



FACTORS INFLUENCING USAGE OF INFORMATION AND COMMUNICATION TECHNOLOGIES AMONG MAIZE FARMERS IN ZARIA LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA

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ABSTRACT

The study examined the factors influencing usage of ICTs among maize farmers in Kaduna State, Nigeria. Simple random sampling was used to select 120 maize farmers. Data were collected using a questionnaire and analyzed using both descriptive and inferential statistics. Results showed that the maize farmers were dominantly males (93.3%) with the mean age of 34 years. Majority (76.7%) were married with large household sizes of up to 10 persons (64%). Most (95.0%) of the maize farmers had various levels of education while majority (68.33%) have up to 10 years of farming experience. However, low productivity is observed as their earnings (85%) are less than N50,000/month, while 65% do not have access to credit. The results of regression analysis reveals that age of the maize farmers was positively significant at ($P < 0.05$). This implies that as the age of the farmers increase there is more likelihood of using ICT. Farming experience was negatively significant at ($P < 0.01$). It means that as the experience of the farmer's increases there is less likelihood using ICT. The extension agent was positively significant at ($P < 0.10$). It connotes that there is more likelihood in ICT usage as the extension participation increases. The study concludes that age, farming experience and contact with extension agents are the factors that influence the proper usage of ICT among maize farmers in the study area. It can be therefore recommended that aggressive awareness/sensitization campaign to be hosted by extension agents for farmers to be encouraged to access and optimally utilize ICT facilities in order to enhance their productivity.

Keywords: Extension agents, ICT usage, Access to credit, Awareness campaign, Productivity.

INTRODUCTION

Information and communication technologies (ICTs) are new technologies that cannot be disregarded in Africa particularly for development in all sectors, agriculture inclusive. This is because ICT is one of the major driving forces that can bring about development and change in this present digital age (Olaniyi *et al.*, 2013). ICTs is a broader term for Information Technology (IT), which refers to all communication technologies, including the internet, wireless networks, cell phones, computers, software, middleware, video-conferencing, social networking, and other media applications and services enabling users to access, retrieve, store, transmit, and manipulate information in a digital form (FAO, 2021). ICTs encompasses both the internet-enabled sphere as well as the mobile one powered by wireless networks. It also includes antiquated technologies, such as landline telephones, radio and television broadcast – all of which are still widely used today alongside cutting-edge ICT pieces such as artificial intelligence and robotics. The list of ICT components is exhaustive, and it continues to grow. Some components, such as computers and telephones, have existed for decades but smart phones, digital TVs and robots, are more recent entries.



According to Emenari (2004), great transformation in the lives of the people especially in the developing countries depends on advances ICTs. The rapid development of ICTs continues to have major influence on the livelihood of people across the world. Social research has shown that, adaptation of ICTs can be a major fuel for the economic and community development in rural areas (Nyika, 2020). It was in the light of this that Nenna (2016), noted that ICTs are what rural dwellers need to climb to the heights developed countries had reached. The recent development in ICT has broken national and international barriers and turned the world into a global village, making information available to everyone, everywhere and at any time it is needed (Onasanya *et al.*, 2011). In agriculture, information and Communication Technology constitutes part of the medium through which information is delivered to farmers. Agricultural information is a key component in improving smallholder agricultural production and linking increased production to remunerative markets, thus leading to improved rural livelihoods, food security and national economies. FAO and a group of founding partners launched the **e-Agriculture Community of Practice** in 2007, this is an online space to facilitate an exchange of knowledge and experiences of projects where ICTs are used for agriculture and rural development (FAO, 2021). Improvement of agricultural productivity will be realized when farmers are linked to market information. The use of ICTs also contributes to research for innovation to be disseminated to farmers. The development process in the world today heavily relies on the use of the ICTs by all sectors of the economy. ICTs in the agricultural sector facilitates knowledge sharing within and among a variety of agricultural networks including researchers, exporters, extension services, traders and farmers. The use of ICTs can progressively reduce the costs of managing information, enabling individuals and organizations to undertake information related tasks much more efficiently and to introduce innovations in products, process and organizational structure in agricultural sector in Nigeria (Anyim and Odoemelum, 2016).

Maize farmers are those farmers who are into maize production. Maize has been of great importance in providing food for man, feed for livestock and raw materials for some agro-based industries. Maize constitutes a staple food for a large population particularly in developing countries (Yadesa and Diro, 2023). Despite the economic importance of maize to the teeming populace in Nigeria, it has not been produced to meet food and industrial need of the country. Farmers are deprived information that would help to assist them in productivity and market survey for their yields and products. Maize farmers experience many challenge with respect to information dissemination and accessibility to ICTs to increase their agricultural information and knowledge. Researchers and extension workers therefore have to rely on the use of ICTs in the process of disseminating information to maize farmers. It is in view of the above that the study was designed to find out factors influencing usage of information and communication technologies among maize farmers in Zaria Local Government Area of Kaduna State. The general objective of the study was to examine the factors influencing usage of information and communication technologies (ICTs) among maize farmers in Zaria local government area Kaduna state, Nigeria, while the specific objectives are to: describe the socio economic characteristic of maize farmers in the study area, ascertain the availability of ICTs among the maize farmers, ascertain the accessibility of ICTs to maize farmers and determine the factor influencing ICTs usage by the maize farmer in the study area.



METHODOLOGY

Study Area

The study was conducted in Zaria Local Government Area of Kaduna State. Zaria LGA is bounded to the east by Soba LGA, to the west by Giwa LGA, to the south by Igabi LGA and to the north Makarfi LGA. Zaria is situated on a plateau, at a height of about 700m above sea level in the centre of northern guinea savannah zone. The Local Government Area is located on longitude 7°42'E and at latitude 11°04'N and covers an area of about 11,120 square kilometers. The projected population of the Local Government Area was put at 1029549 in 2021 from the 2006 figure of 408198 at a growth rate of 0.91 percent per annum (NPC, 2006). Zaria is predominantly made up of the Hausa/Fulani- a major ethnic group in northern Nigeria. There are also other ethnic groups like the Yorubas, Igbos, and Idomas who migrated to the place. Major crops grown include cowpea, maize and sorghum. Other principal crops such as rice, pepper, onion and lettuce are also grown.

Sampling Technique and Sample Size

A two-stage sampling technique was used to select the respondents for this study. In the first stage, four (4) wards were purposively selected due to the high concentration of maize farmers within them. The selected wards were Kwarbai ward A, Kwarbai ward B, Dutsinabba ward and Tukur –tukur ward. In the second stage, random sampling technique was used to select thirty (30) maize farmers from each of the ward to give a total of one hundred and twenty (120) respondents.

Data Analysis

Descriptive statistics such as frequency counts, percentages, means and ranking were used to analyze objectives i, ii, and iii, while inferential statistics (logit regression model) was used to analyze objective iv. The model is specified in explicit form as:

$$Y = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + X_6\beta_6 + X_7\beta_7 + X_8\beta_8 + \mu$$

Where;

Y_1 = binary logit model taking the value of 1 if the respondents is using ICTs facilities and 0 otherwise

X_1 = Age (years)

X_2 =Household Size (numbers)

X_3 =Educational Level (years)

X_4 =Farming Experience (years)

X_5 =Monthly Income (naira)

X_6 =Access to Credit (Yes = 1, No = 0)

X_7 =Extension Contact (Yes = 1, No = 0)

X_8 =Membership of Cooperative (Yes = 1, No = 0)

μ_1 = Error term

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Maize Farmers

The results in table 1 showed that 55.1% of the respondents were between 25-34 years of age, while the least age range 55years and above were just 3.2% of the respondents with a mean age of 34years. This indicates that maize farmers in the study area were dominated by young people who are active and fall within the productive age group. The result agreed with the findings of Ademiluyi (2014) who reported that majority (60.8%) of the maize farmers in Bassa Local Government Area of Plateau State were young and energetic.



Moreover, results in Table 1 showed that majority (93.3%) of the sampled farmers were males, while (6.7%) were females. This implies that there were more male maize farmers in the study area. Also results in Table 1 showed that 76.7% of the sample were married and 23.3% were single, this results implied that majority of respondents' were married. This finding is similar to that of Olaniyi and Ismaila (2016) who reported in their study that majority (84%) of the sampled maize farmers were males and married respectively.

With reference to household size, majority (64.2%) of the maize farmer's had household size between 1-10 persons, while only (3.3%) of them had household size between 21-30 persons with a mean household size of 10 persons. This shows that majority of the maize farmers in the study area had larger household sizes. This implies that the larger household size will help to reduce the cost of labour in maize production due to more hands on the farm which will also lead to increased use of ICTs facilities. The result agrees with the findings of Olaniyi and Ismaila (2016) who reported that majority of the maize farmers in Ondo State had a large household size.

In addition, the results showed that 39.2% of the maize farmers had tertiary education while 35.8%, 12.5%, 7.5% and 5.0% had secondary, Arabic and no formal education respectively. Being educated could imply easier access of the maize farmers to ICTs and use of ICTs facilities. Tertiary education of the maize farmers will lead to approach of agencies/organisation that will facilitate access to ICTs usage. Results in Table 1 also shows that majority (68.3%) of maize farmers had been in farming from 1-10 years, while (4.2%) of them had 31-40 years of farming experience. The mean farming experience of the maize farmers was 13years. This implies that the high years of farming experience of the maize farmer will facilitate ICTs usage in the study area.

As indicated on the Table, majority (85%) of the maize farmers earned <50,000, (11.7%) of them earned between 50,000-100,000, (2.5%) of them earned between 150,001-200,000 while only (0.8%) of them earned >200,000. This indicated that the maize farmers in the study area were average income earners; hence they may possess the financial strength required to purchase and utilize ICTs facilities. This will facilitate a boost in their income through ICT enabled advertisements and access to input and information. As showed in the table, (65%) of the respondents had no access to credit, while only (35%) of them had access to credit. This implies that majority of the maize farmers in the study area do not have access to credit. Most of the maize farmers (54.2%) do not have access to extension officer, while (45.8%) had access to extension officers. Also most (68.3%) of the maize farmers were not members of a cooperative societies while only few (31.7%) of them are members of the cooperatives societies. Majority of the maize farmers (92.5%) are computer literate while (7.5%) are not computer literate. This further proves that the rate of ICTs usage among the respondent in the study area is high.



Table 1: Distribution of Respondents According to Socio-economic Characteristics (n=120)

Characteristics	Frequency	Percentage	Mean
Age (Years)			
15-24	10	8.3	33.9
25-34	66	55.1	
35-44	25	20.9	
45-54	15	12.5	
55 and above	4	3.2	
Sex			
Male	112	93.3	
Female	8	6.7	
Marital status			
Single	28	23.3	
Married	92	76.7	
Household size(persons)			
1-10	77	64.2	9.81
11-20	39	32.5	
21-30	4	3.3	
Educational level			
No formal education	6	5.0	
Arabic education	15	12.5	
Primary education	9	7.5	
Secondary education	43	35.8	
Tertiary education	47	39.2	
Farming experience			
1-10	82	68.3	12.6
11-20	15	12.5	
21-30	10	8.3	
31-40	5	4.2	
41 and above	8	6.7	
Monthly income (₦)			
<50,000	102	85.0	
50,000-100,000	14	11.7	
100,001-150,000	-	-	
150,001-200,000	3	2.5	
>200,000	1	0.8	
Access to credit			
Yes	42	35.0	
No	78	65.0	
Extension contact			
Yes	55	45.8	
No	65	54.2	
Membership of cooperative			
Yes	38	31.7	
No	82	68.3	
Computer literacy			
Yes	111	92.5	
No	9	7.5	
Total	120	100	

Source: field survey, (2017)

Availability and Accessibility of ICTs facilities to maize farmers

Table 2 shows the result on the ICTs facilities available to the maize farmers. It was observed that the most common ICTs facilities available to the maize farmer in the study area were radio (95.8%), mobile phone (92.5%), television (80.0%), internet (70.0%), camera (66.7%) and computer (56.7%). Others are VCD/DVD (22.5%), E-mail (17.5%), and the least was flash drive (15.0%). This finding shows that radio, mobile phone, television, internet and camera are the major ICTs facilities available for accessing agricultural information. Meanwhile, VCD/DVD, E-mail and flash drive are relatively low in terms of its availability for use by the maize farmers. This result confirms the finding of Olaniyi and Ismaila (2016) who reported that the most available ICTs tools used by maize farmers are cell phone, radio and television. This implies that conventional ICTs (radio, television and telephones) still remain the most available ICTs to farmers in the study area.

Furthermore, Table 2 shows the result on the ICT facilities accessible to the respondents. It was revealed that maize farmers were highly accessible to radio (94.2%), mobile phone (91.7%), television (71.7%), internet (70.8%) and camera (68.7%). Others are computer (38.3%), VCD/DVD (21.7%), E-mail (15.0%) and the least was flash drive (10.8%). This finding shows that radio, mobile phone, television and internet were highly accessible to the maize farmers. Meanwhile, camera, VCD/DVD, E-mail and flash drive are relatively poor in terms of its accessibility by the respondents. This indicated that conventional ICTs still remain the most accessible ICTs facilities to farmers in the study area. This result confirms the finding of Ezech (2013) who reported that the most readily available ICT facilities owned, accessed, and utilized by most farmers are radio, television and phones.

Table 2: Percentage Distribution of Respondents Based on Availability and Accessibility to ICT Facilities

ICTs facilities	Availability	Accessibility
Radio	115(95.8)	113(94.2)
Mobile phone	111(92.5)	110(91.7)
Television	96(80.0)	86(71.7)
Internet	84(70.0)	85(70.8)
Camera	80(66.7)	82(68.3)
Computer	68(56.7)	46(38.3)
VCD/DVD	27(22.5)	26(21.7)
Email	21(17.5)	18(15.0)
Flash Drive	18(15.0)	13(10.8)

Source: Field survey, 2017; Figures in parentheses are in percentages

Level of Access to ICT Facilities by the Maize Farmers

Results in Table 3 showed the distribution of the maize farmers according to level of access to ICT facilities. From the table, the maize farmers that had access to mobile phone were the majority with a mean score of 2.78. This means that a very good number of the maize farmers in study area have access to mobile phone used in accessing information on maize production. This was followed by accessibility to radio with a mean score of 2.73. This also indicate that most of the maize farmers in Zaria Local Government Area of Kaduna State have access to radio. Those that have access to television were ranked third with a mean score of 2.30. Access to computer is gaining prominence among the maize farmers as a good number of them with mean score of 1.88 have access to computer. The next level of access to ICT

facilities in the ranking, is the internet. This has a mean score of 1.81 and ranked fifth. Access to camera ranked sixth with a mean score of 1.78. Access to DVD/VCD was ranked seventh with a mean score of 1.38, followed by access to email with the mean score of 1.26. Lastly, access to flash drive was the least level of access to ICT facilities in the study area. The mean score of maize farmers having access to flash drive is 1.23. The result implies that mobile phone, radio and television are the ICT facilities that are highly accessible to the maize farmers in the study area. This finding corroborates the work of Olaniyi and Ismaila (2016) who reported that the most available ICT tools used by maize farmers are cell phone, radio and television

Table 3: Distribution of the Respondents According to Level of Access to ICT Facilities

ICTs facilities	Always	Occasionally	Rarely	Means	Std deviation	Ranking
Mobile phone	101(84.2)	12(10.0)	7(5.8)	2.78	0.54	1 st
Radio	93(77.5)	21(17.5)	6(5.0)	2.73	0.55	2 nd
Television	55(45.8)	46(38.3)	19(15.8)	2.30	0.73	3 rd
Computer	26(21.7)	54(45.0)	40(33.3)	1.88	0.74	4 th
Internet	15(12.5)	67(55.8)	38(31.7)	1.81	0.64	5 th
Camera	14(11.7)	66(55.0)	40(33.3)	1.78	0.64	6 th
VCD/DVD	12(10.0)	22(18.3)	86(71.7)	1.38	0.66	7 th
Email	11(9.2)	9(7.5)	100(83.3)	1.26	0.62	8 th
Flash Drive	6(5.0)	16(13)	98(81.7)	1.23	0.53	9 th

Source: Field survey, 2017; Figures in parentheses are in percentages

Factors Influencing ICT Usage among Maize Farmers

The result of the Logit analysis in Table 4 shows the factors that influence ICT usage by the maize farmers in Zaria Local Government Area of Kaduna State. It was found that three variables were significant, these include age, farming experience and contact with extension agent.

The result shows that age of the maize farmers was significant at 5% probability level with positive coefficient. This implies that there is a positive relationship between age of a maize farmer and ICT usage. This could mean that increase in age would give rise to an increase in likelihood of ICT usage. This finding agrees with the study of Abdulshakur *et al.* (2019) who reported positive and significant relationship between age and ICT usage among maize farmers in Giwa Local Government Area of Kaduna State, Nigeria.

The result revealed that farming experience was significant at 1% probability level with the negative coefficient. This implies that there is a negative relationship between farming experience and likelihood of ICT usage. This means that increase in farming experience decreases maize farmers ICT usage. This finding deviates from expectation as one would have thought that those who have been into maize farming would have realized the advantages of ICT for increased productivity. This finding is similar to that of Kabir (2015) who reported negative and significant relationship between farming experience and attitude of farmers on ICT usage in the study of Attitude and Level of Knowledge of Farmers on ICT based Farming. The study revealed that the coefficient of contact with extension agent was positive and significant at 10% probability level. It implies a positive relationship between contact with extension agent and ICT usage. This means that, an increase in contact with extension agent increases the likelihood of ICT usage. This is because extension agents are likely to sensitise

farmers on the benefits of ICTs and also facilitate adoption of ICTs by the farmers. This finding contradicts that of Ademiluyi (2014) in the study of Adoption of improved maize varieties among farmers in Bassa Local Government Area of Plateau State, Nigeria that reported negative coefficient between the factors influencing farmer's adoption and contact with extension agent.

Table 4: Logit Estimates of Factors that Influence ICTs Usage by the Maize Farmers in Zaria LGA of Kaduna State

Variables	Coefficient	Standard Error	z-value	Probability
Age	0.193	0.080	2.41**	0.016
Household Size	-0.049	0.081	-0.61	0.542
Educational Level	-0.106	0.139	-0.76	0.447
Farming Experience	-0.231	0.070	-3.33***	0.001
Monthly Income	0.001	0.035	0.02	0.986
Access to Credit	-0.363	1.071	-0.34	0.735
Extension agent Contact	2.075	1.254	1.65 *	0.098
Membership of Cooperative	-0.753	1.150	-0.65	0.513
Constant	-2.413	2.357	-1.02	0.306
Log likelihood ratio=-23.61231				
Degrees of freedom = 8				

Source: Field survey, 2017

* = Significant at 10%

** = Significant at 5%

*** = Significant at 1%

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it was concluded that radio, mobile phone, television and internet are highly available and accessible to the maize farmers. Moreover, findings revealed that age, farming experience and contact with extension agent are the factors that influence the proper usage of ICT facilities among maize farmers in the study area. It is therefore recommended that intensive awareness/sensitization campaign to be hosted by extension agents for farmers to be encouraged to access and optimally utilize ICT facilities in order to enhance their productivity.

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