International Journal of Agriculture and Environmental Research

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

ADOPTION OF INFORMATION COMMUNICATION TECHNOLOGIES (ICTs) AMONG FARMERS IN RURAL AREAS OF FEDERAL CAPITAL TERRITORY ABUJA, NIGERIA

[1]Oyewole, S. O.; *[1]Olugbire, O. O.; [1]Akintola, A. L.; [1]Oduola O.M; [1]Oguntoye T.O

[1]Forestry Research Institute of Nigeria, Federal Ministry of Environment,
Forest Hill, Jericho, Ibadan, Nigeria

*Corresponding author

ABSTRACT

This study assessed the adoption of Information Communication Technologies by farmers in rural areas of Federal Capital Territory Abuja, Nigeria. A multi-stage sampling technique was used to select 142 farmers. The data were collected with the aid of structured questionnaires and analysed using descriptive statistics and logit regression analysis. The results showed that majority (91.4 percent) of the respondents are using GSM/cell phone, 83.5 percent used radio and 66. 2 percent used television set. Those that adopted internet electronic mailing constitute 20.1 percent and this was among the lowest adoption rate of ICTs components observed in this study. The findings also revealed that ICTs are being used to established contacts by the farmers. Majority (84.2 percent) reported that they established contacts with the use of ICTs. Those that are getting information on government policies constitute 43.2 percent. About 48 percent benefit from market information through the use of ICTs. Socio-economic factors influencing adoption of ICTs in the study area were age, education, access to credit and farmers income are the factors influencing the use ICTs among the farmers. The study recommends that provision of sustainable rural infrastructure such as electricity should be intensified by government and non-governmental agencies so as to increase the usage of ICTs for the development of agriculture.

Keywords: Information technology, Communication technology, Adoption

INTRODUCTION

Nigeria is an agrarian oriented country. Majority of the population is based in the rural areas and these people heavily depend on farming activities as a source of livelihood. Empowering farming household through Information and knowledge are indispensable tools so that farmers will be able to make informed decisions. Therefore, emphasis is being placed on the use of ICTs in

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

boosting agricultural production among farmers. Farmers who are hooked up to new technologies would perform better (Adejo and Haruna, 2009).

Information plays a vital role in agricultural development. Low level of agricultural information especially, on improved farming is a major limiting factor to increased food production in Nigeria. Gelb and Offer (2005) opined that there is continued need for information by farmers and farm communities, thus necessitating continued improvement in ways and means of providing the extension support that farmers and communities require and demand. Information Communication Technologies (ICTs) provides useful strategies to transmit agricultural information to the rural areas where largest percentage of the farmers resides. Accurate and dynamic information is needed to enhance production (Nkwocha *et al.*, 2009.

Agricultural information is a key component in improving small-scale agricultural production. The importance of knowledge and information sharing in research for development settings has been firmly established through research. Access to appropriate information and knowledge is an overriding factor for successful agricultural planning, implementation and evaluation processes, and it is known to be one of the biggest determinants of agricultural productivity. Knowledge is power and agriculture is no exception. Knowledge and innovation are now widely regarded as key drivers of economic growth. However, information and communication technologies (ICTs) are deeply implicated in knowledge flow and innovation (Verlaeten, 2002).

There has been a noticeable trends in the use of ICTS in almost all spheres of rural life in developing countries in the recent past despite persisting problems of access, connecting, literacy content and costs. Information is one the basic human needs after air, water, food and shelter (Meera, 2002). Most urban communities in Nigeria have adopted ICTs and this is not the case with our rural communities (UNDP, 2002). ICTs application in agriculture especially to Nigerian rural farmers is highly limited because of insignificant level of attention on the part of the government on one hand, as well as the huge capital required for setting it up on the other hand (Sobolaje and Adigun, 2013).

Information and communication technology and its applicability to agriculture and rural development have recently attracted interest. Many authors share the view that ICTs can be used to deliver agricultural information that could stimulate increased production by linking farmers to remunerative markets (Masuki *et al*., 2008; Bertolini, 2004). Based on this, it is clear that agricultural development cannot only be achieved through best practices. Therefore, adoption of information and communication technology is critical among the farmers who can be found largely in the rural areas.

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

ICT adoption for agriculture and rural development today remains a continuously studied, critical issue, at regional, national, and international levels (Sobolaje and Adigun, 2013). Furthermore, Sobolaje and Adigun (2013) opined that farmers admit that they are willing to use or adopt ICT in agriculture. The question then is why ICT adoption in agriculture is so low, with no immediate sign of improvement. It is necessary to assess the underlying factors influencing the adoption of ICTs along with the accessibility of farmers to ICTs. Also, Gelb and Voet (2009) affirm that there are very wide variations between uses of ICT in agriculture, competence in their use, the benefits derived and their distribution. They are instrumental in partially explaining the differences in ICT adoption rates. This assertion requires empirical investigation so that possible reasons could be stated with respect to the rate of adoption of ICTs in agriculture especially in the study area. Specifically, this study determines rate of adoption of ICTs and factors that are influencing rate of adoption among the farmers in the study area.

METHODOLOGY

The Study Area

The study was conducted in Abuja, the Federal Capital Territory of Nigeria. The place is located between latitudes $9^0 25^I$ and $9^0 21^I$ north of the equator and longitudes $6^0 45^I$ and $7^0 39^I$ east of the Greenwich Meridian (AGIS, 2004). Abuja covers an area of 8,000 square kilometres with an approximate projected total population of 1,899,622 in 2013 (NPC, 2006) as at the time when this study was conducted. The Federal Capital Territory has two distinct seasons, namely; rainy season beginning from April to October and dry season beginning from November to March. The Federal Capital Territory falls within the Savanna vegetation zone of Nigeria. Agriculture is the major occupation of the inhabitants. The inhabitants practise subsistence agriculture. The major food crops grown include yam, cassava, and vegetables (AIGS, 2004).The climate falls within the intermediate zone, lying just above the hot, wet, humid lowlands of the Niger-Benue trough, but below the drier climate belt characteristic of the north of the country. Under the influence of the Atlantic air mass, the wet season extends from April to October.

Sampling Procedure and Sample Size

A multi-stage sampling method was used in the study. In the first stage, three Area Councils were purposively selected out of the six area council these are Kwali, Gwagwalada and Kuje based on the intensity and concentration of farming activities. In the second stage, two districts were randomly selected from each of the area council. In the third stage, two villages were selected from each of the districts. Lastly 10 percent of the population of small-holder farmers in each of the villages were selected. A total of 142 respondents were selected for the study.

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

Data Collection

Primary data wre collected through the use of structured questionnaire. The information collected include the use of ICT among the respondents, socio-economic and institutional characteristics of the respondents as well as constraints to ICT usage by the respondents in the study area.

Analytical Techniques

The analytical techniques used for this study include descriptive statistics and Logit regression model

Logit regression model

A logit regression model is a binary choice model in which a dichotomous response variable is considered as the dependent variable (Pindyck and Rubinfed, 1991). The dependent variable takes a value of one if the farmer adopt ICTs and zero value if farmer did not adopt.
The model is expressed as follows:

$$Ln\left\{{}^{P_i}/_{1-P_i}\right\} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + - - - - - - - - + \beta_8 X_8 + e$$

Where the 'P' is the probability of the outcome, β_0 is the intercept or constant term and $\beta_1 - \beta_8$ are the coefficients associated with each of exlanatory variable, X_1 ----- X_8 and e is the error term. The likelihood of observing the samples is formed by introducing a dichotomous dependent variable Y_i such that Y is equal to 1 if the farmer adopt and 0 if otherwise. The factors hypothesized to determine the adoption of ICTs status of the farmer are defined as follows:

X_1 = Age (years)
X_2 = Level of education (Number of years in formal schooling)
X_3 = Household size (number in household)
X_5 = Farm size (hectares)
X_6 = Access to credit (actual amount received N)
X_7 = Membership of association (years of membership of co-operative associations)
X_8 = Extension contact (number of visits)
X_9 = Income (Annual income in naira)

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

RESULTS AND DISCUSSION

Utilization of ICT among farmers

The results of ICT adoption by the respondents in Table 1 showed that majority (91.4 percent) of the respondents are using GSM/cell phone, 83.5 percent used radio and 66. 2 percent used television set. The results implied GSM, radio and television set were the major communication media adopted by the respondents. Usman *et al*. (2012) noted that the high percentage of radio users showed that radio was relevant to any strategy that involves rural development in Nigeria. Radio remained one of the most important medium for communicating with the rural populations of developing countries. Those that adopted internet (e-mailing) constitute 20.1 percent. Limited adoption of internet among the respondents may not be attributed to the level of education but could be due to the fact that the respondents were largely known to be resident in the rural areas where internet is less accessible. It was revealed that only 10.1 percent were using landline phone, this might be due to the gradual disappearance of fixed phones and the fast acceptance of mobile phones in Nigeria.

Table 1: Level of adoption of ICTs among the respondents

ICT Components	Percentage
GSM/cell phone	91.4 (130)
Camera	13.7 (19)
Cassette recorder	16.5 (23)
CD/DVD player	38.8 (55)
Computer	25.2 (36)
Internet (e-mailing)	20.1 (29)
Land line phone	10.1 (14)
Overhead projector	11.5 (16)
Radio	83.5 (119)
Television set	66.2 (94)
Cinema	5.8 (8)

Source: Field survey 2014

The figures in parenthesis are the frequencies

Benefits of ICT among farmers

The benefit derived from the use of ICTs by the farmers in Table 2 showed that ICTs are being used to established contacts by the farmers. Majority (84.2 percent) reported that they established contacts with the use of ICTs. Those that are getting information on government policies

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

constitute 43.2 percent. About 48 percent benefit from market information through the use of ICTs. Information on market is very important because access to market will encourage production. Farmers do not really benefit from sending and receiving mail. This is because the prevalent ICTs media among the farmers is cell phone with primary aim of establishing contacts. About 29 percent obtain information on pest and diseases through the use of ICTs. This limited percentage could be due to the fact that problem of pest and diseases may not be the pressing problem encountered by the farmers in the study area.

Table 2: Benefits of ICT among farmers in the study area

Uses	Percentage
Getting extension information	21.6 (31)
Making contacts	84.2 (120)
Recording agricultural information	19.4 (28)
Viewing agricultural programme	21.6 (31)
Getting information on Government policies	43.2 (61)
Getting information of agricultural technologies	35.3 (50)
Getting market information	48.2 (68)
Getting information on management of pests and diseases	28.8 (41)
Receive mail	16.5 (23)
Send mail	22.3 (32)
News/farm information	31.7 (45)

Source: Field survey 2014

The figures in parenthesis are the frequencies

* Multiple responses were allowed

Factors influencing ICT usage among rural farmers in the study area

As shown in Table 3, age, education, access to credit and farmers income are the factors influencing the use ICTs among the farmers. Age was negative and significant at 10 percent level of probability. This implied that as farmers advance in age adoption of ICTs is reduced. This revealed that younger farmers adopt ICTs better than older farmers. The coefficient obtained for education was positive and significant at 5 percent level of probability. This implied that adoption of ICTs increase as educational level increases. Akingbile (2003) opined that educational levels of respondents enhance their comprehension of technical information and make them able to manipulate the information and hence influence their choice and use of ICTs facilities, especially the complex ones. Access to credit was found increasing the adoption of ICTs among the farmers in the study area. This variable was positive and significant at 5 percent

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

level of probability. The study further revealed that farmers' income was positively and significantly influential to the adoption of ICTs among the respondents. This means there is probability that farmers' adoption of ICTs would increase with increased level of income.

Table 3: Factors influencing ICT usage among farmers in the study area

Variables	Coefficient	Standard error	t-value
Age	-0.049	0.027	-1.75*
Education	0.551	0.267	2.07**
Household size	-0.039	0.090	-0.43
Farm size	0.193	0.126	1.53
Access to credit	0.692	0.299	2.31**
Membership of association	0.122	0.108	-1.13
Extension contact	0.626	0.482	1.30
Income	0.500	0.248	2.01**

** Significant at 5%, * Significant at 10%

CONCLUSION AND RECOMMENDATIONS

It was revealed from the study that majority of farmers adopted GSM/cell phone. This is because mobile phone could be used to make and enquiries. Adoption of GSM was closely followed by the use of radio and television. These could be used to obtain information on improved farm practices and method. The study also established that adoption of ICTs was greatly influenced by the socio-economic and institutional characteristics of the farmers. These were age, education, access to credit and farmers' income. These variables were positive which indicates that as these increased the use of ICTs among the farmers would also increase. Based on the findings of this study, it was recommended that provision of sustainable rural infrastructure such as electricity should be intensified by government and non-governmental agencies so as to increase the usage of ICTs for improved farm operation.

REFERENCES

Adejo, P.E. and Haruna, U. (2009).Access of farmers to ICTs for agricultural development in Bauchi Local Government Area, Bauchi State. Proceedings of the 43rd Annual Conference of the Agricultural Society of Nigeria, Abuja. Pp. 704-707.

AGIS (Abuja *Geographical Information Service*).(2004). Federal Capital Territory Land Survey. Abuja.

Bertolini, R. (2004). Making ICTs work for food security.2020 Africa Conference Brief 11. International Food Policy Research Institute. [Online] Available: http://www.eldis.org/ vfile/upload/1/document/0708/DOC23237. pdf [Accessed 12/8/2009]

Gelb, E. and Offer, A. (2005): ICT Adoption in Agriculture: Perspectives of Technological Innovation. http://departments.agri.huji.ac.il/economics/gelb_main.html.

Gelb, E. and Voet, H. (2009): EFITA (European Federation for Information Technology in Agriculture) Questionnaire ICT Adoption Trends in Agriculture. Paper presented to JIAC. www.jiac2009.nl.

Masuki, K. F. G., Mowo, J. G., Sheila, R.., Kamugisha, R., Opondo, C., and Tanui, J. (2008).Improving smallholder farmers' access to information for enhanced decision making in natural resource management: Experiences from South Western Uganda. In Bationo A, Waswa, B. S., Okeyo J and Maina F. (eds). Innovations as Key to the Green Revolution in Africa: Exploring the Scientific Facts.

Meera, S.N, (2002). A critical analysis of information technology In Agricultural Development impact and implications. MIT Press, Cambridge.

National Population Commission (NPC) (2006). Production Year Book, 2006 Census Result.

Nkwocha, V.I., Ibeabuchi, I.I., Chukwueke, T.C., Azubuike, N.O. and Nkwocha, G.A. (2009).Overview of the impact of ICT on agricultural development in Imo State, Nigeria.Proceedings of the 43rd Annual Conference of the gricultural Society of Nigeria, Abuja. Pp. 711-714.

Pindick, R. S. and Rubinfield, D. L. (1991) *Econometric models and economic forecasts*, 3rd edition. New York: McGraw-Hill Book Co.

Sobalaje, A. J. and Adigun, G. O. (2013). Use of Information and Communication Technologies (ICTs) by Yam Farmers in Boluwaduro Local Government Area of Osun State, Nigeria. *Library Philosophy and Practice (e-journal).* Paper 1018. http://digitalcommons.unl.edu/libphilprac/1018. Pp18

UNDP (2002). Adoption of Information and Communication Technologies in Developing Countries. *Journal of Information Technology Impact* 9 (1), pp. 37-46

ISSN: 2455-6939

Volume:03, Issue:04 "July-August 2017"

Usman, J. M., J. A. Adeboye, K. A. Oluyole and S. Ajijola (2012). Use of information and communication technologies by rural farmers in Oluyole local government area of OyoState, Nigeria, *Journal of Stored Products and Postharvest Research* Vol. 3(11), pp.156-159

Verlaeten, M. .P. (2002). Policy Frameworks for the Knowledge Based Economy: ICTs, Innovation and Human Resources – An OECD Global Forum, OECD, Paris. [Online] Available: http://www.oecd.org/dataoecd/49/11/1961062.pdf

