Mobile Phone Applications (Apps) Usage Issues among Rice (*Oryza sativa*) Farmers in Obafemi Owode Local Government Area, Ogun State

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Abstract

The study focused on mobile phone Apps usage among rice farmers in Obafemi Owode Local Government Area (LGA),Ogun State. Specifically, it determined; frequency of usage of phone Apps; agricultural purposes for which mobile phones Apps were used; benefits of using mobile phone Apps; and constraints to use of mobile phone Apps among rice farmers in the study area. Population for the study comprised of all rice farmers in Obafemi Owode LGA, Ogun State. Random technique was used to select 120 respondents. Questionnaire was used to collect data. Data were analyzed using frequency, percentage and mean. Findings reveal eight Apps being used by farmers, including phone book (x =2.85), radio (x =2.64), calculator (x =2.55), SMS (x =2.52) were highly utilized while calendar (x =2.30), WhatsApp (x =1.57), Facebook (x =1.33) and Twitter (x =0.54) were poorly utilized mobile phone Apps by rice farmers in the study area. Other findings are nine purposes for using phone Apps. These are for calculation of expenses on input e.g. fertilizer, rice seed (94.2%), access market information (90.8%), for purchase of fertilizer (86.7%), listening to radio programs related to rice farming (82.5%) were the leading agricultural purposes of using phone Apps. Also nine benefits from use of Apps were identified. These include; utilization of mobile phone Apps has improved rice production (98.3%), helped them to determine amount of profit and loss on rice sales (97.5%), helped to access extension information on rice production (95.8%). Seven constraints were identified. These include; high tariff deduction from telecommunication companies (68.3%), and unstable power supply (61.7%) among others. It is recommended that rice farmers associations should help members to procure solar facilities to power their mobile phone.

Keywords: Phone, Book, Radio, Calculator, Market, Information, Farm, Productivity

Introduction

Globally, farmers have utilized mobile phone features and Apps for agricultural purposes. Mobile phones are multifunctional devices with several features and applications

(Apps). Common features of the mobile phones is voice call, short message service (SMS), video camera, calendar, calculator, torch, voice recorder, reminder, radio, Multimedia messages, internet browser, etc. Apps usable by mobile smart phones are social media Apps for sharing information and social interaction, agro-related Apps for accessing production, harvesting, market, and distribution of agricultural produce (Krell et al., 2020). The use of phone Apps could be of tremendous help to farmers as they could decrease some of the challenges faced by farmers by increasing their knowledge of planning, decision making and the execution of programmes (Michels et al., 2020). Mobile phones could be used, not only for person-to-person voice communication, but also, as a means of access to information through services like multi-media, Bluetooth, and text message among others (Komolafe et al., 2018).

Studies across the world have shown that the utilization of mobile phone Apps have increased farmers' financial household performance in Vietnam (Do et al., 2023), improved farmers' capacity to use of agricultural inputs and increased productivity in Pakistan (Khan et al., 2022), and improved well-being of farmers in rural China (Nie, Ma and Sousa-Poza, 2021).Farmers could use mobile phones to acquire information especially on price, products, transport, and weather forecast which would assist them on decision making especially on seasons to plant, breed new species, and harvest farm products (Aparo et al., 2022; Kabbiri et al., 2017). 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. Additionally, the use of mobile phones is essential for the acquisition of agricultural information which would aid agricultural activities to have formidable impact in countries (Anadozie et al., 2021), higher farm productivity for farmers in Tanzania (Quandt et al., 2020), as well as technical efficiency of rice (*Oryza sativa*) farming in Indonesia (Kusumaningsih, 2021).

Rice is one of the major staple foods in Nigeria (Komolafe et al., 2019). Due to several challenges facing in accessing relevant extension information for rice cultivation, rice farmers in the country have taken the advantage of mobile phone Apps including Rice Advice and the Nigeria Institute of Soil Science (NISS) AGRO Mobil App, social media Apps and smart phone features to connect with experts, fellow farmers and agricultural extension agents for professional advices in order to solve common challenges in rice farming and access market information (Ogunsola et al., 2022; Alhassan et al., 2022).

Despite the enormous potential benefits of mobile phone features and Apps usage for rice production, rice farmers in Nigeria have not maximally benefited due to series of challenges. A study by Abdullahi, Oladele and Akinyemi (2021) have found that 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. According to Coggins et al. (2022), mobile cellular subscription is an issue which affects the usage of mobile phones by everyone, mostly among farmers. Mobile users in area where data is limited or expensive are very cost-conscious; users frequently adopt a change of non-trival strategies in an attempt to optimize their mobile phone usage, most users switched off cellular data connections or postpone mobile usage until connected with Wi-Fi (Coggins et al., 2022). Umar et al., (2020) further found that agro-App developers for rice farming mostly do not take into consideration the demographic information about farmers such as their educational level and income level, given that most farmers are uneducated and do not have the knowledge about how to operate the internet in Nigeria (Umar et al., 2020).

The aforementioned challenges of rice farmers make it difficult to understand the usage pattern of mobile phone Apps in Obafemi Owode LGA of Ogun State Nigeria. There is knowledge gap that is yet to be covered in the literature. Therefore, empirical investigation into the level of usage, benefits and constraints of the rice farmers in the use of mobile phone applications in Obafemi Owode LGA is necessary. The findings could among other things, promote favourable policies and programmes for widespread adoption of mobile phone features and Apps that will boost rice production in the study area.

Objectives of the study

The broad objective of this study was to assess issues related to phone Apps utilization among rice farmers in Obafemi Owode LGA, Ogun State, Nigeria. Specifically, the study determined:

(1) phone Apps utilized by rice farmers in Obafemi Owode LGA,
(2) agricultural purposes for which phones Apps are used by rice farmers in the LGA,
(3) benefits of phone Apps usage among rice farmers in the LGA,
(4) constraints to the use of phone Apps by the rice farmers in the LGA,

Methodology

***Design of the Study*:** The study adopted descriptive quantitative research design.

***Area of the Study*:** The study was conducted in Obafemi Owode LGA, Ogun State, Nigeria. The LGA is located on the latitudes 03^0 6' and 07^0 3', and longitudes 03^0 2' and 03^0 8' east of Greenwich Meridia. Obafemi Owode LGA is politically divided into 12. The area is particularly regarded as the "Home of *Ofada* Rice" because of the extensive cultivation of the rice variety among others (Sangotegbe et al., 2013).

***Population for the Study*:** This is made up of all registered rice farmers in Obafemi Owode LGA. Population considered were registered rice farmers retrieved from Ogun State Agricultural Development Project Office in three wards namely Obafemi,

Owode and Ofada where rice is widely cultivated in Obafemi Owode LGA. The registered rice farmers were 600, 420 and 180 respectively.

***Sample for the Study*:** Sampling involved a random selection of 10 percent rice farmers in each wards, giving a total of 120 rice farmers as respondents.

***Instrument for Data Collection*:** A questionnaire was used for data. The same instrument was used as interview schedule to elicit data from illiterate respondents. Utilization of phone features and Apps were measured using a 4-points scale of frequently (3), sometimes (2), rarely (1), never (0). Benefits derived from the use of phone Apps were measured the 2-points scale as: benefitted (1), no benefit (0). Constraint to the use of phone Apps were measured by using a 4-points scale of very severe (3), severe (2), not severe (1), not constraints (0). The instrument was validated by five experts in agricultural extension and economics. Reliability of the instrument was established using test-re-test method. This was conducted on 10 rice farmers outside Owode LGA. Cronbach's alpha value of 0.71 was obtained, indicating that the instrument was reliable.

Data Collection Methods: One hundred and twenty copies of the questionnaire were administered to respondents. A comprehensive explanation of the main objective of the study was provided to the respondents. Illiterate respondents were guided as the questionnaire served as interview schedule for them. All the 120 copies of the questionnaire were retrieved. This represent 100 percent return.

***Data Analysis Techniques*:** Data collected was analyzed using frequency count, percentage, mean, and standard deviation to achieve objective 1 to 4. Benchmark score of decision were determined using scale of instrument. Both utilization and constraints to use of mobile phone apps were similarly measured with the numerals 0, 1, 2, and 3. Summation of these scores number (6) and divided by the number of scales (4) giving 1.5. Therefore, mean value of 1.5 was used as benchmark for decision on utilization and constraints to the use of mobile phone in the study area.

RESULTS

Data analysis shows that 67.5 percent of the respondents were men. 47.9 percent were within the age of 51 to 60years, 48.8 percent had 6 to 10 years of farming experience, only 13.3 percent had no formal education while others had one form of formal education, 55.8 percent earned between ₦51,000 to ₦100,000 monthly, and 72.5 percent cultivate between 2 to 6 acre of rice farm.

Mobile Phone Apps Utilization

Table I: Mean Responses on Mobile Phone Apps Utilization among Rice Farmers in Owode LGA

S/N	Phone Apps	Mean	Std. Dev.	Rank	Decision
1.	Phone book	2.85	0.51	1st	High usage
2.	Radio	2.64	0.63	2nd	High usage
3.	Calculator	2.55	0.72	3rd	High usage

4.	Short Message Service (SMS)	2.52	0.94	4th	High usage
5.	Calendar	2.30	0.51	5th	High usage
6.	WhatsApp	1.57	0.79	6th	High usage
7.	Facebook	1.33	0.91	7th	Low usage
8.	Twitter	0.54	0.55	8th	Low usage

Table 1 shows that shows phone book (x =2.85), radio (x =2.64), calculator (x =2.55), SMS (x =2.52), Calendar (x =2.30) and WhatsApp (x =1.57) were ranked first, second, third, fourth, fifth and sixth position respectively with mean scores greater than the cut-off point of 1.5 and were there therefore considered as highly utilized phone Apps by rice farmers in the study area. On the other hand, the utilization of Facebook (x =1.33) and Twitter (x =0.54) were ranked seventh and eighth position respectively with mean score less than the cut-off point of 2.5 and were there therefore considered as low utilized mobile phone Apps by rice farmers in the study area.

Purposes for Using Mobile Phone Apps

Table 2: Frequency and Percentage Responses on Agricultural Purposes for Using Mobile Phone Apps by Rice Farmers in Owode LGA

S/N	Agricultural purposes	Frequency(%)
1.	Interaction with family	118(98.3%)
2.	Access market information	109(90.8%)
3.	Monitor transaction on rice production and sales	79(65.8%)
4.	Listening to radio programs related to rice farming	99(82.5%)
5.	Solve agricultural problems	51(42.5%)
6.	Reduce travelling	94(78.3%)
7.	Calculation of expenses on input e.g. fertilizer, rice seed	113(94.2%)
8.	For purchase of fertilizer	104(86.7%)
9.	Marketing agricultural produce	78(65.0%)

Table 2 reveals that majority of the rice farmers used mobile phone to interact with family (98.3%), calculation of expenses on input e.g. fertilizer, rice seed (94.2%), access market information (90.8%), for purchase of fertilizer (86.7%), listening to radio programs related to rice farming (82.5%), reduce of traveling (78.3%), monitor transaction on rice production and sales (65.8%), and marketing agricultural produce (65.0%) while appreciable percentage use mobile phone Apps to solve agricultural problems (42.5%).

Benefits Derived from the Use of Mobile Phone Applications

Table 3: Percentage Responses on Benefits Derived from Utilization of Phone Apps by Rice Farmers in Owode LGA

S/N	Benefits of mobile phone apps utilization	Freq.(%)
1.	Improved my productivity on rice sales	118 (98.3%)
2.	Improved income generated	114 (95.0%)

3.	Reduced the stress of travelling from one place to another to get information	103 (85.8%)
4.	Helped to make and receive payments of rice sales faster	105 (87.5%)
5.	Assisted in accessing rice market locations	109 (90.8%)
6.	Helped me calculate my profit or loss on rice sales	117 (97.5%)
7.	Improved access to and use of information on rice production	115 (95.8%)
8.	Helped to get update related with agricultural information on rice production	111 (92.5%)
9.	Helped to update knowledge on changes in weather and climate	82 (68.3%)

Table 3 shows that majority of the respondents indicated that utilization of mobile phone Apps has improve rice productivity (98.3%),helped to determine amount of profit and loss on rice sales (97.5%), helped to access extension information on rice production (95.8%), helped farmers to access agricultural information on rice production inputs (92.5%), and helped farmers to access rice markets locations (90.8%). Other majorities further indicated that utilization of mobile phone Apps has reduced the stress of travelling from one place to another to get rice production/sales information (85.8%), helped to make and receive payments of rice sales faster (87.5%) and helped to update knowledge on changes in weather and climate (68.3%).

Constraints to Utilization of Phone Apps by Rice Farmers

Table 4: Mean Distribution of Responses on Constraints to Utilization of Phone Apps by Rice Farmers in Owode LGA

S/N	Constraints to Utilization of Phone Apps	Mean	Std. Dev.	Rank
1.	Unstable power supply	2.45	0.76	1st
2.	Poor network services	2.38	1.04	3rd
3.	Difficulty in the use of the phone applications	1.56	0.46	5th
4.	Cost of recharging mobile phone	2.19	0.66	4th
5.	Lack of training on the use of phone applications	1.46	0.10	6th
6.	High tariff deduction from telecommunication companies	2.39	0.84	2nd
7.	Educational background	1.20	0.84	7th

Table 4 shows constraint with mean value at 1.5 and above which were considered as severe constraints were unstable power supply (x =2.45), high tariff deduction from telecommunication companies (x =2.39),poor network services (x =) which were ranked first, second and third respectively. On the other hand, Lack of training on the use of phone applications (x =1.46), and educational background (x =1.20) were ranked sixth and seventh position respectively and were considered as less severe constraints to utilization of mobile phone apps among rice farmers in Owode LGA.

Discussion

On the usage of mobile phone Apps, phone book, radio, calculator, and SMS were highly utilized by rice farmers. This indicates that phone book, phone radio, phone calculator and SMS were

the most relevant phone apps to rice production activities in the study area. High usage of these apps is expected as rice farming is a day-to-day activity that require recording of events in phone book. This will help farmers to track progress of farm activities and next action to take for each day on schedule of activities. In this case, errors will be minimized while accuracy of task performance, efficiency and improved productivity will be ascertained. Phone radio is a unique app to assess information and update of knowledge on rice farming through radio agricultural broadcast stations. Most radio stations give update on weather forecast expected to assisted farmers to take daily decision and planning for mitigation and adaptation strategies towards the effects of climate change. Other agricultural programme for best agronomic practices in rice farming can also be heard through radio broadcast. The result is in line with reports of studies that indicate that independently indicated phone book (Idiku et al., 2022), phone radio (Anadozie et al., 2021), phone calculator (Aparo et al., 2022), and SMS (Abdullahi et al., 2021; Emeana et al., 2020) were mainly utilized by farmers for agricultural purpose.

The purposes for which the majority of the farmers used phone Apps were to interact with family, access market information, purchase of fertilizer, listening to radio programs related to rice farming, reduction of traveling, marketing of agricultural produce. These purposes are reflection of the commonly used phone apps and are critical to successful farming business. This shows that fertilizer is an important rice farming input. Fertilization is a means to improve soil fertility which helps rice germination and bountiful fruiting. The practice of applying fertilizers at least twice during the growing season (split application), either using basal at planting or top-dressed during vegetative growth increases rice yields (Liu et al., 2019). Thus, rice farmers will always want to have access to fertilizer is a perquisite for rice farming (Iwuchukwu et al. 2022; Umar et al., 2022). In support of this finding, Kijima (2022) report the high use of phone application in accessing fertilizer among rice farmers in Nigeria. After harvesting, the main aimed of commercial rice farmers are to sell the paddy or processed rice for profit. Therefore, it is important for rice farmers to have current and reliable access to market information on the sales of rice. This will help the farmers in selling rice produce while reducing selling at farm gate to middlemen which often reduce farmers' profits. Information on fertilizer accessibility and rice marketing can be access through radio agricultural broadcasts, making phone radio an important app for rice farmers in the study area. The results from this study collaborate with the findings that mobile phones could be used, not only for person-to-person voice communication, but also, as a means of access to information on agricultural production and marketing (Quandt et al., 2020; Rahman et al., 2020; Komolafe et al., 2018).

The main benefits derived from the use of mobile phone applications include increase access to market and increase sales, increase income, reduced traveling, update related with agricultural information on rice production as well as changes in weather and climate. In line with commonly used apps and purposes of using them, mobile phone apps have increased farmers access to market information. When farmers have access to market information, there would be increase rate of sales and income. Information that may require farmers to travel long distant to access can be accessed through phone calls or the use of SMS. Also, rice farming inputs can also be ordered via phone calls and SMS, thereby reducing traveling cost of traveling. Traveling cost entails the time to travel and be absent at farm as well as addition cost to transport fare (to and fro). Reduction in cost of traveling implies a reduction in expenditure while profit increases. On the update related with agricultural information on rice production, radio broadcasts that organize agricultural extension programmes are avenue through which the rice farmers could update their knowledge. The result is in line with findings of studies that indicated that use of phone applications provide direct access to radio programmes through which farmers can access agricultural extension information (Adeyeye et al., 2021; Ifabiyi et al., 2022).

Furthermore, high tariff deduction from telecommunication companies and unstable power supply were the leading constraints indicated by rice farmers. These constraints must have limited and frustrated the desire extent of mobile phone Apps utilization by the rice farmers. For farmers that want to be consistent in the phone Apps, the issues of high tariff deduction from telecommunication companies have the tendency to increase farmers' expenditure as well as decreased profit. In addition, this study suggests that high tariff deduction may be attributed low utilization of phone Apps that requires internets tariff/data bundle charges such as Facebook, Twitter and WhatsApp in order to reduce cost of production. This finding is in line with report of study by Ajayi et al. (2022) who found high charges on services as one of the main constraints limiting farmers the use of phones Apps for agricultural purposes in Nigeria.

Conclusion

Based on findings of the study, it is concluded that phonebook, phone radio, phone calculator, SMS were highly utilized while phone calendar WhatsApp, Facebook and Twitter were less utilized by rice farmers in the study area. Rice production purposes achieved by the farmers through phone Apps utilization were calculation of expenses on inputs, market information, purchase of fertilizer, listened to radio programs related to rice farming, monitor transaction on rice production and sales as well as marketing agricultural produce. Achieving these purposes has further earned the farmers the benefits of improved rice productivity. The farmers were mainly limited in the utilization of phone Apps by high tariff

deduction from telecommunication companies and unstable power supply. These constraints must have limited and frustrated the desire extent of mobile phone Apps utilization by the rice farmers.

Recommendations

The following recommendations will help in the usage of mobile phone applications:

1. Agricultural extension agents should organize trainings on use and benefits of underutilized of phone Apps for the rice farmers in the study area.
2. Government should make policy to control tariff deduction placed by telecommunication companies.
3. Telecommunication should provide adequate network service in the rural areas.
4. On the issue of irregular power supply, rice farmers in their various groups can pool resources together to assist members in accessing solar facilities at moderate price with the capacity that can recharge mobile phone.

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JHER Vol. 30, No. 2, December 2023, pp. 31 - 43

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