Journal of Kerbala for Agricultural Sciences Issue (4), Volume (11), (2024)

Farmers' use of phone applications in accessing information for maize production in Kwara state, Nigeria

Latifat Kehinde Olatinwo[1]*, Olayinka Jelili Yusuf [1], Munir Jamiu Wahab[2]

[1]Department of Agricultural Economics and Extension services, Kwara State University, Nigeria
[2]Department of Agricultural Economics and Extension, Yobe State University, Damaturu, Yobe State, Nigeria
***Corresponding author e-mail: latifat.olatinwo@kwasu.edu.ng**
https://doi.org/10.59658/jkas.v11i4.2787

Received:
July 7, 2024

Accepted:
Oct. 12, 2024

Published:
Dec. 15, 2024

Abstract

This study assessed the farmers' use of phone applications to access information for maise production in Kwara State. Data for the study were analysed using descriptive statistics, likert scale, and Pearson Product Moment Correlation (PPMC). A simple random sampling was used to select 120 maise farmers from 6 villages in both Omupo and Ajase-Ipo districts. The study revealed that 83.3% of the maise farmers were males with an average of 37.6, and 83.3% were married, with an average of 12 years of schooling. The average household size was 7 persons while the number of years of experience was 11 years. The study also revealed that the most common way of accessing information was through voice calls, radio, and WhatsApp, with all the respondents choosing both of these sources. The study also showed that poor internet networks on field/farm sites, with a mean score of 2.59 were the most glaring effect of the use of phones to access information on maise production, while the high cost of mobile smart/android phones with a mean score of 2.58 was one of the mitigating factors. The major constraint of using phone features/applications to access information was that smartphones use a bunch of data bundles and cost implications with a mean score of 2.61. The results of the hypothesis showed a significant relationship between socioeconomic characteristics and farmers' use of phone applications in accessing information for maise production. Data subscriptions on customised phones can also be made affordable for farmers.

Keywords: Farmers, Phone application, information, and Maize Production.

Introduction

According to the a previous study [1], agriculture is essential to fiscal development; it accounted for one-third of the world's GDP in 2014, occupies more than a third of all land, and serves as the main source of income for the vast majority of people who live in rural regions worldwide. The [1] says that, compared to other sec-

tors, improvement in the agricultural sector is the most effective approach to increasing the earnings of people experiencing poverty. According to the 2016 analysis, 815 million people worldwide were hungry, and 65% of the poor workforce depended on agriculture for their livelihoods. Agricultural development is one of the main strategies for eradicating extreme poverty globally. Agriculture communication is unique and audience-specific since it primarily involves technical and economic information about agriculture. A specialised method of disseminating information about agricultural production, processing, and selling is known as agricultural Communication. Due to the world's ever-increasing population and the emergence of human needs due to various challenges like war, insurgency, famine, disease outbreaks, and various climatic change effects, technology plays a significant role in global development. Mobile phones will be crucial in agriculture, according to [2], because future farmers may not necessarily come from farming families. They will have more opportunities to study the trade and modify their knowledge and abilities to meet new obstacles, increasing their likelihood of becoming farmers. Further information was provided, stating that the (GSMA) Global System for Mobile Association expected the number of mobile phone customers in sub-Saharan Africa to increase from 420 million to 535 million between 2016 and 2020, with 40% of them having access to the Internet. Agriculture is a crucial industry overall, but a variety of barriers prevent farmers, particularly those in poorer nations, from receiving farming information. According to [3], these obstacles include a shortage of agricultural information packaged in a way that farmers and limited access to relevant, reliable, and appropriate information prefer. [4] Describe Communication, which is the process by which people or groups share ideas, information, messages, thoughts, and notions using previously established symbols to influence one another. Communication through various tools and channels is the most efficient method of transferring technology in agricultural extension. Only when the advances are explained in a way that farmers understand is the cycle of research-extension-linkage possible. In Nigeria, mobile phones are so widely used that they are now required for all types of transactions and interactions in urban and rural areas. The adoption of the Electronic Wallet System in Nigeria in 2011 resulted in a breakthrough in agriculture input distribution to farmers. [5] Reported that the system primarily hinged on the usage of mobile phones. Vouchers for subsidised inputs were sent to farmers' mobile phones, allowing them to purchase inputs directly from agro-dealers and reach 20 million smallholder farmers. The receiving of seeds and fertilisers was pre-programmed. Every farmer with a phone might get access to farm innovation through mobile technology, making it easier for them to adopt new technologies at any time. Extension practitioners can utilise Internet platforms to look for fresh concepts that can benefit farmers. Frontline extension workers should be well-positioned to use information communication technologies (ICT) to access specialised knowledge and other types of information that could be helpful to farmers [6]. These workers directly link farmers and other stakeholders in the agricultural knowledge transfer and information management system. These are a few of the most significant issues that many farmers in Kwara state, Nigeria, have with their mobile

devices, which could interfere with accurately receiving information from extension practitioners. Since the e-agriculture community was founded in Geneva in 2003, more countries have begun to engage in projects that aim to disseminate agricultural information through various ICT tools. As a result, the accessibility of agricultural information to farmers has improved [7]. This study is important because understanding how mobile phones are used to distribute agricultural information to the maise farming community in Kwara State would help define recommendations that may be used for building mobile phone-based agricultural information dissemination services in the state and Nigeria in general.

The main objective was to assess the usage of phone applications in accessing agricultural information by maise farmers in Kwara State, while the specific objectives were to:

i. Describe the socioeconomic characteristics of maise farmers;
ii. Identify the main farmer level of phone application usage in receiving agricultural messages;
iii. Identify the benefits of agriculture applications among maise farmers in receiving information;
iv. determine the factors that influence smartphone application usage among maise farmers;

Identify the challenges the maise farmers face in using mobile phones to receive agricultural information for their production.

Materials and Methods

The study was carried out in Nigeria's Kwara State. Kwara State has sixteen Local Government Areas (LGAs), and Ilorin is the state's capital. It lies between latitudes 7° 45' and 9°30'North and longitudes 2° 30' and 6° 35' east of the meridian. Kwara State is bound in the north by Niger State, in the south by Oyo, Osun, and Ekiti States, in the east by Kogi State, and the west by the Republic of Benin. It is situated in Nigeria's North Central Geopolitical Zone. The rainy season and the dry season are two separate seasons. There is a 30°C to 35°C temperature range on average. Kwara State has a land mass of 36,825 square kilometres and a projected population of 3,599,975 individuals (projected population from 2006 census figure). Agriculture is the key economic force in Kwara State, and the main cash crops there are cotton, cocoa, coffee, kola nuts, tobacco, Beni seed, and palm products. Among the additional crops grown are Yam, maise, millet, onions, rice, cassava, plantains, bananas, cocoyam, potatoes, fruits, vegetables, and sugarcane. There are around 1,258 rural settlements in the state. Kwara State Agricultural Development Project divides the state into four zones based on ecological traits, cultural customs, and administrative ease (KWADP). Which are: Zone A includes Baruteen and Kaima LGAs; Zone B includes Edu and Patigi LGAs; Zone C includes Asa, Ilorin East, Ilorin South, and Ilorin West; and Zone D includes Ekiti, Ifelodun, Irepodun, Offa, Oyun, Isin, and Oke Ero LGAs [8]. Both commercial and subsistence-sized cassava is produced in the state. This promotes learning about the viewpoints of some farmers on cassava pro-

duction and the sharing and combining of ideas to enhance their cassava output in the state of Kwara. However, this is insufficient as a source of knowledge.

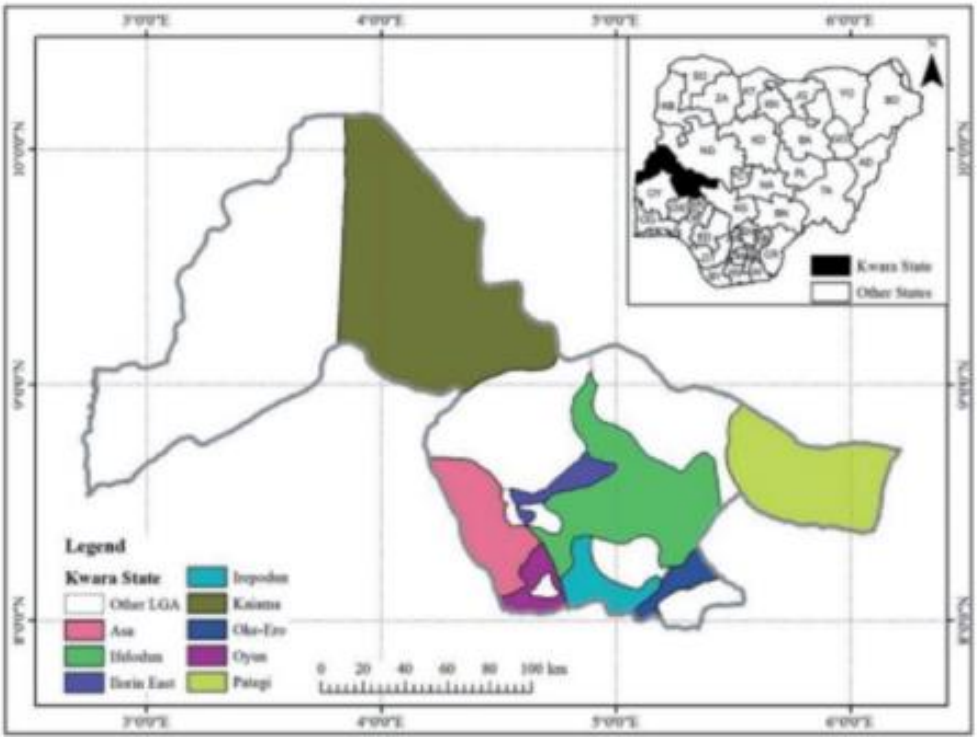

Figure (1): The sampled Local Government Areas are depicted on a map of Kwara State, Nigeria (Kwara State Ministry of Lands 2017)

Sampling procedure and Sample size

The respondents' information was collected using a simple random sampling method. The first sampling technique is the purposive selection of the Ifelodun and Irepodun local government regions. This decision was made since the two (2) LGAs are among the main rural areas where agricultural production, including the growing of maise and other fundamental activities, are practiced. The following step is to randomly select six (6) communities from each of the chosen local government areas in the study area.

Method of Data Collection.

Data for this study was collected through a well-structured questionnaire. Relevant information was elicited from Maise farmers regarding the use of phone applications to get relevant information on farming activities in the study areas.

Analytical Techniques

The data from this study was analysed using descriptive statistics, the Likert scale, and Pearson product-moment correlation analysis.

Results and Discussion

Socio economic and Farm Characteristics of the Maize Farmers in the Study Area

The result presented in Table 1 showed that a significant percentage of the respondents (38.3%) were aged between 31 – 40 years. The average age of the respondents was 37.6±12.8. This implies that maise farmers in the study area are youths possessing the required strength to carry out maise farming activities efficiently through the use of Information and Communication Technology (ICT), including features and Applications. Furthermore, 83.3% of the respondents were male while the remaining 16.7% were female. This indicated that maise farming in the study area is dominated by male folks. On marital status, the majority (83.3%) of the respondents indicated they were married. Since marriage comes with family responsibilities, maise farmers are expected to utilise the needed gadgets to access information to boost maise production. More than half of the respondents (51.7%) indicated 55 persons or below on household size. The average number of persons per household was 7±3.22 persons. This number could be considered moderate to cater for as they could serve labour for maise farming. Family labour is a type of labour utilised by farmers at no financial cost. This will reduce the cost of farm operations and thus increase the profit made by farmers in maise cultivation families that utilise them for farming purposes. On the educational status of farmers, few (25.8%) of the respondents had no formal education, while others had formal education. This implies that maise farmers will be able to read extension information disseminated to them on mobile phones and send messages to extension agents using phone features such as SMS to provide feedback information and challenges needing the attention of extension agents across to them. Unfortunately, most (67.5%) of the respondents do not belong to any farmer's group. Membership of a maise farmer is a crucial network where farmers can join innovations/ideas and resources together to achieve a common goal, thereby overcoming individual or group goals in farming.

Table 2 further provided detailed information about the farm characteristics of the respondents. The table presents the result of years of farming experience. 33.3% had less than 5 years or below, 32.4 percent had 6 to 10 years of experience, and 34.2 percent had 11 years or above in maise farming. The average number of years of farming is 11 years, indicating that maise farmers have reasonable years of experience in maise farming. This wealth of experience is expected to have exposed them to the importance of using phone features and Applications for agricultural purposes. Results show that most (80.0%) respondents have access to or own a smartphone. The implication is that the maise farmers in the study area can access phone features through which extension information could be disseminated. The table also reveals that only 33.7 percent had access to extension contact or visitation. This shows that most maise farmers were not visited by extension agents. This may have severe implications for the use and accurate adoption of improved technology; they may have access through phones, and the vast majority of agricultural-related applications stalled on their phones. Table 2 further shows that the average number of agricultur-

al-related Applications stalled on their phone was 3. This shows that maise farmers in Kwara State utilise agricultural applications.

Table (1): Socioeconomic Characteristics of Maise farmers in the Study area

Variables	Frequency (120)	Percentage (100%)	Mean	Standard dev.
Age (years)				
≤ 30	39	32.5		
31 – 40	46	38.3	37.6	12.81
41 – 50	16	13.3		
Above 50	19	15.8		
Sex				
Male	100	83.3		
Female	20	16.7		
Marital Status				
Married	100	83.3		
Single	8	6.7		
Widowed/widower	12	10.0		
Household size (people)				
≤ 5	62	51.7		
6 – 10	43	35.8	7	3.22
11 and above	15	12.5		
Educational status				
None formal education	31	25.8		
Primary education	30	25.0		
Secondary education	27	22.5		
Tertiary education	32	26.7		
Membership in farmers' group				
Yes	39	32.5		
No	81	67.5		

Source: Field survey, 2023

Table (2): Maize Farming Characteristics of maise farmers in the study area

Characteristics	Frequency	Percentage	Mean	Std. Dev.
Farming experience (yrs.)				
≤ 5	40	33.3		
6 – 10	39	32.5	11.1	9.70
11 and above	41	34.2		
Access to extension services				
Yes	40	33.7		
No	80	66.7		
Access to/ownership of a mobile smartphone				
Yes	96	80.0		
No	24	20.0		
Years of using mobile phone				
≤ 10	54	45.0		
11 – 20	51	42.5	13.2	8.85
20 and above	15	12.5		
Use the mobile phone for agricultural purposes				
Yes	72	60.0		
No	48	40.0		
Number of Agricultural Applications on Phone				
0	12	10.0		
1 – 5	97	80.8	3.1	3.60
6 – 10	8	6.7		
Above 10	3	2.5		

Source: Field survey, 2023

Use of Phone Features and Applications by Maize Farmers

As shown in Table 3, voice call (mean=3.42) ranked first, WhatsApp (mean=3.13) ranked second, internet browsers (mean=2.78) ranked third, Facebook (mean=2.73) ranked fourth, short message service (SMS) (mean=2.53) ranked fifth, while E-wallet was ranked 14th position as the least used feature/application by the farmers. The results imply that voice calls, WhatsApp, internet browsers and Facebook were the foremost phone features/Applications utilised by Maise farmers in the study area to access agricultural information. Based on the usage level of phone features/Applications presented in Table 4, 68.3 percent scored between 36 and 56 points while 31.7 percent scored between 14 and 35 points. This implies that the phone features/applications used are high in the study area. In support of this finding, studies have shown that many Nigerians, including farmers, now use mobile phones

for personal or business transactions. Farmers use mobile phone applications to acquire information, especially on prices, products, transport, and weather forecasts. This would assist them in decision-making, especially regarding seasons to plant, breed new species, and harvest farm products [9, 10].

Table (3): Mobile phone features and Applications used for agricultural messages

Mobile Phone Features and Applications	Always Used	Sometimes used	Rarely used	Never used	Mean (SD)	Rank
Voice call	56(46.7)	60(50.0)	4(3.3)	0	3.43(.56)	1st
WhatsApp	64(53.3)	32(26.7)	24(20.0)	0	3.13(1.15)	2nd
Internet browsers	35(29.2)	43(35.8)	22(18.3)	20(16.7)	2.78(1.04)	3rd
Facebook	27(22.5)	61(50.8)	4(3.3)	28(23.3)	2.73(1.06)	4th
Short message services (SMS)	0	76(63.3)	32(26.7)	12(10.0)	2.53(.67)	5th
Instagram	30(25.0)	27(22.5)	28(23.3)	35(29.2)	2.43(1.15)	6th
Radio	39(32.5)	16(13.3)	20(16.7)	45(37.5)	2.41(1.28)	7th
E-mail	4(3.3)	42(35.0)	46(38.3)	28(23.3)	2.18(.83)	8th
Multi-media messages	3(2.5)	37(30.8)	28(23.3)	52(43.3)	1.93(.92)	9th
Bluetooth	4(3.3)	27(22.5)	38(31.7)	51(42.5)	1.87(.87)	10th
GPS services	4(3.3)	20(16.7)	19(15.8)	77(64.2)	1.83(1.87)	11th
Telegraph	0	0	38(31.7)	82(68.3)	1.32(.46)	12th
Flashare	0	0	29(24.2)	91(75.8)	1.24(.43)	13th
E-wallet	0	8(6.7)	4(3.3)	108(90.0)	1.17(.52)	14th

Source: Field survey, 2023

Table (4): Level of use of phone features and application

Categories	Obtained score range	Frequency	Percentage	Mean score
High	36 – 56	82	68.3	30.9±7.34
Low	14 - 35	38	31.7	
	Total	120	100.0	

Possible range score: 14 – 56 points

Perceived Benefits of Using Phone Features and Applications in Accessing Agricultural Information

As shown in Figure 2, the majority of the respondents indicated that benefits of using phone features and Applications for agricultural purposes include enhanced farmers-farmers sharing of extension information (73.3%), access to improved maise production practices (63.3%), increased farm income (68.3%) and Updates on the weather forecast to mitigate climate variability effects (51.7%) while appreciable per-

centage further indicated the benefit of accessing maise postharvest handling practice. Studies have shown that mobile phone applications are beneficial for acquiring information, especially on price, products, transport, and weather forecasts. These would assist them in decision-making, especially on seasons to plant, breed new species, and harvest farm products [9, 10]. The use of mobile phones by farmers saves costs by providing access to agricultural information through communicating with traders and other partners involved in agricultural processes. However, using mobile phones is essential for acquiring agricultural information, which would aid agricultural activities and have a formidable impact in countries [11], higher farm productivity for farmers, and farm income [12].

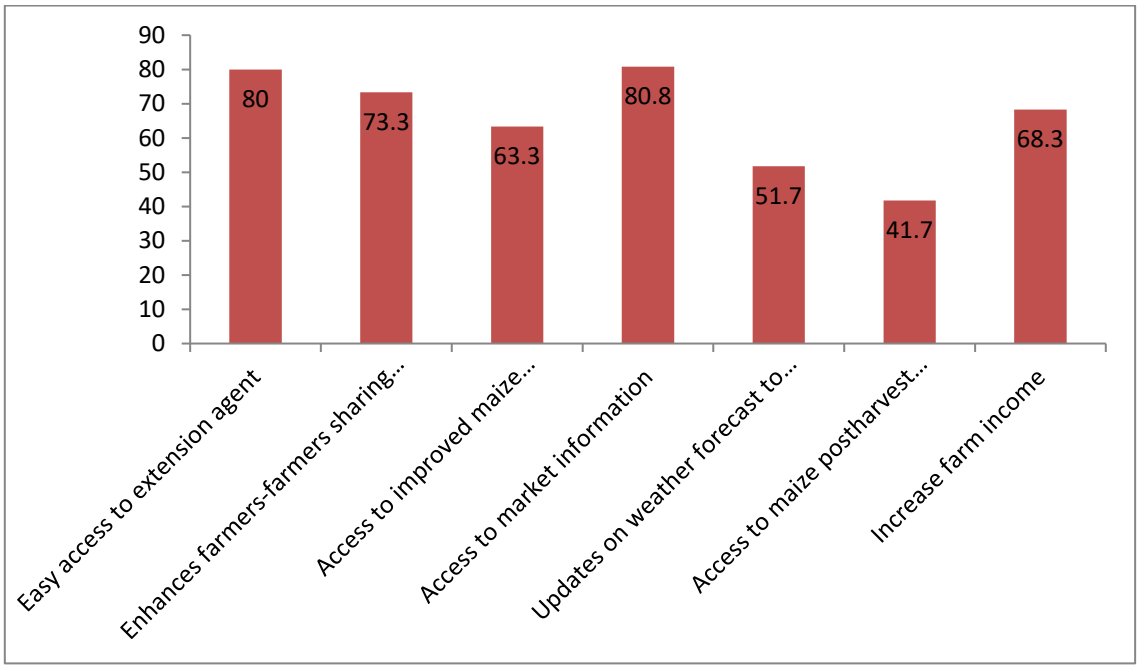

Figure (2): Perceived benefits of using phone features and Applications in accessing agricultural information

Table (5): Result of PPMC analysis between socioeconomic characteristics of farmers and the use of smartphone features and Applications for accessing agricultural information

Variables	r-value	Sig. (p-value)
Sex (male or female)	-0.108	0.240
Age (years)	-0.150	0.101
Educational status (formal or non-formal)	0.473**	0.000
Marital status (married or unmarried)	0.183*	0.045
Household size (persons)	0.552**	0.000
Experience (years)	-0.382	0.000
Contact with extension	0.042	0.649
Membership of group	0.088	0.337
Access/ownership of a smartphone	0.477**	0.000
Years of using a phone	0.060	0.517
Use of phone for agricultural purposes	0.611**	0.000
Number of Agricultural Applications on Phone	0.189*	0.039

**Significant at 0.01 level
*Significant at 0.05 level

The result of the PPMC analysis between socioeconomic characteristics and the use of smartphone features and Applications for accessing agricultural information, as presented in Table 5, indicated that educational status (r = 0.473), marital status (r = 0.0.183), household size (r = 0.552), access/ownership of smartphone (r = 0.477), use of the phone for agricultural purposes (r = 0.611), number of agricultural Applications on the phone (r=0.189) had positive significant correlation with the use of smartphone features and Applications for accessing agricultural information. These findings indicated that an increase in years of formal schooling, household size, access/ownership of smartphones, the extent of using phones for agricultural purposes, and the number of agricultural Applications on phones will increase the use of smartphone features and Applications for accessing agricultural information at $p < 0.05$ level of significance.

Constraints of using phone features/Applications in accessing timely information

The result in Table 6 shows that smartphones use a bunch of data bundles, and the cost implication (mean=2.61) ranked first, poor internet network on field/farm site (mean=2.59) ranked the second, high cost of mobile smart/android phone (mean=2.58) ranked third, inadequate electricity supply to a re-charge smartphone (mean=2.53) ranked fourth, low technical know-how on how the applications work (mean=2.47) ranked fifth, the smartphone is a complicated device (mean=2.28)

ranked sixth, smartphones change frequently. One always need to buy newer models (mean=2.25) ranked seventh, lack of basic knowledge of the efficiency of the applications (mean=2.24) ranked eighth. In contrast, inaccessibility to the proper network (mean=2.23) ranked the least as ninth position respectively of constraints facing the maise farmers in using phone features/applications to access agricultural information. This implies high-cost data bundles, poor internet network on field/farm sites, and high mobile smart/android phone costs. Similar findings by [13] have found that high poor power supply, cost of phones, poor network, complexity in operating phones, and high cost of airtime were the main constraints to the use of mobile phone applications among farmers in Nigeria.

Table (6): Constraints of using phone features/Applications in accessing timely information

Constraints	Very severe	Severe	Less severe	Not severe	Mean (SD)	Rank
Smartphones use a bunch of data bundles	23(19.2)	31(25.8)	62(51.7)	4(3.3)	2.61(.83)	1st
Poor internet network on field/farm site	16(13.3)	43(35.8)	57(47.5)	4(3.3)	2.59(.76)	2nd
High cost of mobile smart/Android phone	15(12.5)	59(49.2)	27(22.5)	19(15.8)	2.58(.90)	3rd
Inadequate electricity supply to re-charge smartphone	3(2.5)	65(54.2)	44(36.7)	8(6.7)	2.53(.66)	4th
Low technical know-how on how the applications work	16(13.3)	31(25.8)	66(55.0)	7(55.8)	2.47(.79)	5th
Smartphone is a complicated device	3(2.5)	43(35.8)	59(49.2)	15(12.5)	2.28(.71)	6th
Smartphones change frequently and one always needs to buy newer models	11(9.2)	27(22.5)	63(52.5)	19(15.8)	2.25(.83)	7th
Inadequate basic knowledge of the efficiency of the applications	12(10.0)	28(23.3)	57(47.5)	23(19.2)	2.24(.87)	8th
Inaccessibility to the proper network	4(3.3)	34(28.3)	67(55.8)	15(12.5)	2.23(.70)	9th

Source: Field survey, 2023

The phone features and agricultural applications used are high among maise farmers in Kwara State. Voice calls, WhatsApp, and internet browsers were the leading features and agricultural Applications used. Maise farming owned phones and had long years of using mobile phones for agricultural purposes. Constraints faced in using phone features and agricultural Applications were that smartphones use a bunch of data bundles and the cost implication, poor internet network on field/farm site, and high cost of mobile smart/android phones. Selected socioeconomics characteristics influence mobile application use for maise production in the study area. This study suggests that internet service providers in Kwara State should reduce the cost of subscriptions for data bundles to affordable rates. Governments at all levels, including private agencies concerned with rural development, can develop customised phones with all smartphone features that are affordable for smallholder farmers. To the farmers, the unaffordability of smartphones can be overcome through farmers' groups.

References

1) World Bank. (2017). Agriculture and food overview. Retrieved from http://www.worldbank.org/en/topic/agriculture/overview (Accessed on 30 October 2017).
2) Chatel, B. (2018). Next generation farmers: Digitally connected and business minded. In Technical Centre for Agricultural and Rural Cooperation, Wageningen, the Netherlands. (CTA), Spore, 187, 4-6.
3) Diekmann, F., Loibl, C., & Batte, M. T. (2009). The economics of agricultural information: Factors affecting commercial farmers' information strategies in Ohio. Review of Agricultural Economics, 31(4), 853-872.
4) Asemah, E. S., Nwammuo, A. N., & Adeline, O. A. N. (2017). General introduction. In Theories and Models**.**
5) Adesina, A. A. (2015). Riding the wave of reformation. In Technical Centre for Agricultural and Rural Cooperation, Wageningen, the Netherlands. (CTA), Spore, 176**,** 7**.**
6) Salau, E. S., & Saingbe, N. D. (2006). Access and utilisation of ICTs among agricultural researchers and extension workers in selected Nassarawa State of Nigeria institutions.
7) Ghogare, S. A., & Monga, P. M. (2015). E-agriculture: Introduction and figuration of its application. International Journal of Advanced Research in Computer Science and Software Engineering, 5(1). Retrieved from www.ijarcsse.com (Accessed 10 August 2017).
8) KWADP. (2010). Kwara State Agricultural Development Programme 2010 report.
9) Aparo, N. O., Odongo, W., & De Steur, H. (2022). Unraveling heterogeneity in farmer's adoption of mobile phone technologies: A systematic review. Technological Forecasting and Social Change, 185, 12-20.
10) Kabbiri, R., Dora, M., Kumar, V., Elepu, G., & Gellynck, X. (2017). Mobile phone adoption in the agri-food sector: Are farmers in Sub-Saharan Africa connected? Technological Forecasting and Social Change, 131, 253-261.

11) Anadozie, C., Fonkam, M., & Cleron, J. P. (2021). Assessing mobile phone use in farming: The case of Nigerian rural farmers. African Journal of Science, Technology, Innovation, and Development, 14(2), 418-427.

12) Khan, N. A., Ray, R. L., Zhang, S., Osabuohien, E. S., & Ihtisham, M. (2022). Influence of mobile phone and internet technology on the income of rural farmers: Evidence from Khyber Pakhtunkhwa Province, Pakistan. *Technology in Society*, *68*, 10-18.

13) Abdullahi, K. A., Oladele, O. I., & Akinyemi, M. (2021). Attitude, knowledge, and constraints associated with the use of mobile phone applications by farmers in North West Nigeria. *Journal of Agriculture and Food Research, 6*, 10-21.