



## Original Research Article

# Exploring the Use of Information and Communication Technologies (ICTs) among Village Extension Agents in Federal Capital Territory, Nigeria

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The study explored the use of Information and Communication Technology among Village Extension Agents in the Federal Capital Territory (FCT), Nigeria. The study was carried out in five agricultural zones of FCT. Purposive sampling technique was used to select 100 village extension workers in the five agricultural zones of FCT and primary data was collected using structures questionnaire and interview schedule. Results reveals that the ICT tools that are frequently used by village extension agents are; mobile phones (21.82%), followed by WhatsApp (19.04%), internet (17.26%). Few number of village extension workers in the study area access information using ICT tools. 18.42% accessed information on new technologies and weather information, 14.21% accessed information on best cultural practices and plant protection (disease/pest control). Furthermore, the constraints village extension workers faced in the use of ICT were; lack of training on use of ICT in accessing agricultural information (14.96%), high cost of ICT tools (14.73%) and high cost of internet subscription (12.05%). There is a need for constant technical trainings for village extension workers on how to explore ICT in accessing relevant information on new agricultural technologies so that they will be up to date on the latest innovations available for farmers to adopt. Also, it is imperative for the government to look into the cost of ICT tools and its infrastructures because it is the major constraints village extension workers have in exploring the application of ICT tools in agricultural information access and usage in dissemination of information to farmers.

**Keywords:** Technology, Village, Extension, Information, Farmers, Communication.

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## INTRODUCTION

In terms of increasing efficiency and productivity, the application of Information and Communication Technology (ICT) in agriculture has proven to be a game changer. In the global economy, the agriculture sector is one of the businesses where ICT is being used extensively in all aspects of its operations. Over the last few years, ICTs have become one of the key driving mechanisms utilized by extension workers in agricultural information distribution to farmers (Daum, 2020). ICTs have the potential to improve rural areas while simultaneously reaching millions of people, overcoming geographical barriers, providing regular and recurring interaction, capturing the actuality of an event, storing, and sending and receiving data and information (Sennuga et al., 2020). Poor innovation access, information on input access, information on market for produce, pest and

disease outbreaks, seasonality and spatial dispersion of farming; high transaction costs and information asymmetry, and so on are some of the enormous problems faced in the field of agriculture that ICT applications can identify and solve (Hung Anh et al., 2019).

For the past ten years, the agricultural sector has undergone a technological revolution. Smartphones (mobile phones with internet access) are the most extensively utilized ICT devices worldwide (O'Dea, 2020). The rapid growth of ICT applications in every sector of the world has prompted the creation of various ICT applications in the agriculture sector to aid farmers, extension services, and other participants in the sector in gaining speedy access to information. In Nigeria, for example, the government has identified the public-sector extension system (Agricultural Development Projects (ADPs)) as a crucial participant in bridging the production gap that exists between agricultural research output and farmers. (Sennuga et al., 2020). Knowledge, agricultural information, and new technology are disseminated to farmers and rural dwellers through extension services around the world. According to the International Food Policy Research Institute (IFPRI), agricultural extension (also known as agricultural advisory services) is vital in increasing productivity, boosting food security, improving rural livelihoods, and promoting agriculture as a pro-poor economic growth engine (IFPRI, 2020). Extension services use a variety of ways and methods to promote new ideas and technologies to those living in rural areas (Sennuga and Fadji, 2020). The primary goal of these techniques is to assist farmers in comprehending the information provided by agricultural extension officers so that they may embrace new technologies to better their livelihoods and become more resilient to the challenges they face in their farming operations.

According to Davis and Franzel (2018), agricultural extension and advisory services can help smallholder farmers break the cycle of poor productivity, vulnerability and poverty. Extension services are in a better position to provide farmers with the most up-to-date agricultural techniques, as well as improved access to funding and market opportunities.

Extension and consulting services are required by rural and subsistence farmers, who are the fundamental pillars of agriculture and food supply systems in low-income countries (Francis, 2014). Extension services use a multidisciplinary tool that combines educational approaches, communication, and group procedures to promote new technologies, transfer information, and exchange experience among farmers and rural inhabitants (Okeke et al., 2015). ICTs can make a significant difference in agricultural extension services, whose principal aim is to convey information to farmers.

ICTs have the potential to improve the connection between extension, research, and farmers. ICT can be a means for research organizations to convey new research

findings to extension workers, who can then pass the information on to farmers. Farmers can also use the same ICT platform to provide extension workers with input on new technologies based on their field experiences, who will subsequently pass the information on to research institutes for action. ICTs are among the current technologies that enable farmers, extension agents, and other stakeholders such as research institutions to obtain timely information and share knowledge, according to Okeke et al. (20015). To increase communication among extension workers and other stakeholders in the agriculture sector, several ICT systems and applications have been developed around the world. In Afghanistan, an ICT application platform known as 'eAfghan' was developed to connect farmers with extension workers, research institutions, and other parties who assist farmers in sharing credible information (Bell, 2013).

FarmStack, an ICT agricultural advisory services platform built in Ethiopia by Digital Green, includes farm-level data, local weather, input availability, and market information, as well as connecting extension system actors and information (Digital Green, 2019). Furthermore, the Lifelong Learning for Farmers program in Jamaica has developed an SMS interactive service to assist rural farmers in Jamaica with education on good agricultural techniques (K'adamawe, 2012). In Kenya, iShamba, a phone-based farmers club, has also been launched. The new system includes a call centre where agricultural extension professionals and researchers provide members with technical support on matters such as appropriate agricultural practices, weather, inputs, and market information via SMS or voice call (Tsan et al., 2019). As many countries have tested and found success with the link between extension and ICTs, it is becoming more widely accepted. Depending on the extension officers' knowledge and technological efficiency, this link and success could grow in the future. Therefore, the primary goal of this research is to assess the usage of information and communication technology among Village Extension Agents (VEAs) in Nigeria's Federal Capital Territory. The specific objectives are as follows:

- i. describe the socio-economic characteristics of VEAs in the study area.
- ii. identify the ICT tools used by VEAs to obtain information on new technology
- iii. ascertain the type of information they access using ICT tools.
- iv. determine the constraints to the use of ICT tools among the VEAs.

## **MATERIALS AND METHOD**

This study was conducted in five Area Council of the Federal Capital Territory, Nigeria namely; Abaji, Bwari, Gwagwalada,

Kuje and Kwali. The Federal Capital Territory (FCT), established in 1976, is located north of the Niger-Benue River confluence. It is bordered on the west and northwest by Niger, on the northeast by Kaduna, on the east and south by Nassarawa, and on the southwest by Kogi. Bwari is a district and an area council in the Federal Capital Territory. The original inhabitants of the town are the Gbagyi speaking people with 67 villages. Agriculture is the mainstay in the interior part of these Area Councils, they produce yams, rice, millet, maize, sorghum, groundnuts, okra, pepper, garden eggs and beans etc.

### Sample and Sampling techniques

Purposive sampling technique (Gillis and Jackson, 2002) was employed to select the farming communities for the study. Five area councils were purposively selected out of 18 villages primarily because of their age-long agricultural practice and presence of adoption technologies noted there. They are similar in agro-climatic, ethnic group, religion and cultural settings. The five area councils namely; Abaji, Bwari, Gwagwalada, Kuje and Kwali out of the six area councils in Abuja because of the activities of village extension officers in these area councils. This was carried out on village extension workers covering Abaji, Bwari, Gwagwalada, Kuje, Kwali area council. Purposive sampling technique was used. Twenty village extension workers were selected from each area council to get the target sample of 100 village extension workers.

### Research Design

The study employed descriptive research design as described by Yin (2003) in order to explore and obtain in-depth information related to the topic. The purpose is to observe, describe and document aspects of a situation regarding to ICT tools they use, information's they access using ICT and the constraints in using these facilities.

### Data collection

Primary data were collected using structured questionnaire from village extension officers. The questionnaire covers the following; the socio-economic information, ICT tools used by village extension officers, the type of information village extension officers access using ICT tools, challenges village extension officers face using ICT tools. Secondary data were gotten from journals, internet, past research and other publications.

### Data analysis

The data collected for the study were analyzed using descriptive statistics such as frequency- and percentages. Spearman rank influence technique was used to test the significant relationship between Improved Agricultural technologies adoption and socio-demographic variables of

the respondents. With aid of Statistical Package for Social Science (SPSS) version 24 the data were analyzed and the descriptive statistics were used to present the results.

## RESULTS AND DISCUSSION

Table 1 reveals that the bulk of the respondents (52 percent) are in the medium age category (41–50 years) and (30.6%) of (51 – 60 years). This indicates that vast majority of the respondent are of age group with in depth knowledge and experience of extension work. It can be observed that in Table 1, majority (68.4%) of the respondents were male, while females constitute (31.6%). This means that in the research area, males dominate agricultural extension activity. According to a report by Strong et al. (2014), agricultural extension services in Ghana have a supply-side challenge. Women make up a smaller percentage of the workforce. They claim that the paucity of women in agriculture and extension service stems from a cultural bias against women based on the roles they should play in society, rather than being a new issue.

Furthermore, Table 1 shows that all of the respondents are educated at various levels. Holders of an OND (37.8%) and a Higher National Diploma (HND) (34.7 percent). It means that extension workers in the research region have a high level of literacy. Which could help them better comprehend and use ICTs in extension communication. This finding is consistent with that of (Michailidis et al., 2011), who discovered that higher levels of education related to an increase in technology use among extension officers.

Table 1 also reveals that majority (77.6%) earn a monthly salary of between ₦40,000 to ₦100,000. Also, the result shows that greater proportion (75.5%) of the village extension agents belong to different agricultural organization. Majority (76.6%) of the extension agents have work experience of 11 to 30 years. Which is an indicated that they are well experienced in the job.

Result from Table 2 reveals the ICT tools that are frequently used by village extension agents are; mobile phones (21.82%), followed by WhatsApp (19.04%), internet (17.26%), television (15.74%), and radio (13.96%) This finding suggests that only a small percentage of village extension agents in the research area employ ICT tools to gather agricultural data and disseminate it to farmers. This contradicts findings from a study conducted in Ghana, which found that mobile phones with internet access (smartphones) are the most extensively used ICT device worldwide (O'Dea, 2020). Also, the ICT tools that are occasionally used are; zoom (17.96%), computer (16.35%), video conferencing (15.82%), YouTube (10.89%), and e-farming app (10.72%).

However, majority of the village extension agents admitted that they do not used some of these ICT tools at all with (21.59%) saying that they do not used e-farming app,

**Table 1.** Socio-personal attributes of the Village Extension Workers.

<b>Variables</b>	<b>Frequency</b>	<b>Percentages (%)</b>
<b>Age</b>		
20 – 30	3	3.1
31 – 40	14	14.3
41 – 50	51	52
51 – 60	30	30.6
<b>Gender</b>		
Male	67	68.4
Female	31	31.6
<b>Marital Status</b>		
Single	16	16.3
Married	67	68.4
Widowed	10	10.2
Divorced	3	3.1
Separated	1	1
<b>House Hold Size</b>		
1 - 5	66	67.3
6 – 10	30	30.6
11 – 15	2	2.1
<b>Educational Qualification</b>		
Primary	1	1
Secondary	18	18.4
OND	37	37.8
HND	34	34.7
BSc	5	5.1
MSc	3	3.1
<b>Salary</b>		
40,000 - 100,000	76	77.6
110,000 - 150,000	14	14.3
151,000 - 200,000	8	8.2
<b>Agricultural Organization</b>		
Yes	74	75.5
No	24	24.5
<b>Work Experience</b>		
1 – 10	16	16.3
11 – 20	43	43.9
21 - 30	32	32.7
31 – 40	7	7.1
<b>TOTAL</b>	<b>100</b>	<b>100</b>

**Table 2.** Distribution of Village Extension Agents according to the ICT tools n = 100.

ICT Tools used by VEA	Frequently used (%)	Occasionally used (%)	Not used (%)
Mobile phones	21.82	3.22	0
Radio	13.96	8.85	4.69
Television	15.74	6.7	5.16
Internet	17.26	5.36	4.69
e-farming app	3.05	10.72	21.59
WhatsApp	19.04	4.83	2.35
You-tube	4.82	10.89	19.25
Zoom	0.76	17.96	13.15
Interactive Video – conferencing	0	15.82	18.31
Computer	3.55	16.35	10.79
Total	100	100	100

**Source:** Field survey 2021 \*Multiple response

**Table 3.** Distribution of VEA according to the information they accessed using ICT.

Information's Accessed using ICT	Frequently accessed (%)	Rank order	Occasionally accessed (%)	Not accessed
On new technologies	18.42	1 <sup>st</sup>	10.34	3.36
Time of planting	9.99	3 <sup>rd</sup>	9.96	10.07
Best cultural practices	14.21	2 <sup>nd</sup>	10.15	6.72
Harvesting and packing	9.99	3 <sup>rd</sup>	10.15	9.7
Source for farm inputs	6.32	4 <sup>th</sup>	10.15	12.31
Market prices	2.11	6 <sup>th</sup>	5.75	23.88
Plant protection (disease/pest control)	14.21	2 <sup>nd</sup>	11.69	3.73
Weather information	18.42	1 <sup>st</sup>	6.51	10.82
Seed information	2.11	6 <sup>th</sup>	12.45	10.82
Preservation of produce	4.21	5 <sup>th</sup>	12.84	8.58

**Source:** Field survey 2021 \*Multiple response

(19.25%) do not use you-tube, 18.31% do not do video conferencing, 13.15% do not do zoom, and 10.79% do not operate computer.

Result in Table 3 reveals that few number of village extension agents in the study area access information using ICT tools. 18.42% accessed information on new technologies and weather information, 14.21% accessed information on best cultural practices and plant protection (disease/pest control). This could be due to the fact that village extension agents are still unaware of the importance of information and communication in obtaining and disseminating relevant agricultural information to farmers. This contradicts the findings of Daum (2020), who stated that in recent years,

information and communication technologies (ICTs) have become one of the most important tools used by extension workers in accessing agricultural information and disseminating it to farmers.

The result presented in Table 4 depicts that very few of the respondents faced serious constraints in using ICT tools in the study area. 14.96% say their constraints were lack of training on the use of ICT in accessing agricultural information and how to use same to disseminate information to the farmers. 14.73% see high cost of ICT tools as a constraint because of the economic situation of the country at the moment and 12.05% see high cost of internet subscription as a challenge. This result is consistent with the

**Table 4.** Distribution of respondents according to the constraints faced in using ICT tools

Constraints using ICT Tools	Very serious (%)	Serious (%)	Not serious (%)
High Cost of ICT	14.73	7.43	0.87
Poor ICT infrastructure	10.49	10.31	6.96
Lack of training on use of ICT	14.96	6.47	3.48
Poor internet access	10.94	11.27	1.74
Poor income	10.49	11.75	1.74
Lack of power supply	9.82	11.99	3.48
High cost of internet subscription	12.05	9.11	5.22
Lack of awareness of the benefits of ICT	4.91	12.47	20.87
Lack of internet access	9.60	11.99	4.35
Negative attitude to change	2.01	7.19	51.30

**Source:** Field survey 2021 \*Multiple response

findings of Albert (2014) in his study on the primary barriers to efficient use of ICT among extension professionals, which include the lack of ICT infrastructures, high ICT costs and a lack of training on how to utilize ICT tools to access information effectively.

## CONCLUSION

The main purpose of this study was to consider how village extension agents in Nigeria's Federal Capital Territory used information and communication technology. Village extension agents commonly utilize ICT tools, and the information types they investigate utilizing these ICT tools, according to the study.

The study found out that very few village extension workers make use of internet, e-farming app, zoom, video conferencing to access and exchange relevance information. And the very few that use ICT tools use it to access information about; new technologies, weather information, best cultural practices, plant protection. Those that do not use ICT tools in accessing information attributed it to; high cost of ICT, lack of training on the use of ICT, poor internet access in their area, poor income, and high cost of internet subscription.

## RECOMMENDATIONS

The following are some recommendations based on the findings of this study.

- i. To improve information knowledge and transmission among village extension agents, there should be more awareness of the importance of information and communication technology application in the agricultural sector.

- ii. The village extension workers also need constant technical trainings on how to explore ICT in accessing relevant information on new agricultural technologies so that they will be up to date on the latest innovations available for farmers to adopt.
- iii. It is imperative for our government to look into the cost of ICT tools and its infrastructures because it is the major constraints village extension workers have in exploring the application of ICT tools in agricultural information access and usage in dissemination of information to farmers.

## Conflict of Interests

The authors declare no conflict of interest.

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