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PERCEIVED EFFECTIVENESS OF MOBILE PHONE USAGE FOR ACCESSING AGRICULTURAL INFORMATION AMONG CROP FARMERS IN KWARA STATE, NIGERIA

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ABSTRACT

This study therefore examined the perceived effectiveness of mobile phone usage for accessing agricultural information, it also ascertain the frequency of mobile phone usage and constraints to mobile phone usage for accessing agricultural information among crop farmers. A multistage sampling procedure was used in the selection of 394 respondents. Primary data were collected from the respondents through the administration of a structured interview schedule. Data for the designed objectives were analyzed using descriptive statistics while Chi-square was used to test the formulated hypothesis. The findings revealed that the mean age of the respondents was 47 years, majority (67.2%) were literate, had a monthly contact with extension agents, owns and have access to mobile phone. It was also revealed that respondents frequently use mobile phone to schedule meeting with farmers with a Weighted Mean Score (WMS) of 2.42, About 44% of the respondents perceived mobile phone usage to be of low effectiveness and inconsistent electric power supply (WMS=2.42) is the most severe constraints. Chi-square revealed that access to mobile phone (X^2 = 13.58, p= 0.000) and educational level (X^2 = 3.72, p=0.000) had significant association with perceived effectiveness of mobile phone usage for accessing agricultural information. The study concludes that crop farmers perceived mobile phone usage for accessing agricultural information to be of low effectiveness. It is therefore recommended that concern stakeholders should facilitate infrastructural facilities such as rural electrification and good network coverage to the rural area.

Keywords: Effectiveness, Mobile Phone usage, Agricultural information, crop farmers.

INTRODUCTION

Agricultural sector serves as the primary pillar of the majority of African economies. A significant proportion (over 80%) of the African population, are engaged in agricultural activities, primarily as small-scale farmers who rely on agriculture as their primary source of income and sustenance (Lusike *et al*., 2023). Effective communication is crucial in the agricultural industry to facilitate the successful implementation of innovative farming practices necessary for agricultural advancement. Koketso et al (2023) asserted that access to quality agricultural information leads to better decision-making, which is directly linked to improved productivity in smallholder farming. However, the limited resources and inadequate infrastructure in numerous developing countries like Nigeria have resulted in a significant disparity in communication between current agricultural stakeholders and farmers (Asanwana *et al*., 2025). A research conducted by Duguma and Bai (2025) revealed the significant potential of mobile phone and it's applications in enhancing communication and bridging digital divide among diverse participants in the agricultural sector. Salisu (2022) opined that ICT and its tools including mobile phone are the foundation of new global information-based economy and they are increasingly becoming the key drivers for socio-economic growth worldwide.

Globally, the rate of mobile phone diffusion is on the high increase into the marginalized and underdeveloped farming communities because of its flexibility, affordability and user-friendly nature as compared to other ICT tools (Rahman et al., 2020). Hence, Mobile phone-based communication has become the most used communication media among all ICTs

(Vishakha, 2022). A recent statistic revealed that in 2021, the number of mobile phone users worldwide stood at 7.1 billion, with forecasts suggesting this is likely to rise to 7.26 billion by 2022. In Nigeria, the current estimates from different sources put the number of smartphone users at roughly 40 million and it is forecast to grow to more than 140 million by 2025 (Statista, 2022), while Kwara State account for 4.07 million subscribers (NBS, 2020). In view of this, a lot of researchers have proved that majority of farmers in the rural areas have access to mobile phones than other ICT tools in accessing agricultural information (Fahim, 2019 and Kumar, 2023). The use of mobile phones therefore has been used as a medium in bridging the information gap. The effectiveness of mobile phones are particularly dramatic in rural Nigeria, where in many places mobile phones have represented the first modern telecommunications infrastructure of any kind (Emmanuel, 2013 and Asa, 2015).

Mobile phones have greatly reduced the usually high costs of providing information via face-to-face interaction that is typically impaired by poor agricultural roads and access to prompt information by smallholder farmers and agricultural extension agents (Folitse *et al*., 2023).

Additionally, in terms of communication and social network, the mobile phone has also empowered farmers to receive and pass information from different channels of communication to one another regarding the agricultural trade, information exchange, and marketing of their farm commodities (Ogutu *et al.*, 2014). Mobile phone has been used to maintain social networks and provide access to information on socio-economic opportunities, and provided a good platform for farmers to get knowledge and shared information among each other in time (Olaniyi, 2016 and Kojo, 2021).

According to Food and Agriculture Organization Statistics and Production (FAOSTAT and Production, 2016), Owolabi and Yekinni (2022), affirmed that in recent years, most farm advisory services in Nigeria are delivered through conventional extension methods. However, the increasing population of farmers let to large disproportionate of farmers to extension agents (EA) ratio making access to agricultural information ineffective as stakeholders cannot cater for the needs of all the crop farmers effectively and in a timely manner (Uzoma, 2024). It is interesting to note that the EA to farmers' ratio in Nigeria is currently pegged at 1:3000, also some states like Kaduna shares the same ratio of 1:3000 while Kwara State has a ratio of 1:2000 (Sennuga, *et al*., 2020). This ratio is grossly inadequate and highly disturbing considering the Food and Agriculture (FOA) and World Bank's standard recommendation which is 1:500 (Nkosi *et al.,* 2022). This large disproportionate ratio makes it imperative for EA to explore a more effective approach of reaching their greater number of clients (farmers) at a shortest possible time, one of such approach is the use of mobile phone applications.

In this particular scenario, communication tools such as mobile phones offer efficacious solutions to the challenges faced by farmers, facilitating effective communication among diverse players within the agricultural industry. Hence, it is imperative to promptly embrace novel methodologies for the distribution of agricultural information, ensuring that it serves as a supplementary resource rather than a replacement for agricultural extension services. Mobile phones have the potential to serve as a rapid and efficient means of disseminating agricultural information to farmers. Nevertheless, the conventional methodology is currently facing challenges due to limited resources and excessive demands (Thiam *et al.,* 2018). The emerging strategy involves the implementation of digital agriculture, which leverages mobile phone-enabled services.

In this regard, in many countries of the world particularly Nigeria, extension practitioners are also interested in experimenting with innovative e-extension initiatives (Kojo, 2021). Even still many extension organizations are yet to fully exploit its full benefits because of lack of uptake of mobile phone technologies appropriately (Chhachhar, Chen and Jin, 2016). It is important to note that several studies have been conducted on the use of the mobile phone for accessing agricultural information over the years these includes; Olaniyi (2016), Olakanmi (2019), Oladipo and Olaniyi, 2020) and others. Only few of the reviewed works have delved into the effectiveness of mobile phone as a tool for accessing Agricultural Information and extension service delivery. This research therefore, filled this gap in order to determine the effectiveness of mobile phone usage for accessing agricultural information in Kwara State, Nigeria. Based on the above background, this research examine the socio-economic characteristics of the respondents, identify the frequency of use of mobile phone for accessing agricultural information by the respondents, ascertain the perceived effectiveness of mobile phone for accessing agricultural information by the respondents and investigate the constraints against the effectiveness of mobile phone usage for accessing agricultural information.

Methodology

The study was carried out in Kwara state, Nigeria. According to Kwara State Ministry of Agriculture and Natural resources (KWSMANR) 2010, the state is located between latitudes 7°45N and 9°30N and longitude 2°30E and 6°25E, the topography is mainly plain to slightly gentle rolling lands, the mean annual rainfall ranges between 1000mm and 1500mm, average temperature ranges between 30°C and 35°C. According to Kwara Agricultural Development Programme (KWADP) 2009, the State has a total land area of 32,500 square kilometers, 75.3% of which is cultivable. Kwara is an averagely populated state in Nigeria, which has a total population of 2,371,089 and with an annual growth rate of 2.8%. The state has a total of 99,695 registered crop Farmers and 88,702 livestock farmers (KWADP, 2023). The population of the study comprises of all crop farmers in the study area.

A multistage sampling procedure was used in the selection of the crop farmers. The first stage involved random selection of 75% of the total ADP Zones in Kwara State, the selected zones are A, B and C. The second stage involved random selection of 50% of the total blocks in the selected zones, while third stage involved a proportionate random sampling technique was adopted for the selection of farmers in each block with the aid of Taro Yamane formulae as adopted by Shonubi *et al*., (2021). Therefore, 72 crop farmers were selected from Kaiama, 146 farmers from Patigi, 136 from Asa and 40 farmers from Ilorin-south, and a total of 394 registered farmers were used for the study. The dependent variable of the study was the perceived effectiveness of mobile phone usage for accessing agricultural information and it was measured on a 4-points rating scale of Very Effective=3, Effective=2, Low Effective=1 and Not Effective=0, it was further categorized into low, moderate and high effectiveness. Also, frequency of mobile phone usage was measured at ordinal level on a 4-rating scale of Often=3, Sometimes=2, rarely=1 and never=0 and finally, constraints against the effective mobile phone usage was measured at ordinal level on a 4-rating scale of Very Severe=3, Severe=2, Fairly Severe=1 and Not Severe=0. The mean score and standard deviation were used for the categorization. Data were collected using a well-structured interview schedule and analysed using a descriptive statistics (frequency count, percentage and mean) and inferential statistics (chi-square) to determine the factor influencing the effectiveness of mobile phone usage.

Results and Discussion

Socioeconomic Characteristics of the respondents:

Age: The result shows that the mean age of the respondents was 47 years which indicate that the respondents in the study area are in their middle and productive age. The result was in agreement with the findings of Oguniyi (2016) who ascertained that middle- aged farmers assimilate, adopt and effectively use mobile phone for accessing agricultural Information.

Sex: The Sex distribution for the crop farmer respondents in the study area, presented that majority (72.1%) of the respondents were male and 27.8% were female. This indicate that crop production in the study area were male dominated. The findings of Kojo *et al.,* (2021) buttress this result that agriculture is a male-dominated activities because it is more like a family-led where the head of household are mainly the decision makers.

Education Status: The result shows that majority (67.2%) of the respondents were literate who can read and write, Education is expected to influence the effective mobile phone usage among farmers. This result corroborate with the findings of Rahman *et al.,* (2020) who says that crop farmers are literate and those who can read and write finds it easier to learn the effective usage of mobile phones in accessing agricultural information.

Years of Farming Experience: The result shows the mean years of farming experience is 18.54±9.66 years, this indicate that crop farmers in the study area are well experienced and their long farming experience is likely to enable them to properly identify their areas of extension needs regarding the effectiveness of mobile phones usage towards crop production. This result is in concordance with that of Tegene *et al.,* (2022), the more experienced farmers are, the more they learn and use alternative channels such as mobile phone to access agricultural information.

Frequency of Contact with Extension Agents: The result revealed that majority (86.3%) of the respondents had contact with extension agents and 43.7% of the respondents had contact with extension agents on monthly basis. This shows that regular monthly contact with extension agents is crucial for effective access to agricultural information and aid easy transfer of knowledge. This result agrees with the findings of Asa and Uwem (2017), who says farmers had contact with extension agents and they get in contact with them regularly on a monthly basis.

Ownership and Access to Mobile Phone: The result showed that majority of the Farming respondents (97.2%) own mobile phone and 94.4% also have access to mobile phone. This implies that mobile phone has become a necessary gadget, more so, crop farmers own and have access to mobile phone in accessing agricultural information, this agrees with the findings of Khan *et al.,* (2019) and Boniface (2025) who revealed that farmers own mobile phone and they use it to communicate information needed for their farming activities

Table 4.1: Distribution of crop farmers according to socio-economic characteristics. n=394

Socio-economic variables	Frequency	Percentage	Mean ± SD
Age			
≤30	25	6.4	
31-40	78	19.9	
41-50	148	37.6	47±9.34
51-60	121	30.8	
>60	22	5.8	
Sex			
Male	284	72.	
Female	110	27.9	
Educational level			
No formal education	63	16	
Primary	73	18.5	
Secondary	129	32.7	
ND	96	24.4	
HND	17	4.3	
BSc	16	4.1	
Years of Farming experience ≤10	82	20.8	
11-20	184	46.7	18.54±9.66
21 and above	128	32.5	
Contact with extension agents			
Yes	340	86.3	
No	35	13.7	
Frequency of contact			
Anytime	45	11.4	
Once a month	171	43.4	
Fortnightly	52	13.2	
Occasionally	72	18.3	
Own mobile phone			
Yes	383	97.2	
No	11	2.8	
Access to mobile phone			
Yes	372	94.4	
		5.6	

Source: Field survey, 2024

Frequency of Use of Mobile Phones for Accessing Agricultural Information

The result revealed that mobile phone among crop farmers is most frequently used for scheduling meeting with farmers for agricultural information and update with a Weighted Mean Score (WMS) of 2.42, receive short message service (SMS) from researchers and extension agents on relevant agricultural information and practices (WMS = 2.04) and listening to agricultural related programmes on mobile phone radio (WMS = 2.03). This implies that mobile phone among crop farmers is mostly used for information sharing and listening to agricultural programmes. This finding tallies with the findings of Asa and Uwen (2017) who posited that mobile phone is efficiently used to schedule meeting and seek agricultural information from fellow farmers, it may be because they trust agricultural information gotten from fellow farmers than any other source which help them to make important farming decision.

Furthermore, it was revealed that crop farmers least frequently used mobile phone for building of multimedia contents such as pictures, videos, and audio recordings of extension instructional materials from extension agents (WMS = 1.76), collaborate with other relevant agencies and agricultural stakeholders for updated information (WMS=1.72) and online Training/seminar /workshop /conferences for farmers and other stakeholders (WMS = 1.61). Crop farmers least used mobile phone for content creation, collaboration with relevant agencies and online training maybe due to the skills involved in the use of mobile phone which crop farmers do not possess, this is in line with the findings of Afolayan *et al.*, (2015) and Ahmed et al., (2024) who states that low farmers' digital literacy and poor network connection in rural areas leads to low mobile phone usage for content creation and internet browsing among crop farmers..

Table 4.2: Distribution of Respondents According to Frequency of Use of Mobile Phones for Accessing Agricultural Information Source: Field Survey, 2024

S/N	Frequency of Mobile Phone usage	WMS	Rank
1	Scheduling of meeting with farmers for agricultural information and updates	2.42	1st
2	Receiving SMS from researchers and extension agents on relevant agricultural information and practices.	2.04	2nd
3	listening to agricultural related programmes on mobile phone radio	2.03	3rd
4	Access to a wide range of relevant information, such as weather updates, and market prices	1.89	4th
5	Receiving extension advisory service anytime when needed	1.86	5th
6	Building of multimedia contents such as pictures, videos, and audio recordings of extension instructional materials for farmers	1.76	6th
7	Collaboration with other relevant agencies and agricultural stakeholders for updated information	1.72	7th
8	Online Training/seminar /workshop /conferences for farmers and other stakeholders	1.61	8th

Source: Field Survey, 2024

Perceived Effectiveness of Mobile Phone Usage for Accessing Agricultural Information

The result shows the distribution of crop farmers according to perceived effectiveness of mobile phone usage for accessing agricultural information. It was revealed that mobile phone is highly effective for scheduling of meeting with farmers for agricultural information and updates with a weighted mean score (WMS) of 2.46, Sending and receiving short message service (SMS) from researchers and farmers on relevant agricultural information and practices (WMS=2.17), followed by the used for listening to agricultural related programmes on mobile phone radio (WMS=2.07), and building of multimedia contents such as pictures, videos, and audio recordings of extension instructional materials from extension agents (WMS=1.89).

Other perceived effectiveness of mobile phone usage includes access to a wide range of relevant information, such as weather updates, and market prices (WMS=1.87) and receiving extension advisory service from extension agents when needed (WMS=1.79). Conversely, the crop farmers perceived effectiveness of mobile phone usage to be low for the following: online training/seminar /workshop /conferences for farmers and other stakeholders (WMS=1.66), collaboration with other relevant agencies and agricultural stakeholders for updated information (WMS=1.58). This implies that mobile phones are highly effective for information sharing among fellow farmers and listening to agricultural information. These results corroborate the findings of Ifeanyi-Obi (2022), who stated that mobile phone is highly effective in scheduling meeting, sending and receiving short messages services (SMS) on mobile phone highly effective for accessing agricultural information.

Table 4.3: Distribution of Crop Farmers on the Perceived Effectiveness of Mobile Phone Usage for Accessing Agricultural Information Source: Field survey, 2024

S/N	Effectiveness of Mobile Phone Usage	WMS	Rank
1	Scheduling of meeting with farmers for agricultural information and updates	2.46	1st
2	Sending and receiving SMS from researchers and extension agents on relevant agricultural information and practices.	2.17	2nd
3	listening to agricultural related programmes on mobile phone radio	2.07	3rd
4	Building of multimedia contents such as pictures, videos, and audio recordings of extension instructional materials from extension agents	1.89	4th
5	Dissemination and Access to a wide range of relevant information, such as weather updates, and market prices	1.87	5th
6	Receiving extension advisory service from extension agents when needed	1.79	6th
7	Online Training/seminar /workshop /conferences with farmers	1.66	7th
8	Collaboration with other relevant agencies and agricultural stakeholders for updated information	1.58	8h

Source: Field survey, 2024

Categorization of Respondents into Levels of Perceived Effectiveness of Mobile Phone Usage

The respondents were further categorized in to levels of perceived effectiveness among crop farmers, it was revealed that 44.4 % of the respondents perceived mobile phone usage to be low effective, while 41.2% as Moderate effective and only 14.5% as highly effective. This implies that there exists a low effectiveness of mobile phone usage among crop farmers in the study area which may probably be due to the fact that many farmers do no fully trust mobile-based advisory content or find it insufficient to their needs like the technical depth and the content relevance. This result corroborates the findings of Lusike et al., (2023), it was reported that crop farmers do not effectively use mobile phones to access agricultural information because they perceived that extension services delivered through mobile phones are not well tailored toward their needs and it is not localized enough to be easily understood due to lack of knowledge, and inadequate network coverage, leading to low effectiveness of utilizing mobile phone for agricultural purposes.

Table 4.4: Categorization of Respondents into Levels of Perceived Effectiveness of Mobile Phone Usage

Category	Range	F (%)
Low	< 22	174 (44.4)
Moderate	23 – 30	161 (41.2)
High	> 30	57 (14.4)
Mean □ Standard Deviation	22.33□8.04	

Field Survey, 2024

Constraints militating Against Effectiveness of Mobile Phone Usage

The result revealed the distribution of crop farmers according to the severity of constraints against effectiveness of mobile phone usage for accessing agricultural information. The identified constraints are: inconsistent electric power supply for charging mobile phone has the highest severity with a WMS=2.42, lack of institutional policy for mobile phone usage for extension services delivery (WMS=2.33) and lack of knowledge about using mobile applications (WMS=2.31). Other constraints are limited network coverage (WMS=2.29), high cost of mobile phones, data plan and other associated expenses (WMS=2.28) and limited Internet Connectivity (WMS=2.15). This implies that effective mobile phone usage depends majorly on the availability of electricity in the study because when a phone is not charged, mobile phone cannot be effectively used and also, effective access to agricultural information is hinge on lack of knowledge about using mobile phone. The result agrees with the findings of Kumar Nyarko et al., (2021) who reported that inconsistent power supply, lack of knowledge about mobile phone is a major constraints to effective use of mobile phones for accessing agricultural information.

Table 4.5: Constraints against the Effective Mobile Phone Usage

S/N	Constraints	WMS	Rank
1.	Limited Internet Connectivity	2.15	6th
2.	High cost of mobile phones, data plan and other associated expenses	2.28	5th
3.	Limited network coverage	2.29	4th
4.	Inadequate of knowledge about using mobile applications	2.31	3rd
5.	Lack of institutional policy for mobile phone usage for extension services delivery	2.33	2nd
6.	Inconsistent electric power supply for charging mobile phone	2.42	1st

Source: Field Survey, 2024

Test of Hypotheses

Relationship between selected socio-economic

characteristics and perceived effectiveness of mobile phone usage.

This hypothesis is stated in null form as follow:

$H_0$1: There is no significant association between the selected socio economic characteristics of respondents and perceived effectiveness of mobile phone usage for accessing agricultural information.

For the hypothesis above, Chi-Square analysis was used to determine significant association between the independent and dependent variables. Chi-square revealed that Contact with extension agents (X^2=30.89, p=0.000), Access to mobile phone (X^2=13.58, p=0.000), and Educational level of crop farmers (X^2=3.72, p=0.000) were statistically significant at 1%. The result implies that educational level has influence on the effective usage of mobile phone in accessing agricultural information, when there is increase in the level of education, it will transcends to how they access agricultural information through mobile phone. Also, being a member of social organization will increase the social interaction and networking with fellow farmers, hence, the effective use of mobile phone. Furthermore, access to mobile phone influence the effective usage of mobile phone, as the more you get access to a technology is the more the effective usage of the technology. These factors can be stated to be a determinant to effective mobile phone usage in accessing agricultural information among crop farmers. This finding agrees with that of Osadebamwen and ideba (2017) and Olakanmi (2019), who reported that contacts with extension agents, access to mobile phone and membership of social organization has influence on the effectiveness of mobile phone usage for accessing agricultural information.

Table 4.6: Summary of Chi-Square Establishing Association between the Selected Socio-Economic Characteristics of the Respondent and Perceived Effectiveness of Mobile Phones Usage for Accessing Agricultural Information

Variables	X^2	Cc	Df	p-value	Decision	Remark
Sex	0.046	0.011	1	0.830	Accept Ho	Not Significant
Member of Social Organization	15.702	0.196	1	0.000	Reject Ho	Significant
Contact with extension agents	30.894	0.270	1	0.000	Reject Ho	Significant
Access to mobile phone	13.575	0.183	1	0.000	Reject Ho	Significant
Digital literacy	3.725	0.097	1	0.005	Reject Ho	Significant
Educational Level	65.359	0.377	4	0.000	Reject Ho	Significant

Source: Computed data, 2024

cc: 0.00-0.20=very weak; 0.21-0.40=weak; 0.41-0.60=moderate; 0.61-0.80=Strong; 0.81-1.00=Very Strong.

**: correlation significant at 0.01 level

*: correlation significant at 0.05 level

Source: Computed data, 2024

cc: 0.00-0.20=very weak; 0.21-0.40=weak; 0.41-0.60=moderate; 0.61-0.80=Strong; 0.81-1.00=Very Strong.

**: correlation significant at 0.01 level

*: correlation significant at 0.05 level

Conclusion and Recommendation

It can be concluded that the respondents perceived the use of mobile phone for accessing agricultural to be moderately effective. It can be concluded that limited network coverage and inconsistent electric power supply for charging mobile phone are the major constraints for mobile phone usage towards assessing agricultural information. Furthermore, there is a significant association between the selected socioeconomics characteristics of respondents and perceived effectiveness of mobile phone for assessing agricultural information. To aid effectiveness of mobile phone among crop farmers, it is therefore recommended that; infrastructural facilities such as rural electrification and good network coverage should be facilitated by various stakeholders such as government, non-governmental organization, and network provider companies to the rural people who are involved in agricultural production.

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