



ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN DISSEMINATION OF AGRICULTURAL EXTENSION SERVICES TO FARMERS IN DELTA STATE, NIGERIA: A PARADIGM SHIFT

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ABSTRACT

Information and communication technologies (ICTs) is a modern means of disseminating agricultural extension services to farmers. Extension agents' adoption of ICTs in the dissemination of agricultural extension services to farmers in Delta State, Nigeria as a paradigm shift was examined in this study. The objectives were to describe the socio-economic characteristics of the extension agents, identify the ICTs that are within the extension agents reach for use, ascertain respondents' level of adoption of ICTs and factors limiting extension agents' effective use of ICTs in disseminating agricultural information to farmers in the study area. Fifty-eight (58) respondents were randomly selected from Delta North and South agricultural zones of the State. Descriptive and inferential statistics were respectively used to analyze objectives and hypotheses of the study. Results revealed that the average age, household size and work experience were 43.28 years, 6 persons and 13.05 years, respectively. The respondents' level of adoption of ICT tools was high (72.41%). Lack of funds, on-the-job training, supportive services from government, non-governmental organizations (NGOs), electricity supply and technical skills were of the serious constraints limiting effective use of ICTs by the extension agents. Other limiting factors were high cost of the tools and poor network coverage. Socio-economic variables like sex, age, educational level and work experience were found to have significantly influenced on the level of adoption of ICTs in dissemination of agricultural information to farmers. The study also revealed a significant difference between respondents with high from those with low level of adoption of ICTs. The study recommended an improvement in electricity supply to those areas where it is epileptic and the push of network providers to make network available to those areas where such is lacking or poor.

Keywords: Agricultural information, Adoption, Dissemination, Extension agents, Extension services, Farmers, ICT tools.

INTRODUCTION

Agricultural extension is a sub-programme under the Ministry of Agriculture and Natural Resources (MANR). It is defined as a service which assists farm families through educational procedures to improve farming methods and techniques, increase production efficiency and income and better the levels of living and the social and educational standards of rural people (Okwuokenye and Urhibo, 2019). To this end, Erie (2009) stated that the primary role of agricultural extension is to transmit improved agricultural technologies to farmers who are the end users of all findings emanating from agricultural related researches and as well taking their (farmers) problems to appropriate research or government agency for solution. Agricultural extension was described by Erie (2009) as that which was mandated to educating farmers, providing advisory services and distributing inputs amongst the farmers.



Going further, Erie (2009) stated that different countries have adopted different approaches such as public (as in America in most cases) or private (as in the case of India) to extension practice. Okwuokenye and Urhibo (2019) pointed out that extension service is able to meet up with her mandate through the adoption of the contact-farmers approach which enables the extension agents to reach the farmers being served by the State's Agricultural Development Programme (ADP).

The dissemination of agricultural extension services is linked with the use of different communication means and strategies (Ovwigho *et al.*, 2014). Ovwigho *et al.* (2014) advanced that before the advent of the 21st century, the inter-personal communication strategy dominated the agricultural extension-farmer linkage. The authors further stressed that the inter-personal communication strategy was characterized with so many short comings like not only reaching a limited number of farmers at a particular period of time but was also described as ineffective. Based on the aforementioned inter-personal communication, Ovwigho *et al.* (2014) pointed out that the trend in strategy use has changed with the advent of Information Communication Technology (ICTs). The later strategy (ICT) has the ability of being able to reaching a larger number of farmers and within a particular of time.

Food and Agriculture Organization (FAO, 1993) defined Information Communication Technology as those technologies used in collecting, processing, storing, retrieving, disseminating and implementing data and information using electronics, optics and telecommunications and computers. In where agricultural extension is concerned, ICT is known to be an embodiment of different equipment like television, radio, mobile phones, Web, search engines, video, e-mail, computers, cameras, DVD, CD-Roms, just to mention a few (Odame *et al.* 2002). Odame *et al.* (2002) mentioned that the use of ICT on extension service delivery has a direct bearing on impacting on agricultural productivity. Meanwhile, Ovwigho (2014) posited that the use of ICT by extension service providers (extension agents) on farmers is still perceived as being low. This underscores the assertion of Erie (2009) which stipulated that the public extension systems have failed to provide the needed efficient services to farmers. The issue of concern is whether the perceived failure is due to the inefficient use of ICT or other causes. It was against this background this study was carried out. In order to achieve the goals of this study, the following objectives were to:

- i. Describe the socio-economic characteristics of the extension agents in Delta State;
- ii. Identify the Information and Communication Technologies that are within the Extension agents reach for use;
- iii. Ascertain the level of adoption of Information and Communication Technologies (ICTs) by Extension agents in disseminating agricultural information to farmers in the study area; and
- iv. Identify the factors limiting extension agents' effective use of Information and Communication

Technologies (ICTs) in disseminating agricultural information to farmers in the study area.

The hypotheses were stated in their null forms:

H₀₁: There is no significant relationship between Extension Agents socio-economic characteristics and level of adoption of Information Communication Technologies in disseminating agricultural information to farmers.

H₀₂: Extension agents with high level of adoption are not significantly different from those with low level of adoption of Information Communication Technologies (ICT) in disseminating agricultural information dissemination.



MATERIALS AND METHODS

The Study Area

Delta State is one of the States producing oil producing in Nigeria and it is one of the two states that made up the former Bendel State. The State has always been perceived as an important state by every successive governments of the country because of the oil it produces which constitutes a major source of revenue to the state in particular and the country at larger (Nigeria Atlas of Electoral Constituencies [NAEC], 2008). The state lies within Latitudes 5° 00' and 6° 30' N, and Longitudes 5° 00' and 6° 45' E and it covers an area of approximately 17,698 Km². The State is bound on the north by Edo State, on the east by Anambra and Rivers States, on the south by Bayelsa State and on the west by Ondo State and the Bight of Benin of the Atlantic Ocean. (DTSG Agric Policy, 2006) It has an approximate population size of 5,663,400 (National Population Commission [NPC], 2018). Delta State has 25 local government areas with Asaba as its capital and many other developed towns which include Warri, Ughelli, Agbor, Sapele, Koko, Oghara, Ogwashi-Uku, among others (Delta State Agricultural Policy [DTSG], 2006). The state is made of diverse ethnic groups with varying languages, culture and tradition. Most of the languages spoken by these groups include Igbo, Itsekiri, Urhobo, Ijaw, Ika and Isoko. Apart from oil, other mineral deposits of the state are natural gas, kaolin, laterite, clay, gravel, silica sand bauxite and granite (NAEC, 2008). The indigenes of Delta state engage mostly in agriculture (fishing and animal rearing as well as cropping) at subsistence level.

Sampling Techniques and Sample Size

The population of the study was made up of extension agents who are active and still in service. The study adopted the multi-stage random sampling method. This was used for selecting the respondents of the study. It began with the random selection of two agricultural zones out of the three that exists in the state. These were Delta North and Delta South Agricultural zones. These zones are respectively made up of nine (9) and eight (8) local government areas (LGAs). This stage was followed by the random selection of six (6) local government areas (LGAs) from each of the agricultural zones and this brought the number of LGAs used for the study to 12 (Ika North-East, Ika South, Ukwuani, Ndokwa West, Oshimili South and Aniocha South LGAs were randomly chosen from Delta North; while Isoko North, Isoko South, Bomadi, Patani, Warri North and Warri South LGAs were randomly selected from Delta South Agricultural zone). The third stage involved the random selection of five extension agents from each of the LGAs and this resulted to having 60 extension agents used for the study. They were administered with the question instrument (questionnaire). From the returned questionnaire 58 of them (which constituted 96.67% that were suitable for analysis were used for the study.

Analytical Techniques

Descriptive and inferential statistics were used to analyze the data of the study. Frequency count, percentage and mean were applied in the case descriptive statistics. This was used to analyze respondents' socio-economic characteristics and their responses to level of adoption of information and communication technologies by extension agents in the dissemination of agricultural information to farmers. Likert scale was used to identify the Information Communication Technologies that are within the reach of the extension agents for use and the factors limiting the extension agents from effective use of ICTs in disseminating agricultural information to farmers in the study area. On the area to identify the ICTs within extension agents reach and limiting factors, Likert scale used ranged from "Strongly Agree" (coded 4), "Agree" (coded 3), Disagree (coded 2) and Strongly Disagree (coded 1) and it then produced a weighted mean score of 2.50 which was obtained thus: $4 + 3 + 2 + 1 = 10 / 4 =$



2.50. The value of ≥ 2.50 was considered as important in agreeing to the ICT tools within extension agents reach and factors limiting extension agents from effective use of ICT tools on disseminating agricultural information to farmers. On the other hand, values less than 2.50 were considered contrary.

Logistic regression and Product Moment Coefficient were used to analyze hypothesis one and two, respectively. The explicit form of Logistic regression is expressed as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_nX_n + U \quad \dots(1)$$

Y = Level of adoption of ICT (dependent variable)

X₁ = Sex (dummy: male = 1; female = 2)

X₂ = Age (years)

X₃ = Educational level

X₄ = Marital status (single = 1, Married = 2, Divorced = 3, Widow(er) = 4)

X₅ = Household size (number of people living and feeding together)

X₆ = Work experience (years)

a = constant

U = Error terms

Product Moment Correlation Coefficient (r) was used to analyze hypothesis two. The correlation coefficient measures linear association between interval variables (Okwuokenye and Urhibo, 2019). Okwuokenye and Urhibo (2019) further explained that the coefficient can take a value between -1 to +1. When “r” = +1, it means that there is a perfect linear relationship between X and Y. By implication, a unit increase in X, will result to a constant increase in Y. On the other hand, when “r” = -1, it implies that there is a perfect inverse relationship between X and Y. By interpretation, a unit increase in X would result to a unit decrease or reduction in Y. Going further, when “r” = 0, it means no relationship exist between X and Y. The computation of Product Moment Correlation Coefficient is specified as:

$$r = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{[n\sum X^2 - (\sum X)^2][n\sum Y^2 - (\sum Y)^2]}} \quad \dots(2)$$

In decision rule, the Product Moment Correlation produces coefficient estimates (X) and standard errors (E). Where the standard error of the independent variable (X) is smaller than half of the value of the parameter estimates of the variable, we conclude that the estimate of the variable is statistically significant. In that case we accept the alternative hypothesis, indicating significant relationship between X and Y while the null is rejected.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

Table 1 shows the socio-economic characteristics of the extension agents that are saddled with the responsibility of rendering extension services to the farmers in the study area. Extension services in the study area was dominated by males (89.66%) most (70.69%) of whom were married. Having most of them as married people is an indication that they are responsible people. The dominance of males in the extension service delivery could be attributed to the great tasks assigned to and expected of the personnel's and this can be most tackled by the males. Similar results have been obtained in the above cases by Okwuokenye and Okoedo-Okojie (2014) who noted that male extension agents formed the bulk of the extension work force in the agricultural extension service in Delta State and that a higher proportion of the extension workers are married.



The average age of the extension service providers was 43.28 years with the majority (41.385) of them been between 40 – 49 years and this indicates that the workers are in their active age group. The result is in line with that of Erie (2009) that reported similar average age for extension agents in Edo State. On the educational status, it was revealed that most (65.62%0 of the extension workers are literate and had First Degree qualification or its equivalent. (B.Sc./B.Agric/HND). This implies that the workers are well trained and grounded in extension issues or matters, thus ensuring their capacity in handling agricultural innovation and showing expertise to the farmers. Similar results on educational status were obtained by Okwuokenye and Ovharhe (2017) who reported the possession of post-secondary qualification by majority of extension agents in Delta State.

Table 1: Socio-economic characteristics of respondents (n = 58)

Variables	Categories	Frequency	Percentage	Mean
Sex	Male	52	89.66	
	Female	6	10.34	
Age range (years)	< 30	6	10.35	
	30 – 39	13	22.41	
	40 – 49	24	41.38	
	50 – 59	15	25.86	43.28
Educational status	NCE/OND	15	25.86	
	B.Sc/B.Agric/HND	38	65.52	
	M.Sc	5	8.62	
Marital status	Single	6	10.35	
	Married	41	70.69	
	Divorced	8	13.79	
	Widowed	3	5.17	
Household size (years)	1 – 3	7	12.07	
	4 – 6	28	48.28	
	7 – 9	19	15.52	
	10 – 12	4	6.90	6.03
Work experience (years)	< 5	5	8.62	
	5 – 9	9	15.52	
	10 – 14	22	37.93	
	15 – 19	13	22.41	
	≥ 20	9	15.52	13.05

Source: Field survey, 2021

From the results of Table 1, the respondents' average household size was 6 persons with majority (48.28%) of them having between 4 – 6 persons. The size of the household indicates that the extension agents have a household size that is within their economic carrying capacity. In line with this finding, Okwuokenye and Okoedo-Okojie (2014) found similar household size. The modal work experience of respondents (37.93%) was 10 – 14 years. On the average, they have 13.04 years' experience, thus implying that they are experienced in the job and such level of experience helps to build capacity on how to handle agricultural innovations. This result agrees with the findings of Erie (2009) which revealed similar work experience of extension personnel in Edo State.



Information and Communication Technologies available for Use by the Extension Agents

Table 2 shows the different information and communication technologies (ICTs) tools that were used in one form or the other for disseminating agricultural information's to the farmers. The extension personnel were requested to respond to those ICT tools that were available for use to disseminate agricultural information to the farmers. Among the ICT tools, mobile phones had mean of 3.12. This was followed by audio cassette player (mean = 2.87), radio (mean = 2.82) and use of computer (mean = 2.73). They actually ranked 1st, 2nd, 3rd and 4th ICT tools that were available for use by the extension agents. The findings of Ovwigho *et al.* (2014) revealed the availability of similar ICT tools within the reach of extension personnel and so supports this result.

Going further, television, DVD/VCD, video and flash drive / rewritable CD, respectively, had means of 2.65, 2.62, 2.52 and 2.51. By these, they ranked 5th, 6th, 7th and 8th ICT tools that were within extension personnel reach and used in disseminating agricultural information. The availability of these ICT tools for use by the extension personnel would go a long way in enhancing their reach-out to the farmers thereby improving information flow and farmers' productivity, income and livelihood. The result corroborates that of Ovwigho *et al.* (2014) which revealed the availability of similar ICT tools within the reach of extension agents for the dissemination of information.

Table 2: Information and Communication Technologies Use by the extension Agents

ICTs available	Mean	Standard Deviation	Ranking
Mobile phones	3.12	0.56	1 st
Audio cassette player	2.87	0.61	2 nd
Radio	2.82	0.59	3 rd
Computer	2.73	0.51	4 th
Television	2.65	0.63	5 th
Digital Versatile Disc/Video Compact Disc (DVD/VCD)	2.62	0.57	6 th
Video	2.52	0.64	7 th
Flash Drive/Re-writable Compact Disc (CD)	2.51	0.58	8 th
Cable Satellite dish	2.01	0.81	9 th
Internet services	1.90	0.73	10 th
Video cassette containing agricultural programmes	1.84	0.81	11 th
Diskette	1.82	0.76	12 th
CD plates containing agricultural programmes	1.78	0.77	13 th
CD-Rom	1.12	0.83	14 th

Agreed = Mean \geq 2.50

Level of adoption of ICTs by Extension agents

The level of adoption of ICTs by extension personnel's is shown in Table 3 and it revealed that most (41.38%) of the extension personnel indicated that their level of adoption of ICTs in the dissemination of improved technologies to farmers was high. Further categorization shows that a very high proportion (79.31%) of the extension agents were of average and beyond in their consideration. The other fraction (20.69%) were of below average consideration in their application of ICT in spreading information to farmers. High level of use of ICTs in spreading information to farmers was confirmed in the study of Sobalaje and Adigun (2013) which



stressed in terms of frequency of use, that majority of the farmers claimed that they use ICTs twice per week and this was further interpreted to mean high level of use of ICTs in farm activities.

Table 3: Level of adoption of ICTs by Extension Agents (n = 58)

Level	Frequency	Percentage
Very High	7	12.07
High	24	41.38
Average	15	25.86
Low	10	17.24
Poor	2	3.45

Source: Field survey, 2021

Respondents level of adoption of ICT in disseminating agricultural information to farmers

Table 4 shows a dichotomous categorization of extension agents' level of adoption of ICTs in disseminating useful information to the farmers. The result revealed that most (72.41%) of the respondents were of high level of adoption while the other fraction (27.59%) were low adopters of ICT tools in disseminating information to the farmers.

Table 4: Extension agents' level of adoption of ICTs (n = 58)

Level of adoption	Frequency	Percentage
High	42	72.41
Low	16	27.59

Source: Field survey, 2021

Factors limiting extension agents effective use of ICTs

Factors limiting extension agents' effective use of ICTs is shown on Table 5. These factors were ranked according to the extent of their level of seriousness as a constraint. First amongst the factors is lack of funds whose mean was 3.82. Lack of on-the-job training (mean = 3.70), lack of supportive policies from non-governmental organizations (NGOs)/government (mean = 3.23) and lack of or poor electricity supply (mean = 3.11) were, respectively, of 2nd, 3rd and 4th ranking to the limiting factors plaguing the effective use of ICTs in information dissemination to farmers. In continuation, lack of technical skills on use of ICTs (mean = 3.01), high cost of ICT tools (mean = 2.91) and poor or unavailability of network coverage (mean = 2.84) were the 5th, 6th and 7th serious challenges limiting the effective use of ICTs in spreading agricultural information by extension personnel. This result agrees with findings of Arokoyo (2005) which acknowledged an erratic and unstable power supply, problem of network connectivity, high cost of telephone services, lack of communication policy and high level of rural poverty as challenges to effective use of ICTs in the dissemination of agricultural information to farmers. Results on limiting factors such as lack of technical know-how and Lack of on-the-job training respectively disagrees and aggress with the findings of Ovwigho *et al.* (2014) which stated that extension agents disagreed that lack of technical know-how was not a challenge to the use of ICT in agricultural information dissemination. On the other hand, Ovwigho *et al.* (2014) findings revealed that lack of on-the-job training was a constraint to agricultural information dissemination to the farmers.



Table 5: Factors limiting extension agents' effective use of ICTs

Constraints	Mean	Standard Dev.	Ranking
Lack of funds	3.82	0.51	1st
Lack of on-the-job training	3.70	0.59	2nd
Lack of supportive services from NGOs/ government	3.23	0.61	3rd
Lack of or poor electricity supply	3.11	0.53	4th
Lack of technical skills on use of ICT	3.01	0.59	5th
High cost of ICT tools	2.91	0.64	6th
Poor or unavailability of network coverage	2.84	0.66	7th
Poor transportation problem	1.89	0.77	8th

Agreed = Mean \geq 2.50

Hypotheses of the Study

Hypothesis one states that there is no significant relationship between extension agents' socio-economic characteristics and level of adoption of ICTs in disseminating agricultural information to farmers. This hypothesis was tested with the use of Logistics regression (Table 6). The Table shows the regression result which revealed independent variables like gender, age, educational status, marital status, household size and work experience to have jointly accounted for about 67.3% of the variation of extension agents' level of adoption of ICTs in disseminating agricultural information to farmers. The result further revealed that out of the six socio-economic variables analyzed, four of them (Sex, age, educational status and work experience) were found to be significant to extension agents' level of adoption of ICT in disseminating agricultural information to farmers. These variables revealed thus:

Sex of the respondents has a beta coefficient of 5.379 and t-value of 3.38. The variable was positively signed and significant at the 1% level. The result implies that since male constituted the majority, (89.66%), the use of more males as extension agents would result to having higher level of adoption of ICTs in the dissemination of agricultural information to farmers. The variable (sex) has an odd ratio of 4.29 which implies that the more involvement of males as extension agents would result to as much as four-times the adoption of ICT in the dissemination of agricultural information to farmers. The result agrees with that of Joyous and Paul (2016) which stated that women reportedly face more farm level challenges compared to their male colleagues and that the scenario is due to the fact that they make less use of farm book ICTs application compared to their male colleagues. This situation was adduced to their attainment of lower level of education when compared to their male counterparts.

Age of the extension personnel was negatively signed, significant at the 5% level with a beta coefficient and t-value of -0.043 and 0.10 respectively. The result implies that older extension agents would have lower level of adoption of ICT in disseminating agricultural information to farmers and vice versa. The odd ratio was 0.98 which is approximately one, thus implying that the use of more aged or elderly extension agents in the use of ICTs in spreading agricultural innovations would result in a proportionate decline in level of adoption of ICT in the innovation disseminating process. This result is in line with the findings of Joyous and Paul (2016) which revealed that older extension agents were reportedly experiencing more technical problems compared to their younger counterparts. The younger extension agents were observed to be more enthusiastic about farm book ICTs and thus showed more level of adoption.



The educational level of the extension agents had a beta coefficient of 3.364 and t-value of 2.52. The result was positively signed and significant at the 1% level. By implication, the more educated extension agents are, the higher would be their level of adoption of ICTs in disseminating agricultural innovations. The odd ratio was 3.16 thus implying that the use of more educated extension agents in the job of agricultural innovation dissemination would result to an increase of about three-times the level of adoption of ICTs in carrying out the agricultural innovation dissemination to the farmers. This finding concurs with the result of Strong *et al.* (2014) which found that the educational status of extension officers played a significant role in technology acceptance and adoption level. Strong *et al.* (2014) stated further that extension officers with higher level of education strived for an increase in technology use.

The extension agent's work experience (beta = 0.386; t-value = 0.81) has a direct positive relationship with level of adoption of ICTs in disseminating agricultural information to the farmers. The relationship was significant at the 1% level and it has an odd ratio of 3.24 which implies that the use of extension agents with more work experience would result to about three-times of the level of adoption of ICTs in disseminating agricultural information to farmers. This result is supported by that of Okwukenye and Ovharhe (2017) which stated that work experience has a positive relationship with level of adoption along line with the understanding of extension packages (inclusive of ICTs) and its appropriate dissemination to farmers.

Table 6: Extension agents' socio-economic characteristics on level of adoption of ICTs

Variables	Coefficient (b)	Standard Error	t - values	Prob. Level	Odd ratio
Constant	7.286	5.015	1.64	0.235	
Sex	5.379**	2.986	3.38	0.024	4.29
Age	-0.043*	-0.148	0.10	0.012	0.98
Education	3.364**	0.619	2.52	0.009	3.16
Household size	0.587	0.439	0.19	0.847	1.05
Work experience	0.386**	0.116	0.81	0.521	3.24
Marital status	0.246	0.281	1.30	0.195	1.26

**significant at the 1 %, and * significant at the 5%; Chi-square = 39.67; df = 6; $p < 0.05$ (This indicates that the model is significant, that is, the independent variables exert combined significant effect on the dependent variable (level of adoption of ICT)). Goodness-of-fit Chi-square = 52.81; df; = 6; $p < 0.05$ and Pseudo Coefficient of determination = 0.673 (67.3%)

Relationship between Extension Agents with High and Level of Adoption of ICTs

The relationship between extension agents with high level and those with low level of adoption of ICTs in their agricultural information dissemination was analyzed using the Product Moment Correlation Coefficient. This was expressed in hypothesis two and it states that: extension agents with high level of adoption are not significantly different from those with low level of adoption of ICTs in their agricultural information dissemination to farmers. Product Moment Correlation (r) was used to determine the statistical significance of extension agents with high level of adoption of ICTs and those with low level of adoption of ICTs. The Results reveals parameter estimate of 0.5496; standard error of 0.1241 and R^2 of 0.6713. from this, it can be concluded that half of the parameter estimate was 0.2748 (this was obtained thus: $0.5496 / 2 = 0.2748$). This half of the parameter estimate is greater than the standard error (0.1241) of the estimate. This implies that the estimate or equation was significant. It therefore



implies that extension agents with high level of adoption are significantly different from those with low level of adoption of ICTs in their agricultural information dissemination to farmers. This result led to the rejection of the null hypothesis and the acceptance of the alternative hypothesis.

CONCLUSION AND RECOMMENDATIONS

The study found that extension job is mostly undertaken by males who are expected to be educated and responsible to family life. The younger extension agents and those with more working experience show more pragmatism to the use of ICTs in disseminating agricultural information to farmers, they are as well constraint by many factors like lack or poor electricity supply, lack of funds, high cost of ICT tools among others. Several socio-economic variables in different magnitude influenced level of adoption of ICTs in the dissemination of agricultural information to the farmers. From the findings, the following recommendations were made:

1. Lack of or poor electricity supply was identified as a limiting factor to effective use of ICTs in agricultural information dissemination. To ameliorate this problem, there is need for the government to ensure good and steady supply of electricity. This will help to keep the ICT tools of the extension agent's functional in this regard and ready for effective use.
2. There is need for the government or any supportive agency or institution to help make some of the very important ICT tools available to the extension agents, thereby making it as part of work tools. This can be achieved through loan provision or subsidizing the price for them so that they can be more accessible to handling and using them more often.
3. The unraveling of poor or unavailability of network services in their area of living as a limiting factor simply suggests the need for the government to compel the network providers to spread their distribution to the rural areas where they do not exist. Doing this will increase the use of ICT tools and consequently improve farmers output.
4. Training the extension agents (especially the older ones) on technical skills surrounding ICTs usage has become very important since it was identified as a limiting factor. Building capacity in this direction (training on ICTs) will encourage and make the extension agents become more enthusiastic to ICTs usage on agricultural information on farmers.

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