rural Development* 2012;. **4**(20):561-568,accessed December,2012 Available at <http://academicjournals.org/JAERD>

- 297 [5] FAO Institute building to strengthen agricultural extension. 27<sup>th</sup> FAO regional conference for  
298 Asia and the Pacific Beijing, China, 2004; May, 17<sup>th</sup> – 21<sup>st</sup> pp1-11
- 299 [6] Qamar K Global trends in Agricultural Extension: Challenges facing Asia and the Pacific  
300 region. Paper presented at the FAO regional expert consultation on Agricultural  
301 Extension, Research-Extension-Farmer Interface and Technology Transfer in  
302 Bangkok Thailand 2002; July, 16<sup>th</sup> – 19<sup>th</sup>. Pp1-11
- 303 [7] Salau E.S.; Saingbe ND. Access and Utilization of Information and Communication  
304 Technologies (ICTs) Among Agricultural Researchers and Extension Workers in  
305 Selected Institutions in Nasarawa State of Nigeria. *Production Agriculture and*  
306 *Technology*: 2008; 4(2): 1-11 ISSN: 0794-5213
- 307 [8] Meera SN; Jhamtani A; Rao DUM. Information and communication technology in agricultural  
308 development: a comparative analysis of three projects from India. AgREN Network  
309 Paper No.135, 2004; ODI. p20.
- 310  
311 [9] Arokoyo T. ICTs in the transformation of agricultural extension: The case of Nigeria. A paper  
312 presented at the 6th Consultative Expert Meeting of CTA's Observatory on ICTs:  
313 ICTs – Transforming Agricultural Extension? Held at WICC/CTA, Wageningen,  
314 2003; September, 23rd–25th, 2003 20pp.
- 315  
316 [10] Hosseini S F J; Niknami M; Chizari M. To determine the challenges in the application of ICTs  
317 by the agricultural extension service in Iran, *J Agric Ext Rural Dev.* 1(1):2009; 27-30  
318
- 319 [11] Hossein S F J; Niknami M; Nejad G H H. Policies Affecting the Application of Information  
320 and Communication Technologies by Agricultural Extension Service *Am. J. Appl.*  
321 *Sci.* 2009; 6 (8): 1478-1483.
- 322 [12] Oloruntoba, A and D.A. Adegbite Improving agricultural extension services through university  
323 outreach initiative: a case of farmers in model villages in Ogun State, Nigeria.  
324 *Journal of Agricultural Education and Extension* 2006; 12 (4), 273-283.
- 325 [13] NPC Federal Republic of Nigeria Official Gazette, National Population Commission  
326 2006; 23(94)
- 327 [14] Wikipedia The free encyclopedia. assessed on 15th May, 2013. Available at  
328 <http://en.m.wikipedia.org/wiki/Ilaro>
- 329 [15] Subair S.K; Eludire, A A; J A Akinjobi; N Tselaesele; D O Torimiro Identification of  
330 knowledge and practical skills possessed by Kgatleng District Farmers on ICT  
331 usage in D O Torimiro; Eludire A A; Subair S K; J A Akinjobi; (eds)  
332 Complementing Extension roles through young animators and ICT usage in sub-  
333 saharan Africa: Experience from Nigeria and Botswana. Published by Association of  
334 African Universities, Accra. Ghana. 2013; Chapter 8. pp119-128.
- 335 [16] Lahai, B A N; Goldey P A; Jones G E The Gender of the Extension Agents and farmers'  
336 access to and participation in agricultural extension in Nigeria. *Journal of*  
337 *Agricultural Education and Extension* 2000; 6 (4) 223-233 .

- 338 [17] Ofuoku A U ; A.C. Agumagu Farmers perception of audio visual aids in technology  
339 dissemination by the agricultural development programme in Delta State,  
340 Nigeria *Agricultura tropica et subtropica*.2008;**41** (4) 1-5
- 341 [18] Oluwatayo IB Information and communication technologies as drivers of growth: Experience  
342 from selected small-scale businesses in rural southwestern Nigeria. *African Growth*  
343 *and Development Policy*.2013;p1-17.
- 344 [19] Okwu O J; Iorkaa T.I Assessment of Farmers' use of new Information and Communication  
345 Technologies as sources of Agricultural Information In`Ushongo Local Government  
346 Area, Benue State, Nigerian. *Journal of Sustainable Development in Africa* 2011;  
347 **13** (2) :1-13.
- 348 [20] Fadiji T O; Atala T K Relationship between Socio-economic characteristics of Farmers and  
349 Utilization of Agricultural Extension Information in Rural Areas of Nigeria.  
350 *Continental J. Agricultural Science* 2009; **3**:65-74,