INFLUENCE OF ICTS ON E-AGRICULTURAL EXTENSION SERVICES: INSIGHT FROM NIGER STATE, NIGERIA.

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Abstract

Agricultural extension in this information age has been recognized as an essential medium of disseminating information and advice to farmers and this is achieved through the usage of Information and Communication Technologies (ICTs). The paper dwelled on the influence of ICTs for E- agricultural extension services in three selected Agricultural Development Projects (ADPs) of Niger state. A multistage sampling procedure was used to select (204) Extension Agents as respondents. Data were analyzed using both frequency and percentages of summated scores by categorization into high moderate, and low range, chi-square, and regression analysis. Result reveal the highest proportion of the respondents use Mobile phones and television (M=422; M=4.41). However, the levels provide a true picture of what is on the ground at the time of conducting this study. A moderate level was shown on Radio (M=3.06) and a Low level on the internet (M=2.15). Therefore, the overall mean score on ICTs (M= 3.46) signifies a moderate level on the usage of ICTs for E-agricultural extension services. There was a statistically significant relationship between ICTs and E-agricultural extension services. Results of regression analysis revealed that the influence of ICTs was statistically and positively significant on E-agricultural extension services. Therefore, there is a need for a schedule of programs on ICTs for extension personnel as ICTs play a vital role in E-agricultural extension.

Key words: Agriculture, E-extension services, ICTs, Information dissemination

Introduction

In Nigeria today, the concept of ICTs has become a global concern and the increasing application of the technology in every segment of our natural life, especially through the GSM, radio, television, projectors, internet, video, camera, computers, e-wallet, has been felt (Okeke et al.,

2015). The application of Information and Communication Technology (ICT) across different sectors of the global economy has become a game changer in boosting work efficiency and productivity (Nyarko & Kozári, 2021). The agriculture sector in the global economy is one of the industries experiencing tremendous ICT application in all spheres of its operations. Akintonde et al. (2020), observed that in recent years, ICTs had become one of the main driving tools used by farmers to manage the essential factors of production (land, labour, capital, and soil) in agriculture.

The agriculture sector has experienced a new technological revolution for the past ten years. Compared to a decade earlier, this new technological revolution, has the potentials to respond to farmers' needs accurately and swiftly. Wolfert et al. (2017) observed that technological advancement in the area of digital platforms, such as e-commerce, agro-advisory apps, big data, computational power, and satellite systems like remote sensing, among others, quicken communication and information sharing among farmers in recent years. Mobile phones that have internet connectivity (smartphones) are the most widely used ICT devices across the globe (Boulos et al., 2011). Research published by Choudrie, (2020), showed that the number of smartphone users around the world were 3.2 billion in 2019, and forecasted that this figure could reach 3.8 billion by 2021. The pace at which ICT application is growing in every sector of the world has triggered the development of different ICT applications in the agriculture sector to aid the rapid access to information by farmers, extension services, and other players within the sector.

Okeke et al. (2015), concludes that ICT in general are an expanding assembles of technologies that are used to handle information and aid communication. The ADPs is a veritable and formative structure, in which its extension service was characterized by the rapid rural development and spread across the nation; with full responsibility to reach the grassroots with extension delivery using different extension theories and models to disseminate innovation Friederichsen et al. (2013). Agricultural extension are already being acknowledged as information and knowledge sharing where by innovations and improved methods and techniques of planting crops and rearing animals are made available to the farmers in their settlements through service inform of advice and assistance given to them to help them improve their methods of production, marketing and processing activities (Pretty et al., 2011).

Globally, the objective of agricultural extension services remains the development of rural populaces and raising the standard of living of the farmers through increased farm production and income (Salami et al., 2010). According to the International Food Policy Research Institute (IFPRI), agricultural extension (also known as agricultural advisory services) plays a crucial role in promoting productivity, increasing food security, improving rural livelihoods, and promoting agriculture as a pro-poor economic growth engine (Laborde et al., 2020). Effective communication of agricultural information to farmers is crucial in achieving optimum efficiency in agricultural extension administration and practice in Nigeria. Agricultural extension in this information age has been recognized as an essential medium of disseminating information and advice to farmers and this is achieved through the ICT (Dhaka & Chayal, 2010). ICT as the biggest factor for change

in extension service plays important roles in enhancing agricultural extension administration such as helping in producing knowledgeable and well informed farming communities, individually and collectively through diagnosing problems, interpreting data (Audu, 2017).

Again, by providing knowledgeable and new technology, up-to-date information and services for increased production, improving market access, capacity building and empowerment and information for improvement, management of new developed agricultural practices and methods emanated from extension education (Audu, 2017). According to Okeke et al. (2015), the ICT facilitates and promotes the collaboration between agricultural researchers, farmers, extension agents and other stakeholders. For example, in Nigeria generally and Anambra State in particular, urban areas have witnessed development in the sighting of computers and internet cafes in the last few years, whereas the rural areas did not smell this development.

It is worth to note that one of the major objectives of the Nigerian's ICT's policy is to empower Nigerian people with ICT skills and ICT capable country in Africa and a key player in the information society by the year 2005 through using ICT as an engine for sustainable development and global competiveness (Matthew et al., 2015). This is 2014, whether the vision of 2005 time line has been fully realized or not especially in the field of agriculture is an open question. In Nigeria, for instance, the Government extension worker to farmer ratio is very high, estimated at 1: 3000 against a target of 1: 500 (Sennuga, 2019). This gap is extremely large to effectively reach out to the creasing needs of the rural communities and this is making direct communication difficult. However, the ICT concept infiltrates perfectly well for its reachability to complement the efforts by improving capacity to connect without costly visits The study however seeks to identify the influence of ICTs on 'E- agricultural extension services: insight from north central, Nigeria. Specifically to; determine the level of ICTs usage for E-agricultural extension services; ascertain the roles of ICTs in E-agricultural extension services; and ascertain the Influence of ICTs on 'E-agricultural extension services.

MATERIALS AND METHODS

Study area

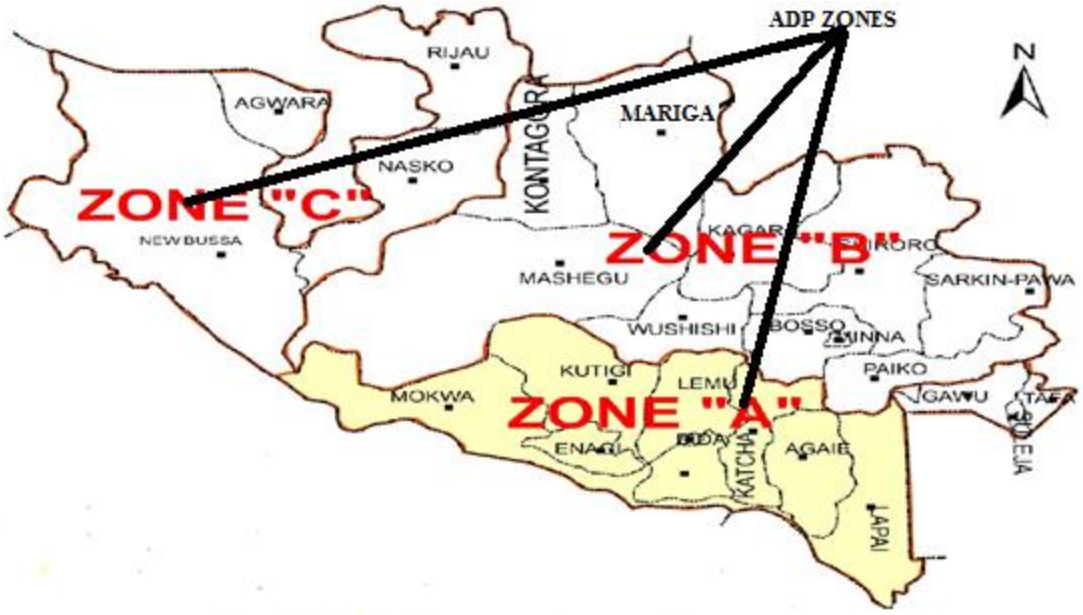

FIG. 1 MAP OF NIGER STATE SHOWING ADP ZONES

A structured questionnaire was designed to adequately elicit information needed for the study. A multistage sampling technique was used for the study. The first stage was identification of the study area and the population. The population for research was the EAs in the state comprising of 27 LGA. The second stage involved the use of the three zoning system namely: zone I, zone II, and zone III. Thus, Out of the Zones, three LGAs' ADPs (Bida, Kuta, and Kontagora) were purposively chosen for this study taking into cognizance the need to give geographical representation and coverage of the state. The third stage involved the use of random sampling technique. The quantitative data drawn out by the questionnaire were analyzed using SPSS (version 24). From ADP zonal offices, a list of 204 EAs was obtained and all the 204 EAs were engaged as respondents. The breakdown of respondents was 76, 74 and 54 from Bida, Kuta, and Kontagora ADPs respectively as shown in Table 1.

Table 1: The population and sample sizes of the EAs.

State zonal ADPs	LGA	No of EAs
Zone I	Bida	76
Zone II	Shiroro	74
Zone III	kontagora	54
Total		**204**

The data were collected through a questionnaire and interview method. Firstly, the level of ICTs usage was determined using frequency and percentages of summated scores by categorization into high moderate, and low range. Moreover, the level of ICTs as perceived by individual EA was determined, this provides a true picture of what is on the ground at the time of conducting this study. In addition, the Influence of predictor variables on the outcome variables (ICTs on E-extension services) was determined through regression analysis.

Results and Discussion

Level of ICTs Usage

Data relating to respondents' ICTs usage levels are presented in Table 2. The table shows the highest proportion of the respondents uses the Mobile phone and television (M=422; M=4.41). However, a moderate level was shown on Radio (M=3.06) and Low level on internet (M=2.15). Therefore the overall mean score on ICTs (M= 3.46) signifies a moderate level on the usage of ICTs on e-agricultural extension services. Information and Communication Technologies (ICTs or ICT) is a relatively new means of disseminating information among people worldwide. ICTs have been defined as and it comprises of processing and transmission of information by electronic means such as radio, television, telephones (fixed and mobile), computers, Pocket PCs and the internet (Ezeh, 2013).

The use of ICTs helps one to acquire necessary technical skills and knowledge towards a logical and progressive attitudinal change which may result in improved performance and productivity (Sima et al., 2020). Mobile phones reduced the gap between farmers and extension research centers as he communicates directly with the extension agent on the issues related agricultural practices. Chhachhar et al. (2014) revealed that the internet, mobile phones, radio, and television were the most important tools of communication providing knowledge and information to farmers about agriculture.

Table 2 level of ICTs usage for E- agricultural extension services

ICTs usage	Mean	Level
Mobile	4.22	High
Radio	3.06	Moderate
Television	4.41	High
internet	**2.15**	Low

Role of ICTs

The Results in Table 3 reveals that majority of those who agreed with the statement explained that believe ICTs play a vital role in helping the extension agent towards E- agricultural services. The chi-square test shows that there is a statistical significant relationship between ICTs and E-agricultural extension services. This may be because of the effective usage of the ICTs by the extension workers. The findings of the study show that ICTs were relevant for e-agricultural extension in effective delivery services. There has been a major shift in modernizing extension and

advisory services and key studies were done by Ferris (2014) and Mbo'o-Tchouawou & Colverson (2014). Mark Bell and Judith Payne (2011) provides an interesting mapping of ICT options to extension functions.

Table 3 Roles of ICTs for E-agricultural extension services

Do you believe ICTs play a vital role in helping the extension agent towards E- agricultural services	Ext. agent N=204	Chi-Square	df	p-value
yes	150	67.84	1	0.005
No	54			
Do you think ICTs for E- agricultural extension services is effective way of delivery?				
Effective	130	61.29	1	0.006
Not Effective	50			
I don't know	24			

X2 = Chi-square; P< 0.001 is significant

Influence of ICTs on 'E- agricultural extension service

The findings on Table 4 shown the existence of relationships between ICTs and E- agricultural extension services. It revealed a positive and significant relationship between Radio and E-agricultural extension services (β=.276, P=.000), Television and E- extension agricultural services (β=.272, P=.000), Mobile phone and E-agricultural extension services (β=.400, P=.000). This implies that ICTs play a vital role for E-agricultural extension services in the study area. Nevertheless, it can be observed that the R2 value is 0.528 which means, by implication, that the proportion of variation in the dependent variable that was explained by variations in independent variables was 53%. In other words, the influence of the predictor variable on the outcome variable in this study has been confirmed. ICTs have the ability to intensifying the linkage between extension, research, and farmers. ICT can be a medium through which information on new research findings can be communicated to extension workers by the research institutions for onwards communication to farmers. Also, farmers can use the same ICT platform to communicate feedbacks on the new technologies from their field experiences to the extension workers for a relay to the research institutions for appropriate action.

Furthermore, ICT has the means of creating a platform (WhatsApp or Facebook group) that will have farmers, extension workers, and researchers on-board to share valuable information for a rapid response, which will help break the weak linkage between these three parties. Ajani (2014) argued that ICTs are among the modern tools that facilitate rapid information delivery and knowledge sharing among farmers, extension agents, and other stakeholders such as research institutions.

Table 4 Influence of ICTs on 'E- agricultural extension service

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std Error	Beta		
(Constant)	.460	.316		1.455	.147
Radio	.342	.051	.276	6.709	.000
Television	.215	.037	.272	5.835	.000
Mobile phone	.318	.049	.400	6.434	.000
Internet	.043	.055	.040	.780	.436

R= 0.727, R2=0.528, Adjusted R2 -=0.520

Conclusions and Recommendations

This paper sought to identify the major knowledge gaps and capacity building needs of agricultural extension agents on ICTs for e-agricultural extension services in order for them to more effectively support smallholder farmers. Results revealed that agricultural extension officers in the study area have good knowledge on ICTs as the key drivers for e-agricultural extension services. Results indicated that mobile phone, radios and televisions and remain the main sources for e-agricultural extension information for officers in the study area. Findings further indicated that agricultural extension agents felt that ICTs play a vital role in helping the officers towards E-agricultural services. Also revealed ICTs for E- agricultural extension services is an effective way of extension delivery.

However, findings revealed the existence of relationships between ICTs and E- agricultural extension services. It is therefore, recommended that the central government and development partners should commit more human, financial and logistical resources to agricultural extension delivery in Niger state to boost agricultural productivity. However, farmers should therefore be educated and supported to accept innovation and technologies. Periodic workshops should be organized for agricultural extension agents on the use of ICT to deliver e-agricultural extension services, as well as undertaking regular assessments of their training needs.

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