DETERMINANTS OF UTILIZATION OF MOBILE PHONES FOR AGRICULTURAL INFORMATION SUPPORT SERVICES AMONG FOOD CROP FARMERS IN ALBASU LGA, KANO STATE, NIGERIA

*Owoade E. O.[1], Saleh R. A.[2], Tidy A. S.[3] and Ismaila H. A.[4]

[1, 4]Department of Agricultural Economics and Extension, Federal University Gashua, Nigeria.
[2]Desert Research, Monitoring and Control Center, Yobe State University, Damaturu, Nigeria
[3]Department of Agricultural Extension, Faculty of Agriculture, Federal University of Kashere, Gombe State, Nigeria
***Corresponding author:** *owoadeezekieloluwatoyin@fugashua.edu.ng;* +234 806 952 5752

ABSTRACT

The study analyzed the determinants of utilization of mobile phones for agricultural information services among food crop farmers in the Albasu Local Government Area of Kano State. A multi-stage sampling procedure was adopted to select one hundred and twenty (120) food crop farmers. Primary data was collected on the socio-economic characteristics of the respondents, information needs, utilization of mobile phones, and constraints. The results revealed that the mean age was 39.83 years. Most (91.7%) of the respondents were males and the mean year of experience was 15.27. Most (68.3%) of the respondents had formal education. The respondents needed different types of information. The respondents utilized mainly mobile phone voice calls (1.63) and short message services (1.06). Lack of skills (1.48), poor mobile network (1.44), low income (1.53), and lack of education (1.47) were the main constraints to the use of mobile phones. Information needs ($\beta = 0.413$, $t = 5.707$, $p < 0.001$), education ($\beta = 0.281$, $t = 4.110$, $p < 0.001$), and membership of association ($\beta = 0.149$, $t = 2.193$, $p < 0.05$) were significant positive predictors of utilization of mobile phones. The constraints to the use of mobile phone was a significant negative predictor of utilization of mobile phones ($\beta = -0.193$, $t = -2.599$, $p < 0.05$). The study recommended the need for farmers' organizations or extension agencies to train food crop farmers on the use of other mobile phone functions to maximize their potential for obtaining and sharing agricultural information.

Keywords: Utilization, mobile phones, food crops, farmers, Yobe, State

INTRODUCTION

The capacity of the farmers to improve food production in Nigeria depends on the level of their access to seeds, pesticides, credits, and extension service information. Extension service information is critical to obtaining and appropriately using agricultural inputs and technological innovations through effective communication. In Nigeria, public extension which is the largest in terms of its scope and spread is not adequate to meet the demands of the farmers for services owing to the paucity of staff, high extension-farmers ratio, and poor logistics (Agbamu *et al.*, 2005; Ogunlade *et al.,* 2012; Haruna *et al.*, 2013). The use of Information and Communication Technologies (ICTs) to facilitate and enhance farmers' access to information is aimed at increasing extension outcomes. ICTs make it possible for agricultural stakeholders to share and obtain information. ICTs comprise radio, television, computers, mobile phones, and the internet which are used

to store, process, and share information among the people (Okon, 2013). A mobile phone also known as a hand phone or cellular phone is a device that can make and receive telephone calls over a radio link while moving around a wide geographic area (Wikipedia, 2023). Mobile phone is one of the ICTs that have gained widespread acceptance and use among people in both developed and developing countries. But mobile phones have attained a level of sophistication beyond voice calls and Short Message Services (SMS) as other functions have been integrated to work through the internet in sharing audio, visuals, and audio-visual content on social media, radio, and video applications.

The capacity of mobile phones to overcome restrictions placed on the physical movement of the extension agents has made them acceptable to millions of people for knowledge and information sharing. Mobile phones have been used to spread information to the mass audience, facilitate feedback, teach skills, create awareness of emerging problems, new ideas, and practices, give out market information, and locate inputs. Akpan *et al.,* (2016) affirmed that mobile phones are more viable and accessible in rural areas that are characterized by poor infrastructure. Mobile phones can be used to enhance the activities of extension workers as home and farm visits can be reinforced with follow-up calls, SMS, or pictures (Akpan *et al.,* 2016). Horizontal sharing of information among farmers can also be facilitated with mobile phones as farmers share experiences and ideas with others. Input dealers, produce buyers and other stakeholders who have dealings with farmers can also harness mobile phones for the exchange of information. Despite its wide acceptance, there is the underutilization of the capacity of mobile phone functions among the farmers to reap the full benefits it offers as a tool for information exchange as illiteracy limits the people to voice calls (Mundi, 2011).

Some factors from past studies have been revealed to influence the use of mobile phones. Hoang (2020) found that the use of mobile phones by Vietnamese farmers for marketing was positively and significantly associated with education level, gender, and income but negatively and significantly associated with age.

Akinwale *et al.* (2019) reported that education level and maintenance cost were positively and significantly associated with the use of mobile phones. Against the background of the underutilization of mobile phones which may occur among the food crop growers in rural communities, the study sought to boost the current knowledge about the determinants of utilization of mobile phones for agricultural information support services in the study area. The objectives of the study were to: describe the socio-economic characteristics of food crop farmers in the study area; identify the information needs of the respondents; ascertain the respondents' level of use of mobile phones; and identify the constraints to the use of mobile phones among the respondents. The following null hypothesis was tested in the study:
There are no significant contributions of independent variables to the utilization of mobile phones (Dependent variable).

MATERIAL AND METHODS
Study Area
The study was carried out in Albasu Local Government Area (LGA) of Kano State, which is in the northwest region of Nigeria. The land area is 398km^2 and the population was 190,153 at the 2006 census (Wikipedia, 2023). Its coordinates are 11° 40′ 26′ N and 9° 08′ 28′ E. Albasu LGA shares borders with Gaya LGA to the northwest, Bagwai LGA to the northeast, Gezawa LGA to the southeast and Gabasawa LGA to the southwest (Property, 2023). The headquarters of Albasu LGA is the town of Albasu. The population of the LGA is predominantly the Hausa-speaking ethnic group. The LGA is predominantly rural and agriculture is the primary occupation and livelihood of the majority of the people (Property, 2023). The hottest months are March and April with temperature ranges of 38-40° Celsius. In the rainy season, from June to September, temperatures fall to 33-38° Celsius, with rainfall of 500mm to 1000mm. The farmers in the LGA cultivate crops such as maize, millet, rice, and vegetables. Albasu LGA has limited access to urban amenities and infrastructure compared to larger towns or cities. The available facilities such as healthcare centers, schools, and markets are more basic in nature (Property, 2023).

Data Collection
The population for the study is all the food crop farmers in Albasu LGA in Kano State. A multi-stage sampling procedure was used to select the sample for the study. Albasu LGA comprises ten wards, namely Albasu Central, Fanda, Saya-saya, Bataiya, Faragai, Tsangaya, Chamarana, Gagarame, Daho and Hungu (Manpower, 2023). In the first stage, five wards were selected using a simple random sampling technique. In the second stage, a simple random sampling technique was used to select two villages from each of the selected wards, making a total of ten (10) villages. In the third stage, a snowball technique was used to select twelve (12) farmers from each selected village to arrive at a total of one hundred and twenty (120) farmers from whom primary data for the study was collected.

Analytical Techniques
Utilization of Mobile Phone: It was measured by asking the respondents to indicate the extent to which they use mobile phone functions to obtain or share farm information on a three-point rating scale of "Always", "Occasionally" and "Never", which was scored "2", "1" and "0" respectively. The sum of the scores on all of the items will be the extent of utilization of mobile phones by each respondent.
Information Needs of the Food Crop Farmers: It was measured at interval level by asking the respondents to indicate through ticking the categories of farm information that they need for farm work and support. A need for information attracts a score of 1. The sum of scores on all the needs is a measure of the information need of each respondent.
Constraints to the Use of Mobile Phone: It was measured at interval level by asking the respondents to indicate the extent to which epileptic power supply, lack of education, poor mobile network, lack of skills, low income, and cost of airtime were the constraints to the use of the mobile phone on a three-point point rating scale of "Serious constraint", "Mild constraint" "Not a constraint" score of 2, 1 and 0 respectively. The sum of the scores on all of the items will be the measure of constraints to the use of mobile phones.

Statistical Tools: Descriptive and inferential statistical tools were used to analyze the data. The descriptive tools that were used include mean, frequency counts, and percentages while the inferential statistical tool used was Multiple Regression Analysis. Objectives 1, 2, 3, and 4 were analyzed with mean, frequency counts and percentages. Hypothesis 1 was analyzed with Multiple Regression Analysis (MRA) at a 0.05 level of significance.
Multiple Regression model is explicitly given below:
$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 \ldots b_7x_7 + e$$
…………(1)
Where Y= Utilisation of mobile phone (Index)
x_1= Age of the respondents (years)
x_2 = Education qualification (formal education =1, no formal education =0)
x_3 = household size (actual number of people)
x_4 = Total income in Naira
x_5 = Membership in association (member=1, non-member=0)
x_6 = Information needs (index)
x_7 = Constraints to the use of mobile phone (index)
e = error term

RESULTS
Socio-Economic Characteristics of the Respondents
The results in Table 1 show that 29.2% of the respondents were within the age range of 25-34 years while 18.3% of the respondents were within the age brackets of 15-24 years. The mean age was 39.83 years. The majority (91.7%) of the respondents were males while 8.3% were females. Most (78.3%) of the respondents had 0-20 years of experience while 17.5% of the respondents had 21-40 years of experience and the mean year of experience was 15.27. Also, the results in the table reveal that 31.7% of the respondents had no formal education but 24.2% of the respondents had secondary school education, and 23.3% of the respondents had HND/First-degree educational qualifications. The majority (71.7%) of the respondents had a household size within the range of 1-10, while 24.1% of the respondents had an 11-20 household size. The mean household size was 8.67. Only 43.3% of the respondents had other sources of income, while

DETERMINANTS OF UTILIZATION OF MOBILE PHONES FOR AGRICULTURAL INFORMATION SUPPORT
SERVICES AMONG FOOD CROP FARMERS IN ALBASU LGA, KANO STATE

29

the remaining percentage solely depended on crop farming activities. Most (60.0%) of the respondents had a total monthly income (Naira) of ₦10,000 – ₦50,000 per month, while 21.7% of the respondents also earned ₦50,001-₦90,000. The mean monthly income was ₦65,275. The majority (93.3%) of the farmers had a total farm size of 1-5 ha while 5.9% of the respondents had 6 -10 ha. The mean farm size was 2.92 ha. Furthermore, the result on membership in farmers' associations reveals that only 34. 2% had membership in farmers' associations.

Table 1: Socioeconomic Characteristics of the Respondents

Variable	Percentage (n=120)	Mean	Standard Deviation
Age			
15 – 24	18.3	39.83	18.147
25 – 34	29.2		
35 – 44	12.5		
45 – 54	16.7		
55 – 64	10.8		
65 and above	12.5		
Sex			
Male	91.7		
Female	8.3		
Years of experience			
0 – 20	78.3	15.27	13.76
21 – 40	17.5		
41and above	4.2		
Education qualification			
No formal education	31.7		
Primary education	10.8		
Secondary education	24.2		
OND/NCE	10.0		
HND/First degree	23.3		
Household size			
1 – 10	71.7	8.67	6.70
11 – 20	24.1		
21 – above	4.2		
Other sources of income			
Yes	43.3		
Monthly income (Naira)			
₦10,000 – ₦50,000	60.0	65,275	74,398
₦50,001 – ₦90,000	21.7		
₦130,001 – ₦130,000	7.5		
₦130,001 – ₦180,000	6.6		
Above ₦180,000	4.2		
Farm Size (Ha)			
1 – 5	93.3	2.92	1.97
6 – 10	5.9		
Above 10	0.8		
Membership in the farmers' association			
Yes	34.2		

Information Needs of the Respondents

Table 2 shows that 95.8% of the respondents needed information on new varieties of crops and location, and prices of seeds, fertilizer, and pesticides respectively. While the majority (98.3%) needed information on solutions to problems of diseases, pests, and parasites as well as markets and prices of crops for sale. Less than two-thirds (54.2%) of the respondents needed weather information. Also, 64.2% of the respondents needed information on government subsidies and other supports.

Table 2: Information Needs of the Respondents (n=120)

S/N	Information needs	Percentage
i.	New varieties of crops	95.8
ii.	Location and prices of seeds, fertilizers, and pesticides	95.8
iii.	Solutions to problems of disease, pests, and parasites	98.3
iv.	Markets and prices of crops for sale	98.3
V.	Weather information	54.2
vi.	Government subsidies and other supports	64.2

Utilization of Mobile Phone Functions

Table 3 reveals that the utilization of voice calls (1.63) and short message service (1.06) on mobile phones was high. However, there was low utilization of video calls (0.75), watching videos on crop farming (0.76), chatting on social media (0.90), and browsing mobile internet for farm information (1.00).

Table 3: The Respondent's Use of Mobile Phone Functions (n = 120)
* Mean > 1.01 indicates high use while mean < 1.01 indicates low use

S/No.	Use	Never	Occasionally	Always	Mean
I	Making voice calls	00.0	36.7	63.4	1.63 *
ii	Short Message Services (SMS)	26.7	40.8	32.5	1.06 *
iii	Video calls	55.0	15.0	30.0	0.75
iv	Watching on video on crop farming	43.3	37.5	19.2	0.76
v	Chatting on social media	35.8	38.3	25.8	0.90
vi	Browsing the internet	32.5	35.0	32.5	1.00
	Overall mean				1.01

Constraints to the Use of Mobile Phones

Table 4 on the constraints to the use of mobile phones reveals that lack of skills in using certain phone functions (1.48), poor mobile phone network (1.44), low income (1.53), and lack of education (1.47) respectively were the main constraints to the use of mobile phones. Inadequate electricity (1.28) and cost of airtime (1.41) were not serious constraints to the use of mobile phones.

Table 4: Constraints to the Use of Mobile Phones (n = 120)

S/N	Constraint	Serious constraints	Mid-constraints	Not constraints	-x
i	Inadequate electricity	56.7	15.0	28.3	1.28
ii	Lack of skill in using certain phone functions	66.7	15.0	18.3	1.48 *
iii	Poor mobile network	58.3	27.5	14.2	1.44*
iv	Low income	64.2	24.2	11.7	1.53 *
v	Lack of education	63.9	19.3	16.8	1.47*
vi	Cost of airtime	56.7	27.6	15.8	1.41
	Overall mean				1.43

*Mean > 1.43 indicates high constraint while mean < 1.43 indicates low constraint

31

DETERMINANTS OF UTILIZATION OF MOBILE PHONES FOR AGRICULTURAL INFORMATION SUPPORT
SERVICES AMONG FOOD CROP FARMERS IN ALBASU LGA, KANO STATE

Determinants of Utilization of Mobile Phones for Agricultural Support Information Services

In order to test the research question, a multiple regression analysis was conducted, with age, education, household size, income, membership in association (member = 1, non-member =0), information needs, and constraints to the use of mobile phones as the predictor variables, while utilization of mobile phones was the dependent variable. The result of multiple regression analysis is presented in Table 5. Overall, the significance of the model as shown in the table is as follows: F (7,111), = 21.529, P < 0.05. The model explains 57.6% of the variance (R^2 = 0.576) in the utilization of mobile phones. The results reveals that information needs, education, and membership of association were significant positive predictors of utilization of mobile phones (β = 0.413, t = 5.707, p < 0.001, β = 0.281, t = 4.110, p< 0.001, and β = 0.149, t = 2.193, p< 0.05). The constraints to the use of mobile phone was a significant negative predictor of utilization of mobile phones (β = -0.193, t = -2.599, p < 0.05). The results show that age, household size, and income were not significant predictors of utilization of mobile phones (β = 0.045, t = 0.403, p > 0.05, β = 0.113, t = 1.016, p> 0.05, and β = 0.088, t = 1.333, p> 0.05). The finding is similar to the finding of Falola et al., (2013) who reported that education and membership in an association had a significant positive relationship with the utilization of mobile phones.

Table 4 Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficient		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-3.225	1.974		-1.634	0.105
	Age of respondents	0.009	0.022	0.045	0.403	0.688
	Education	2.208	0.537	0.281	4.110	0.000*
	Household size	0.062	0.061	0.113	1.016	0.312
	Total income	4.333E-6	0.000	0.088	1.333	0.185
	Membership of association	1.151	0.525	0.149	2.193	0.030*
	Index information needs	1.548	0.271	0.413	5.707	0.000*
	Index constraints to the use of mobile phone	-0.254	0.098	-0.193	-2.599	0.011*

Significant variable P<0.05; Model Significant F (7,111) = 21.529, P< 0.05; R square = 0.576; Adjusted R square = 0.549

DISCUSSION

Most of the respondents were young and active food crop farmers. As able-bodied farmers, they are likely to develop interest in the utilization of mobile phones for agricultural information support. The finding is similar to the finding reported by Owoade et al., (2021) that the mean age of rice farmers in Bade Local Government Area of Yobe State was 38.62 years. Male farmers dominated the food crop farming in the study area. The finding aligns with Owoade et al., (2021) about the dominance of male farmers in rice production. The food crop farmers were highly experienced in farming. The finding is similar to the finding reported by Owoade et al., (2021) that the mean years of experience of rice farmers studied was 12.87. Most of the respondents had formal education to be able to utilize mobile phones for agricultural support information services. The finding agrees with Owoade et al., (2021) who reported that the majority of rice farmers had formal education. With large family size, farmers could have access to family labor for their farm work. The finding is similar to the finding reported by Owoade et al., (2021) of rice farmers having a mean household size of 9.00. Farmers were mainly food crop producers. The finding agrees with the finding reported by Oluwatusin et al., (2016) that the majority of the farming households earned their income from crop production. The income from farming was moderate. Increasing farm yield and income is possible if farmers acquire information and

make use of it. Food crop farmers in the area are smallholders. Irrespective of their small farm holdings, farmers can improve production using information on improved technologies. The finding is similar to the finding of Maurice *et al.,* (2015) who reported that the mean farm size of food farmers was 2.12 ha. Most food crop farmers did not belong to a producers' association. Membership of producers' association offers an opportunity to farmers to access social capital. The finding agrees with Owoade *et al.,* (2021) about the majority of rice farmers not belonging to a farmer association.

Food crop farmers needed a variety of information to improve their production activities, increase yield and income. This implies that the need for information among food crop farmers can be a motivation to use mobile phones. The finding is corroborated by Asa *et al.,* (2017) who reported that the farmers they studied used mobile phones to obtain agricultural information, access inputs, and market agricultural produce. Furthermore, restricted utilization of mobile phone to voice calls and short message services gave rise to low utilization. Hence, low utilization would reduce the potential benefits of utilizing mobile phones. The finding is consistent with the finding reported by Akinwale *et al.,* (2019) and Falola *et al.,* (2013) that farmers in Ondo State used voice calls and short message services on mobile phones more than other functions. The constraints associated with the use of mobile

phone could further hamper their maximum use. The results imply the need to address these constraints through training and improvement in mobile infrastructure. The finding agrees partly with the finding of Falola *et al.,* (2013) about fluctuating telecommunication services serving as a constraint to the use of mobile phones.

CONCLUSION AND RECOMMENDATIONS

Food crop farmers in the study area were young, literate, and highly experienced in food crop farming. They needed agricultural support information on new varieties of crops, market information, weather, and available government support schemes. The main constraints to the use of mobile phones were lack of skills, poor mobile networks, low income, and lack of education. Voice calls and short message services were used more than other functions to share and obtain agricultural information. The major determinants of the utilization of mobile phones were education, membership in association, information needs, and constraints. Based on the findings of the study, the following recommendations were made: Extension agents should make use of mobile phones to disseminate information needs identified by farmers; mobile service providers should improve the mobile network in the area; training on how to use other mobile functions to maximize its potential should be given to farmers by the farmer organizations or extension agency.

REFERENCES

Agbamu J.U. and Okagbare G.O. (2005). Institutional strengthening of Ogun State ADP upon expiration of World Bank assistance. In: Orheruata A.M. et al. (eds.), Agricultural Rebirth for Improved Production in Nigeria (pp. 322-325). Proc. 39th Ann. Conf. Agric. Soc. Nig., University of Benin, 9-13 Oct., Benin City

Akinwale, J. A., Owoade, E. O. and Oloruntobi, D. O. (2019). 'Analysis of Utilisation of Mobile Phones in Agricultural Information Dissemination among Maize Farmers in Ondo State,

Nigeria'. *Journal of Agriculture and Environment.* 15 (2), 39-49

Akpan, V. I. and Nzeakor, F. C. (2016). 'Awareness and Utilisation of Cell Phones as an Effective Resource among Farmers in Ikwuano LGA of Abia State, Nigeria'. *Scientia Agriculturae.* 15 (3), 387-391

Asa, U. A. and Uwem, C. A. (2017). 'Utilisation of Mobile Phones for Agricultural Purposes by Farmers in Itu Area, Nigeria'. *European Scientific Journal.* 13 (19): 395-402.

Falola, A. and Adewumi, M. O. (2013). 'Constraints to Use Mobile Telephony for Agricultural Production in

33

DETERMINANTS OF UTILIZATION OF MOBILE PHONES FOR AGRICULTURAL INFORMATION SUPPORT SERVICES AMONG FOOD CROP FARMERS IN ALBASU LGA, KANO STATE

Ondo State, Nigeria'. *Journal of Research in Forestry, Wildlife and Environment.* 4 (2): 52-63

Haruna S.K. and Abdullahi, Y. M. (2013). 'Training of Public Extension Agents in Nigeria and the Implications for Government's Agricultural Transformation Agenda'. *Journal Agricultural Exension.:* 17 (2), 98-104

Hoang, G. H. (2020). Adoption of Mobile Phone for Marketing of Cereals by Smallholder Farmers in Quang Dien District of Vietnam. *Journal Agricultural Extension:* 24(1), 106-117

Manpower (2023). List of wards in Albasu Local Government Area. https://www.manpower.com.ng/places/wards-in-lga/408/albasu

Maurice, D. C., Adamu, Y. and Joseph, M. (2015). 'Analysis of Cost Efficiency in Food Crop Production among Small-scale Farmers in Adamawa State, Nigeria'. *Global Journal of Agricultural Sciences.* 14: 17-25.

Mundi, I. (2011). Kenya Literacy *http://www.indexmundi.com/kenya/literacy.html*

Ogunlade, I., Atibioke O.A., Ladele A.A. and Adumadehin G.S. (2012). 'Capacity of Agro-Input Dealers in Advisory Service Delivery to Maize Farmers in Kwara State, Nigeria'. *International Research Journal of Agricultural Science and Soil Science:* 2 (10), 426-443

Okon, D. P. (2013). Information and Communication Technologies used in Extension in Nwachukwu (Ed) *Agricultural Extension and Rural Development Promoting Indigenous Knowledge*. Lamb House Publications, Umuahia, Nigeria. 105p.

Oluwatusin, F. M. and Sekumade, A. B. (2016). 'Farm Households' Income Sources Diversification Behaviour in Nigeria'. *Journal of Natural Sciences Research.* 6 (4): 102- 111.

Owoade, E. O. *et al.* (2021). 'Effect of Importation Ban on Rice Production in Bade Local Government Area of Yobe State, Nigeria'. *Asian Research Journal of Agriculture, 14(3): 36-44*

Property (2023). Albasu. https://www.propertypro.ng/guide/axes/albasu/#:~:text=Albasu%20is%20a%20Local%20Government,primary%20occupation%20of%20the%20people.

Wikipedia (2023). Albasu. https://en.wikipedia.org/wiki/Albasu

Wikipedia (2023), Mobile phones. https://en.m.wikipedia.org/mobilephone