



Original Article

## Socio-Economic Characteristics Influencing Farmers Adoption of Information and Communication Technologies in Lokoja Local Government Area of Kogi State, Nigeria



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### ABSTRACT

The study analyzed the socio-economic characteristics influencing farmers adoption of Information and Communication Technologies (ICTs) in Lokoja Local Government Area of Kogi State, Nigeria. A multi-stage random sampling technique was utilized to select 120 respondents. Descriptive and inferential statistics were employed for data analysis. Descriptive statistics such as percentages, frequency distribution and mean were used to organize and summarize data for objectives ii and iii. Probit model was used to analyze objective i and the hypothesis testing. The results of the estimated probit model of the factors affecting the adoption of ICT in the study area revealed that the coefficient of the sex and education status were the significant factors affecting the adoption of ICTs at five percent level of significance and 10 percent level of probability. 45.85 percent and 45.83 percent of the respondents acknowledged that poor access to ICT infrastructure, cost of hardware and software were the major problems affecting their adoption of ICT. It was found that 53.33% of the respondents acknowledged that ICT can broaden the knowledge of the user while 43.33% of the respondents prospected high income as one of the advantages of the ICTs, 39.16% were of the view that ICT is time effective while 25.83% of the respondents that ICT can save inputs. The results also revealed that mobile phones and radio set were the commonly adopted ICTs facilities in the study area and this was because of the cost of software and hardware, poor access to ICT infrastructure, constant power supply and low computer literacy level in the area. It was recommended that appropriate government agencies responsive for agricultural development should carry out thorough review about ICT facilities in the area with a view to increase and update them with modern ICTS.

### 1.0 INTRODUCTION

Disseminating agricultural information to farmers has been an integral part of agricultural development strategies for years. In an Information and Communication Technology (ICT) enabled approach, information dissemination and communication techniques from institutionalized knowledge sources will continue to be important, but the real transformation that ICT makes is to allow feedback and return flow of

information from user (extension agent) whether the information they supplied was relevant, and other guidelines to improve it (Farinde, 2018).

In concrete context, Kirschner (2021) stated that ICT can enhance agriculture through its dynamic, interactive and engaging contents and it can provide real opportunities for individualized instruction. ICT has the potential to accelerate, enrich and deepen skills, motivate and engage students in learning, help to relate farm experiences to



work practices, help to create economic viability for workers, contribute to radical change in agriculture, and also provide opportunities for conception between the farm and the world (Ayim *et al.*, 2022). ICT would make agriculture more effective and productive, thereby engendering a variety of tools to enhance and facilitate farmers' professional activities (Kirschner, 2021).

The age of the farmers determines the quality and quantity of work that can be done on the farm. Age is thus, an important measure of farm productivity. Ajiboye *et al.* (2019) found that the older the household head, the lower the probability that the household would be food secure. Mpiira *et al.* (2024) found that age influences the rate of household adoption of new technologies, which in turn influences household livelihood strategies.

Abdul-Majid *et al.* (2024) stated that farmers adopt or practice new technologies when they expect a more profitable outcome that is gained from the existing technologies. However, Okoji (2019) opined that the factors affecting adoption of ICT in agriculture were inadequate knowledge or information concerning an innovation, adoption of wrong communication channels and incompatible client needs. Although most of the farmers and researchers now have computers for information and data management, most of the computers have neither telephone nor internet access (Aroyede, 2018). Maayaki (2021) stated that as a result of the emerging new paradigm of agricultural development, traditional ways of delivering significant services to citizens are being challenged, old societies are also being transformed into knowledge societies over the world.

Conventional communication channels have been utilized successfully but there have been monologue and have not been allowed for much interaction with users. Radio for example have been effective for diffusing improved agricultural technologies to farmers but broadcasting times are sometime not appropriate for most people. Akingbade (2020) reported that major agricultural innovation rarely reaches the rural farmers who are the major producers in Nigeria. Ogunleye and Petersons (2021) also reported that the cost of software and hardware as well as poor access to ICT infrastructure are the major challenges confronted by the farmers in the adoption of ICT in Nigeria. They, however identified other problems associated with the adoption of ICT to include: unstable power supply, poor sensitization about ICT, poor network and networking and low computer literacy. These predicaments are common in Nigeria in which the study area is not an exception. In order to improve agricultural production in Lokoja Local Government Area (LGA) of Kogi state, adoption of relevant agricultural technologies that will proffer solution to farmers need and problems become imperative. Thus, the specific objectives of this study were to: i. determine the respondents' socio-economic characteristics influencing the adoption of ICT, ii. identify the challenges and iii. prospects associated with the adoption of ICT in the study area.

The null hypothesis ( $H_0$ ) formulated and tested was that: socio-economic characteristics of farmers (age, gender, mental status, education, farm size, etc.) do not positively influence the adoption of ICT in the study area.

## 2.0 MATERIALS AND METHODS

### 2.1 Area of the study

Kogi State is one of the middle belt States and it was created from parts of three different States namely, Benue, Niger and Kwara States in 27th August, 1991. It is known as an important State and as well nicknamed as the "Confluence State". This is due to the fact that two important and large rivers; river Niger and river Benue meet there. Kogi State by size, is the 9<sup>th</sup> largest State in Nigeria but in population size, it is one of the least populous with an estimated population (as at 2022 estimation) of about 4,466,800 million people (Nigeria Population Commission, 2022). The State has coordinates of 7.7337<sup>0</sup>N and 6.6906<sup>0</sup>E. Its capital seat is at Lokoja Local Government Area which is one of the 21 LGAs that make up the State (Ayodele *et al.*, 2023). Ayodele *et al.* (2023) also documented that Kogi State is made up of two distinct regions which are West Sudanian savanna and the Guinea forest – savanna. The major ethnic groups are the Bariba, Busa and the Fulani people. There are notably three major languages which are Okun, Epira and Igala with Igala being the largest of them all. Kogi State is endowed and blessed with different types of solid minerals and natural resources (fig 1 shows Kogi State with Lokoja as the study area).

### 2.2 Population and Sampling Selection Technique

The target population for this study comprised farmers from Lokoja Local Government Area (LGA) of Kogi State, Nigeria. Lokoja LGA consists of two (2) blocks (Lokoja and Abugi) and sixteen (16) circles. That is Lokoja block has the following 8 number circles namely Sarkin Noma, Tajimi, Karara, Owara, Jamata, Crusher, Lokongoma/Gadumo and Barracks/zango. Abugi block with the following 8 number circles: Abugi, Mami, Buddon, Eggon, Tsanawa, Kayinko, Ataji and Aginni. From each block, three circles were selected by simple random sampling technique making a total of six (6) circles. From each circle, twenty (20) farmers were selected making a total of one hundred and twenty (120) respondents (farmers).

### 2.3 Sources and Instrument of Data Collection

The required information for this study were obtained from both primary and secondary sources. The primary data were obtained from interview schedule and structured questionnaire administered to the sampled farmers. The instrument designed for data collection was the interview schedule. The instrument was developed, pre-tested and subjected to validity test before being administered. The instrument was used to collect the required information needed on the variables to be tested. The secondary data were obtained through text books, journals, bulletins, monographs and internet.





more on their husbands for information as they have some restriction in mingling with other men than their husbands.

The results showed that educational status was directly related to the respondents' use of ICTs and was equally statistically significant at five percent level of probability. This suggests that respondents with formal education tend to have higher level of awareness and its usage. It has been argued that education is considered very important in the acceptance of new practices. It is expected that farmers with more years of education would be able to understand the benefits of such new technologies (Okello *et al.*,2019).

In addition, the correlation coefficient (rho) between the adoption of ICTs and the major occupation of the respondents is significantly different from zero at the five percent level. Though weak evidence, it validates our suspicion that respondents in agricultural related occupations tend to match their priority problems and plans with available technologies to solve their problems than those not in full-time agricultural related occupation. Results on membership to co-operative society was found to be directly related to the use of ICTs and statistically significant at 1.0% alpha level. The direct relationship between respondent's membership to co-operative

society and their level of awareness implies that the more the respondents belong to an association, the more their level of awareness. This is in line with the *a priori* expectation because membership of association is expected to increase the level of awareness and member's adoption to ICTs (Effiong, 2018). This result suggest that the respondents were enjoying the benefits of group dynamic.

Furthermore, access to electricity supply was directly related to the level of adoption and also was found to be statistically significant at 5.0% alpha level. This implies that the respondents make use of the sources of electricity supply available to them in accessing their various ICTs and receiving information about new technologies.

The result of relationship between ownership of mobile phone and use of ICTs revealed thus, ICT usage for farming requires that the ICT components are able to process communication (Robinson, 2022). Moreover, the table also showed that there is a strong positive and significant relationship between ownership of mobile and adoption of ICTs for both the women's and men's group. Mobile phone being an ICT tool, the user is likely to be aware of ICT-based information service projects and hence likely to use it for farming (Zachariya, 2019).

**Table 1: Estimation Results of Probit Models on Adoption of ICT Project for Farming.**

Independent Variables	Coefficient	Standard	Z - Error	P-value
Sex	-0.392	0.196	-2.010*	0.045
Age	0.003	0.057	0.560	0.574
Household size	0.299	0.232	1.290	0.197
Educational level	0.121	0.014	1.650*	0.099
Farm size	-0.023	0.014	-1.650	0.099
Membership to Co-operative society	2.251	0.228	9.850***	0.000
Farming experience	0.027	0.025	1.090	0.275
Extension contacts	0.281	0.410	0.690	0.495
Farm income	0.031	0.284	0.110	0.914
Access to electricity	0.048	0.015	3.235***	0.003
Mobile phone ownership	0.217	0.105	2.060*	0.039
farm occupation	0.815	0.275	2.960**	0.003
No. of observations	120			
Wald chi <sup>2</sup>	152.07***			
Prob >chi <sup>2</sup>	0.0000			
Log Likelihood	185.661			

Sources: Field survey data, 2024; \*\*\*, \*\* and \* represented 10%, 5% and 1% significant level, respectively

### 3.2 Problems of ICTs Adoption

The results presented in Table 2 shows the problems identified by the respondents. From the table, it was found that cost of software and hardware (45.83%) as well as poor access to ICT infrastructure (45.85%) were the major problems faced by the respondents in the study area. Also, 27.50% of the respondents identified problems of poor network and networking, about 39.16% of the respondents recorded the problems of unstable power supply while about 27.5% agreed that poor sensitization was their problem with low computer literacy affecting ICTs adoption (30.83%).

The table showed that few (25.83%) of the respondents complained about having only few extension agents and services being available to create awareness and guidance for application of ICTs to farmers. The above results agreed with Okwuokenye (2023) findings that revealed unavailability of mobile network, poor electricity supply, high cost of ICT tools, low level of awareness, lack of infrastructure and lack of technical skills on ICT use as factors hindering small-scale yam farmers effective use of Information and Communication Technologies (ICTs) in yam production in Delta State, Nigeria.



**Table 2: Problem Limiting the ICTs Adoption**

Problems	No. of respondents	Percentage
Unstable power supply	47	39.17
Cost of software and hardware	55	45.83
Poor network and networking	33	27.50
Low computer literacy	37	30.83
Few Extension service and agents	31	45.83
Poor access to ICT infrastructure	55	45.83
Poor sensitization about ICT	33	27.50

Sources: Field survey data, 2024.

\*Multiple responses for respondents that were aware of ICTs.

### 3.3 Prospects of Information and Communication Technology (ICT) adoption

The respondents that adopt any of the available ICTs identified a number of advantages emanating from their use. These advantages are shown in Table 3. The table showed that about 53.33 percent of the respondents acknowledged that ICTs can broaden the knowledge of the user while 43.33 percent of the respondents reported that ICTs could lead to high income. The result also indicated that 39.16 percent of the respondents were of the view that ICT can reduce drudgery and also it is time effective while about 25.83 percent of the respondents acknowledge that ICTs can save the available inputs and

35 percent of respondents agreed that ICTs can be advantageous in the following ways (increase yield, broaden knowledge, high income, saves time and inputs). The result further showed that 25.83 percent of the respondents agreed that ICT can save inputs of farmers in the study area while 25 percent believed that ICT can lead to increase in yield. The result of the finding is in line with the report of Kirschner (2021) who revealed that ICT can provide real opportunities for individualized instruction, has the potential to accelerate, enrich and deepen skills, helps to relate farm experience to work practices, create economic viability for workers and radical change in agriculture.

**Table 3: Distribution of Respondents According to Prospects Identified**

Prospects	No. of respondents	Percentage (%)*
Increase yield	30	25.00
Broaden knowledge	64	53.33
High income	52	43.33
Saves time	47	39.16
Saves inputs	31	25.83
All of the above	42	35.00

Sources: Field survey data, 2024.

\*Multiple responses for respondents that adopt ICT.

### 4.0 CONCLUSION AND RECOMMENDATIONS

Effective agricultural extension depends on extension information reaching many farmers and farmers' problems in the form of feedback reaching extension quickly and regularly. An effective way of facilitating this process is through the utilization of information and communication technologies (ICTs). There is need for ICT facilities to be available, accessible and usable among rural farmers irrespective of gender. In so doing, the farmers will be more effective in their agricultural productivity.

Based on the findings, the following recommendations are made.

For effective and quality Information and Communication Technology (ICT) to take place, Agricultural Information in the study area of Kogi State acquisition, dissemination and application of various agricultural ICT should be encouraged by the government. Agricultural Development Project (ADP) should carry out a thorough review of ICT facilities in the study area with a view to increase and update them with modern information and communication technologies.

These facilities should not only be made available but also accessible to farmers. Government should establish television viewing centers in Lokoja Local Government of Kogi State where agricultural programmes can be broadcast and viewed by the rural farmers

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