AWARENESS AND UTILISATION OF INFORMATION AND COMMUNICATION TECHNOLOGY TOOLS BY CASSAVA FARMERS IN KOGI STATE, NIGERIA

Victor Alex[1], Usman O. Omale[2], Emmanuel S. Salau[1], and Ezra G. Luka[1],
[1]Department of Agricultural Economics and Extension, Nasarawa State University, P.M.B 1022, Keffi, Nasarawa State, Nigeria
[2]Department of Crop Production Technology, Federal University of Technology, P.M.B 50 Ilaro, Ogun State, Nigeria
Email: victoralex1891@nsuk.edu.ng/08102978688

Abstract
The study evaluated the awareness and utilisation of ICT tools among cassava farmers in Kogi State, Nigeria. Using multi-stage sampling procedure, a sample of 260 cassava farmers was selected for the study. A well-structured questionnaire was used for data collection. Data were analysed using descriptive statistics such as frequency, percentages and mean score from Likert scale. Result shows that the majority (57.3%) of the respondents were male, 47.7% were married, and 41.5% had tertiary education, whereas, 93.0% had some formal education, indicating a relatively high level of basic education among participants. The mean age of the farmers was 46 years, suggesting a mature and experienced farming population. The farmers had an average of 13 years of farming experience, cultivated on a mean farm size of 2.6 hectares, and earned an average annual income of ₦800,000 from cassava production. Concerning ICT engagement, awareness levels were high (61.53%), with mobile phones being the most commonly used ICT tool (22.0%). Poor rural internet access, poor power supply and inadequate extension service were the constraints that hindered effective use of ICT facilities by cassava farmers. It was therefore, recommended that government should provide adequate and constant power supply to rural areas among others.

Keywords: cassava, awareness, utilisation, information, technologies

Introduction

Information and communication technology (ICT), an extension of information technology (IT), incorporates the amalgamation of unified communications systems including telephone lines, wireless signals, computers, enterprise software, middleware, storage, and audiovisual components to facilitate seamless information exchange (Ogiagah & Ofule, 2020). In modern-day development discourse, ICT has emerged as a pivotal enabler of socio-economic transformation, particularly in agriculture, where access to timely and relevant information is critical for productivity and resilience. Universally, ICTs have been developed, tested, and deployed with varying degrees of success, especially in rural and agricultural contexts. These technologies are increasingly tailored to support farmers by enhancing access to market information, weather forecasts, financial services, and agricultural innovations (Awojide et al., 2021).

Cassava (*Manihot esculenta*) has gained manufacturing, monetary, and dietary distinction due to its starch rich roots and versatility. It serves as a staple food in various forms such as garri, fufu, and tapioca, and is also processed into secondary products such as chips, pellets, flour, adhesives, alcohol, and starch. These derivatives are essential raw materials in industries ranging from livestock feed and textiles to confectionery and biofuel production (Ikwu-Oche et al., 2024). The international marketability of cassava-based products further underscores its strategic importance.

ICT is increasingly recognized as a transformative force in agriculture, capable of driving inclusive growth, innovation, and sustainable development in the digital age (UNDP, 2024). The rapid advancement of information and communication technologies (ICTs) has transformed agricultural systems globally by facilitating access to timely information, extension services, market intelligence, weather forecasts, and financial services. Across Africa, increasing mobile phone penetration and digital agricultural innovations have created new opportunities for smallholder farmers to improve productivity, profitability, and resilience. In Nigeria, government policies and digital economy initiatives have further emphasized the integration of ICTs into agricultural development as a means of enhancing agricultural productivity and food security.

Problem Statement

Despite these advancements, significant disparities remain in ICT awareness, access, and utilisation among rural farming populations. Kogi State, one of Nigeria's leading cassava-producing states, exemplifies this paradox. The state produces over 4.16 million metric tons of fresh cassava roots annually from approximately 269,270 hectares of farmland (Kogi ADP, 2024), making a substantial contribution to national cassava production. However, many cassava farmers continue to rely predominantly on traditional sources of agricultural information and remain disconnected from ICT resources that could enhance their productivity and decision-making processes. Factors such as limited digital literacy, inadequate infrastructure, poor network connectivity, high costs of ICT devices and services, and insufficient access to digital extension support may constrain the effective utilization of ICTs among farmers.

Furthermore, recent developments in digital agriculture, including e-extension services, mobile advisory platforms, and artificial intelligence-based agricultural information systems, offer considerable potential for improving cassava production through enhanced access to technical knowledge, market opportunities, and real-time agricultural information. However, the extent to which cassava farmers in Kogi State are aware of and utilize these technologies remains inadequately documented. Existing studies have largely focused on ICT adoption among farmers in other regions or on general agricultural populations, leaving a gap in empirical knowledge regarding cassava farmers in Kogi State. Consequently, there is a need to assess the level of awareness and utilization of ICT among cassava farmers in Kogi State, Nigeria. Understanding farmers' engagement with ICT tools will provide valuable evidence for policymakers, extension agencies, and development partners in designing targeted interventions that promote digital inclusion, strengthen agricultural extension delivery, and enhance sustainable agricultural development. Therefore, the study aims to:

i. describe the socioeconomic characteristics of cassava farmers.
ii. ascertain the level of ICTs awareness among cassava farmers.
iii. identify the types of ICTs utilised by cassava farmers.
iv. identify the constraints to the utilisation of ICTs by cassava farmers.

Theoretical Framework

Diffusion of Innovation Theory (DIT) by Rogers (1962)

Diffusion research centers on the conditions which increase or decrease the likelihood that a new idea, product, or practice will be adopted by members of a given culture. Diffusion of innovation theory predicts that media as well as interpersonal contacts provide information and influence opinion and judgment. Studying how innovation occurs. The theory argued that it consists of four stages: invention, diffusion (or communication) through the social system, time and consequences. The information flows through networks. The nature of networks and

the roles opinion leaders play in them determine the likelihood that the innovation will be adopted. Innovation diffusion research has attempted to explain the variables that influence how and why users adopt a new information medium, such as the Internet. Opinion leaders exert influence on audience behavior via their personal contact, but additional intermediaries called change agents and gatekeepers are also included in the process of diffusion. Five adopter categories are: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. These categories follow a standard deviation-curve, very little innovators adopt the innovation in the beginning (2.5%), early adopters making up for 13.5% a short time later, the early majority 34%, the late majority 34%and after some time finally the laggards make up for 16%.

Methodology

The study was conducted in Kogi State, Nigeria. It is located in the middle belt or the North Central zone of Nigeria. The population of the state is put at 4,466,800 million according to the population projection of 2022 and about 75% of the population lives in rural areas. Kogi State stretches from about 6.500N to 8.500N latitude, and 5.500E to 7.800E longitude. The state comprises 3 major ethnic groups and other languages. The state is divided into four Agricultural Development Project (ADP) zones namely; zones A- Aiyetoro-gbede, B- Anyigba, C- Koton-karfe and D- Alloma. The study population comprised all cassava farmers in Kogi State. A multistage sampling procedure was used in selecting a sample size of two hundred and sixty (260) cassava farmers for the study. In stage one, one (1) extension block was purposively selected from each zone. In stage two (2), five (5) extension cells were selected from each of the four (4) blocks, giving a total of twenty (20) cells. In stage three (3), thirteen (13) cassava farmers were selected from each of the twenty cells, giving a total of two hundred and sixty (260) cassava farmers as the sample. A structured questionnaire was used for data collection for the study. Socio-economic characteristics of the cassava farmers, types of ICTs utilised by cassava farmers were analysed using frequency, mean and percentages. A 3-point likert scale with real limits of: index of above 5 ICT tools= high; index of 3-5 tools= moderate; and index of 12 tools= low was used to analyse level of ICTs awareness among the respondents and the constraints to the utilisation of ICTs by the respondents were analysed by mean score through 3-point likert scale of very severe=3, severe=2 and not severe=1. The 3-point likert scale which was used to measure the constraints to the utilisation of ICTs is as given below:

Opinion	**Point**
Not severe (NS)	1
Severe (S)	2
Very severe (VS)	3

The mean response to each item was calculated using the following formula:

$$\overline{X} = \frac{\sum FX}{N}$$

Where $\underline{X}$ = Mean Response

$\sum$=Summation

F= No. of responses choosing a particular scale point

X= Numerical value of the scale point

N= Total No. of respondents to the item

The mean response to each item was interpreted using the concept of real limits of numbers. The numerical value of the scale points (response mode) and their respective real limit were as follows:

Not severe (NS) = 1 Point Real limit =0.50 - 1.49
Severe (S) = 2 Points Real limits =1.50 - 2.49
Very severe (VS) = 3 Points Real limits = 2.50 - 3.49

Decision rule: Add scale points and divide by the number of scales considered

Decision rule= 2.0**.** This means that any mean score that is below 2.0 was interpreted as not severe, while any mean score up to 2.0 and above was regarded severe and very severe.
High (H) = index of above 5 tools
Moderate (M) = index of 3 – 5 tools
Low (L) = index 1–2 tools

Decision Rule: Any cassava farmer that tick more than 5 ICT tools was interpreted as "High" while 3 to 5 and 1 to 2 ICT tools of awareness were regarded "Moderate" and "Low".

Results and Discussion

Socio-economic Characteristics of the Cassava Farmers

Table 1 shows the socio-economic characteristics of the respondents.

Table 1: ***Frequency Distribution on the Socio-economic Characteristics of the Cassava Farmers***

Socioeconomic variables	Frequency	Percentage	Mean/Mode
Sex			
Male	149	57.3	
Female	111	42.7	Male
Total	**260**	**100**	
Age			
20 – 30	31	11.9	
31- 40	53	20.4	
41 – 50	124	47.7	46 Years Old
Above 50	52	20.0	
Total	**260**	**100**	
Marital Status			
Single	109	41.9	
Married	124	47.7	Married
Divorced	7	2.7	
Widowed	20	7.7	
Total	**260**	**100**	
Level of Education			
No formal education	18	6.9	
Primary education	45	17.3	Tertiary education
Secondary education	89	34.2	
Tertiary education	108	41.5	
Total	**260**	**100**	
Farm Size (Hectares)			
1 – 2	156	60.0	2.6 ha
3 above	104	40.0	
Total	**260**	**100**	
Farming Experience in years			

3-10	65	25.0	
11-20	128	49.2	
Above 20	67	25.8	13Years
Total	**260**	**100**	
Annual Farm Income (#)			
100,000 - 500,000	25	9.6	
501,000 – 1,000,000	95	36.5	800,000
Above 1,000,000	140	53.8	
Total	**260**	**100**	
Source: Field Survey, 2025			

Results in Table 1 show that the majority (47.69%) of the cassava farmers were in the age bracket of 41-50 years, with the mean age of 46 years. It implies that cassava farmers' age influences their ability to utilise ICT tools and productivity. This implies that cassava farmers in the study area were still in their active and productive ages. This agrees with the findings of Ikwu-Oche et al., (2024) that a high proportion (29.0%) of the respondents was within the age bracket of 41-50 years.

The majority (57.3%) of the respondents were male cassava farmers, while 42.69% were female cassava farmers, implying that majority of the cassava farmers in Kogi State were males. This finding aligned with that of Ekanem and Ekerete (2018) also reported that majority (66.0%) of the respondents were males.

Majority (47.7%) of the cassava farmers were married with only a small proportion (41.9%) single and 2.7% divorced or separated, while 7.7% were widowed. This implies that married individuals dominated cassava farming in the study area with 93.0% of the respondents have formal education. The educational level of the farmers could influence access to ICTs used for cassava production. The finding is consistent with Ajayi and Soyebo (2023), who reported that 87.5% of arable farmers in Ekiti State were formally educated. These studies emphasised that education enhances farmers' awareness, understanding, and utilisation of ICT tools for agricultural information dissemination and decision-making.

Results from Table 1 also show that the average farm size among cassava farmers in the study was 2.6 hectares. This means that the farm size recorded is an indication that cassava farmers in the study area were still at the subsistence level. Most (49.2%) of the respondents had farming experience of above 10years, and the mean years spent farming among cassava farmers was also 13years where majority (53.8%) of the cassava farmers earned above #1,000,000 from cassava production through utilisation of ICTs as tools of information and marketing. This average is long enough for farmers to understand the importance of ICTs to maximize production. This finding is in line with Suleet al. (2021) who found that productivity increases with years of experience.

Awareness of ICTs among Cassava Farmers

Table 2 shows that 61.53% of the cassava farmers were highly aware, while 9.23% were not aware at all. This implies that majority of the respondents were aware of the various ICT tools used to disseminate agricultural information. The finding corroborates the findings of Ikwu-Oche et al. (2024) that there is high level of ICT awareness among cassava farmers in Kogi State.Daneji, et al. (2025) reported high awareness of ICT tools such as mobile phones, radio, and television among farmers in Kano State. These studies suggest that increase access to education, extension services, and mobile communication technologies has improved farmers' awareness of ICTs.

Table 2: ***Frequency Distribution on the Awareness of ICTs among Cassava Farmers***

Awareness Level	Percentage (n=260)
High	61.53
Moderate	20.38
Low	8.85
No Awareness	9.23

Source: Field Survey, 2025

Types of ICTs Utilised by Cassava Farmers

Out of the 260 cassava farmers, 236 cassava farmers were aware of ICT and used the different ICT tools and the result is shown in Table 3. 22.0% cassava farmers used mobile phone, 16.5% used SMS, 14.8% used social media, 13.1% used radio, 11.4% used television, 8.5% used internet, 5.1% used poster and magazine and 3.4% used newspaper. This finding is consistent with that of Hassan,*et al*. (2019) who reported that in rural Nigeria where most of the cassava farmers are found, the ICTs tools available for use are mainly radio and telephone.

Table 3: ***Frequency Distribution on the Types of ICTs Utilised by Cassava Farmers***

Types	Percentage (n=236)
Radio	13.1
Television	11.4
Mobile phone	22.0
SMS	16.5
Internet	8.5
Newspaper	3.4
Poster	5.1
Magazine	5.1
Social media	14.8

Source: Field Survey, 2025

Constraints to the Utilisation of ICTs among Farmers

The major constraint was poor rural internet access with the mean score of 2.4423, followed by power failure (m=2.3885) and inadequate extension service (m=2.3178) as shown in Table 4. The production can be increased by improving the capacity in terms of access to information, as the recent development in the field of agriculture can be readily obtained through effective and efficient use of ICT facilities. This result is in line with result of Ikwu-Oche et al. (2024) that enhancement of production is the product of access to information for effective and efficient agriculture practices. Matto (2018) reported that majority of farmers suffered great limitations in the utilisation of ICTs such as lack of power supply, high cost of telephone services, lack of internet services to access global information on agricultural improvement and many more.

Table 4: ***Frequency Distribution on the Constraints to the Utilisation of ICTs among Farmers***

Research items	Mean Score (MS)	Ranking
Poor Internet Network	2.4423	1st
Inadequate Power Supply	2.3885	2nd
Inadequate Extension Services	2.3178	3rd
Time constraint	2.1441	4th
Illiteracy	1.9915	5th
Cost of Recharge Card on Calls	1.8269	6th
Low Farmer's Income	1.5385	7th
Internet Subscription Cost	1.45	8th

Source: Field Survey, 2025

Conclusion and Recommendations

The study's findings reveal significant insights into cassava farming practices in Kogi State, with implications for policy and extension practices. The age distribution of farmers (predominantly aged 41-50) suggests that this demographic is capable of utilizing ICT tools effectively, which enhances productivity. Such insights are essential for developing targeted training programs that cater to the active age group, thereby promoting better use of technology in agriculture.

Furthermore, gender dynamics showed a majority of male farmers, indicating a potential area for policy intervention to encourage female participation in cassava farming. The high marriage rate among respondents is noteworthy, as is the high education level, suggesting that educational programs that include ICT training could further enhance farmers' ability to leverage technology for agricultural success. The average farm size of 2.6 hectares indicates subsistence farming, underscoring the need for policies that support farmers in scaling up their operations and utilizing ICT for marketing and information dissemination. The substantial portion of farmers with more than ten years of experience highlights the potential for mentorship programs, leveraging their expertise to train newer farmers.

The high level of awareness and varied use of ICT tools among farmers' points to a growing familiarity with technology in agricultural practices, which can influence policy design aimed at increasing accessibility to ICT resources. Future research should focus on exploring the impact of these ICT tools on productivity quantitatively and examining the barriers to increased adoption among underrepresented groups, particularly female farmers. Additionally, further studies on how education influences ICT utilization can yield comprehensive strategies for agricultural development in the region.

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