

**USE OF MOBILE PHONES IN IMPROVING LIVELIHOODS AMONG
HORTICULTURAL FARMERS IN PARTS OF KADUNA NORTHERN GUINEA
SAVANNAH ECO-ZONE: EMPIRICAL STUDY OF IGABI LOCAL GOVERNMENT
AREA OF KADUNA STATE**

ABSTRACT

The study examined the use of mobile phones in improving the livelihoods of rural horticultural crop farmers in Igabi Local Government Area of Kaduna State. Eighty (80) questionnaires were sampled among horticultural crop farmers who own and use mobile phones and seventy-six (76) questionnaires were retrieved. A multistage sampling technique was used in sampling the respondents. The data collected is analyzed using descriptive statistics and regression analysis. The results showed that 46.05% are males and 53.95% are females, 26.32% were between 31-40 years, 55.26% were married and 52.63% had at least secondary education. Data further revealed that 52.63% have owned handsets for at least 4-6 years and 56.58% obtained the sets from personal savings. Mobile phone usage improved the livelihood in reducing transport cost which was highlighted by 96.05% of the sampled farmers, reduced exploitation/low pricing by middlemen and improved income of producers (84.21%). It also enhanced interaction among rural horticultural crop farmers at different locations (92.11%). Poor network coverage (39.47%), poor power supply (19.74%) and theft/loss of handsets (10.53%) are the major constraints associated with mobile phone usage. The regression analysis showed significant relationship between age, household size, educational status and use of mobile phone ($P < 0.05$) level of significance. Therefore, it is recommended that Federal Government should improve electricity supply to rural farm communities and provides economic incentives, such as tax deductions for imported equipment, for mobile service providers to expand their mobile service coverage in rural/horticultural production areas. Furthermore, the state and local government should improve rural electricity supply to enable rural horticultural crops farmers utilize the full potentials of mobile phones.

Key Words: Mobile phone, Horticulture, Farmers, Livelihoods, Northern, Kaduna

1.0 INTRODUCTION

One of the biggest concerns of farmers globally is the need to increase agricultural productivity and production efficiencies. This holds true both for horticultural production producing for the market or purely for self-consumption. The productivity and profitability of smallholder farmers are often limited by a number of factors that are out of their control such as the increasingly erratic vagaries of the weather; climate; technology; global commodity prices; and policies (1,2). All of these factors are further compounded by the relative lack of technical and financial services and dearth of information (e.g. about prices, market requirements) (2). Information and Communication Technologies (ICTs) are seen as revolutionary agents of change in the field of agriculture, providing a number of tools that can help the smallholder farmer, primarily through improving the quality and quantity of information available to them (3). More specifically, many of the tools and those that perhaps hold the greatest promise are those that utilize mobile technologies. Mobile adoption in the developing world is occurring rapidly: in such a way that the rate of increase is greater than that of the developed world (2). In addition, phones have provided new opportunities to

address the challenges faced by horticultural farming. For example, increasing use of mobile phones for information exchange, such as disease surveillance and pest tracking, is now common practice (4). Linking knowledge to innovation is also crucial to addressing the information and knowledge gaps in the agricultural sector (3). Therefore, mobile phones can also play a very important role in bridging information gaps. FAO has been promoting the use of ICTs in agriculture and has focused on ICT innovation for improving agricultural production and enhancing value chains. Mobile phone technology has rapidly expanded all over the world as well as in developing countries (4).

Mobile phones, which is an integral part of ICT, has become an information communication of our time and their increased number of growth rates have been attributed to many factors including the liberation of communication processes. Government of many developing countries and development agencies are focusing on extending ICT information structure into rural areas as they seek to encourage growth, alleviate poverty and become the perceived digital divide (5). These plans would also accelerate food production since the majority of what is consumed is imported thus this becomes a strategy for import substitution. According to (6), mobile phones are ideal development tools that are cheap to set up, easy to use and filling a vital need. Today in Nigeria, most rural farming communities have access to mobile phone services, which have enabled closer contact between them and development. (7,4) have separately shown that in developing countries ICTs such as mobile phones can impact on rural livelihoods and on poverty in the following areas: increased opportunity to access resources, empowerment through information about choices that affected them, decreased vulnerability to risk due to the possibility to send and receive information (8).

About 75% of horticultural farmers live in rural areas where they are struggling for their basic needs (9). Their living standards are very low which limits them to the use of ICTs in which mobile phone is an integral part; to increase and improve their livelihood and horticultural farming activities in disseminating vital information on new ideals of modern method of producing various horticultural crops; combating outbreak of pest and diseases; seed improvement and use of genetically modified seeds which can give them quick returns, fertilizer application and various ways of improving soil fertility. The advent of ICTs to our horticultural farmers (mobile phones) will not only guarantee the poor rural communities an opportunity to create and share vital knowledge on various horticultural systems that could lift them out of poverty level but in all areas of life that will improve their standard of living and sustainability. Mobile phone services should be in use to access horticultural market information and knowledge, increase the agriculture business by improving the productivity, especially for developing countries. Mobile phones which are normally in use to communicate with family and friends could be used for horticulture business stakeholders. Mobile phones could be good device to make strong relationship with all horticulture business stakeholders by communication, SMS and email thus benefiting farmers by providing timely market information to increase the income and reduce levels of poverty.

Although mobile communication has quickly become an important part of rural populations, its applications are not always the most appropriate for farmers because most of these

applications are not related to livelihoods and the environment of rural area farmers. These mobile phone applications generally do not follow any generic blueprint and design for specific target markets and lack localized contents (10). Most mobile applications are not user-friendly and inconsiderate of the illiteracy of rural farmers. The information such as on horticultural agronomic practices, marketing, weather, advices should be local based and in local language. There are also educational and social barriers which need to be broken by academic institutions and proper interest of religious, government, NGOs, Mobile phone companies and development participants (11). Infrastructure and cost are also big issues to consider in mobile phone technology. The objective of the study is to examine the perception of rural horticultural crop production on the usage of mobile phones in improving livelihoods among horticultural farmers in parts of Kaduna Northern Guinea Savanna Eco-zone.

1.1 Hypothesis

- H₀: There is no relationship between selected socio-economic characteristics of the rural horticultural farmers and their perception of contribution of mobile phone to improvement of rural livelihoods.
- H₁: There is relationship between selected socio-economic characteristics of the rural horticultural farmers and their perception of contribution of mobile phone to improvement of rural livelihoods.

2.0 MATERIALS AND METHOD

2.1 Study Area

The study was carried out in Igabi Local Government Area (LGA) of Kaduna State. Igabi is located in Northern Guinea Savanna region of Nigeria on latitude 10⁰E 37¹N and 10⁰ 41¹N and longitude 7⁰ 47¹E (12). Igabi Local Government Area shares boundary with Kaduna South, Kaduna North, Giwa Local Government and Zaria Local Government Areas of Kaduna State. It has an annual rainfall of about 1000mm-1500mm per annum. Major crops grown in the area include maize, cassava, millet, sorghum, guinea-corn and water-melon. The area consists of different tribes and ethnic groups such as Yoruba's, Hausa, Igbos, Fulani's, Gbagyi's, Ebira's living together in peace and harmony but predominant tribal majorities are Gbagyi's and Hausa's. The area has an estimated population of about 570,000 people and covers an area of about 4556.95 square kilometers. (13).

2.2 Method of Data Collection

Primary data and secondary data were used for this study. The primary data was collected through structured questionnaires while secondary data was sourced from past survey data, the Internet, text books and journals. The questionnaires were designed to collect the following types of information;

- i. Socio-economic characteristics of the respondents in the study area.
- ii. Horticultural crop farmer's perceptions on how mobile phone have improved in the study area.

- iii. Data related to the relationship between the selected socio-economic variables and the use of mobile phoned.

2.3 Sampling Techniques

Multistage sampling was used. In selection of respondents Igabi Local Government has a total of 65 districts, out of which four (4) districts were purposively selected because of the prevalence of mobile phone usage by the respondents and access to the three (3) main mobile service providers namely; MTN, Glo and Airtel. Through simple random sampling technique four (4) communities each were selected from the districts while five (5) respondents were also picked from each community using the same sampling technique to give a total of eighty (80) respondents. The questionnaire was designed in English language and administered by group of interviewers who can speak and write in local dialects. Face-to-face method of interviews was adopted (14).

2.4 Analytical Tools

The following tools of analysis were used to achieve the stated objective.

- i. Descriptive statistics
- ii. Regression analysis

2.4.1 Simple Descriptive statistics

Descriptive statistics such as frequency counts and percentages, and pie charts were used.

2.4.2 Regression Analysis

This was used to determine whether or not there was any relationship between selected socio-economic variables and the use of mobile phones. The deficiency was considered significant at $P < 0.05$ to interpret the hypothesis formulated.

3.0 RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Sampled Respondents

Some socio-economic characteristics are known to influence the use of mobile phones in improving livelihood among horticultural farmers in different parts of Kaduna Northern Guinea Savanna Eco-region. The variance employed in the study include; age, sex, marital status, household size, education, years of ownership of phones, etc.

Table 1: Socio-economic Characteristics of Horticultural Crop Farmers.

S/NR	Variance	Frequency	Percentage %
1	Age (Years)		
	10-20	12	15.79
	21-30	19	25.0
	31-40	20	26.32
	41-50	15	19.74
	51-60	10	13.16
2	Marital Status		
	Married	42	55.26
	Single	15	19.74
	Divorcee	07	9.21
	Widow/Widower	12	15.79
3.	Gender		
	Male	35	46.05
	Female	41	53.95
4	Household size		
	1-5	20	26.32
	6-10	30	39.47
	11-15	10	13.16
	16-20	09	11.84
	21 and above	07	9.21
5	Education		
	Primary	20	26.31
	Secondary	40	52.63
	Tertiary	10	13.16
	Non formal	06	7.89
6	Years of Ownership of Phones		

1-3	20	26.31
4-6	40	52.63
7-9	10	13.16
10 and above	06	7.89
7 Source of Fund for Mobile Phone		
Personal Savings	43	56.58
Gift	20	26.31
Bank Loan	13	17.11
Total	76	100

Table 1 showed that the majority (26.32%) of the respondents were middle-aged (between 31-40 years). This category of people falls into the energetic force in the horticultural sector. There were more females (53.95%) than male (46.05%) in the sample indicating that horticultural sector is dominated by female farmers. The majority (55.26%) of the respondents were married, 15.79% widowed/widower, 9.21% separated or divorced and 19.74% were single. Data showed that 52.63% had secondary education, 13.16% graduated from tertiary institutions and 26.31% had primary education. Only 7.89% did not attend formal educational schools. This result indicates that most horticultural crop farmers had formal education good enough to efficiently operate handsets with minimum difficulty and to respond positively to information from mobile phones. (15), observed that formal education has positive influence on farmers and the general society at large.

The result also showed that 52.63% have owned mobile phones for 4-6years, 26.31% for 1-3years, 13.16% for 7-9 years and 7.89% owned mobile phones for 10years and above. This implies that the technology is gradually gaining acceptance among the rural horticultural farmers. A majority (56.58%) of the respondents purchased their handsets through personal savings and only 26.31% got theirs through gifts from friends and relatives. This implies that most rural people are no longer seeing mobile phones as luxury but as a necessity/asset because of its strategic importance to their lives. The result also suggests that horticultural crop farmers acknowledge the usefulness of mobile phones in their livelihood pattern and the number of years' farmers have owned mobile phones may be related to the relatively higher level of education in the study area. There were variations in the household size of the families, 39.47% had between 6-10 members, 26.32% had between 1-5 members, 13.16% had 11-15 members, 9.21% had 21 and above while 11.84% had 16-20 members. This is typical of most rural Nigeria communities where polygamy and having large households is a sign of wealth and opportunity for adequate farm labour. The above results of socio economic characteristics agree with the findings (16) that socio-economic characteristic influence mobile phone usage within the smallholder horticultural sector in rural areas of Nigeria.

3.2 Perception of Horticultural Crop Farmers on How Mobile Phones have improved their Livelihoods.

Perceptivity of horticultural farmers on how mobile phones have connected to different aspects of livelihoods to indicate their level of agreement on contribution of mobile phones to items expressed. The livelihood aspects as presented in table 2 were drawn from various components of the sustainable livelihood framework.

Table 2: Perception of Horticultural Crops Farmers on How Mobile Phones have improved their Livelihoods.

S/N	Use of Mobile Phones	Agree	Percentage (%)	Disagree	Percentage (%)
1.	Improve social interaction amongst horticultural crop farmers	70	92.11	6	7.89
2.	Reduce cost of crop of transportation from one market to another in search for good sale	73	96.05	3	3.95
3.	Facilitate fast respond through emergency call	75	98.68	1	1.32
4.	Provide quick information availability and market price of farm inputs	71	93.42	5	6.58
5.	Obtain current sales prices of horticultural crop from bigger market to facilitate bargaining	65	85.53	11	14.47
6.	Reduce exploitation/low pricing of middle men and improved income of producers.	64	84.21	12	15.79

Table 2 revealed that most of the horticultural crop farmers agree that mobile phones facilitate fast response to emergency calls (98.68%), cost of transportation reduced (96.05%), quick information on availability and market price of farm inputs (93.42%), level of interaction improved (92.11%), sales prices of horticultural crops (85.53%) were readily obtained. Lastly, exploitation by middle men were reduced (85.21%) because producers could access sales prices from other markets that helped them to bargain. This in turn

facilitates a significant improvement in farmers' incomes. The results agreed with that of (9) who reported that mobile phones increase livelihood of horticultural farmers in rural areas.

3.3 Horticultural Farmers Constraints in the Use of Mobile Phones

The farmers faced with the enormous constraints in the use of mobile phones in the study area. Some of the constraints observed are shown in Table 3 below.

Table 3: Horticultural Farmers Constraints in the Use of Mobile Phones

S/N	Constraints	Frequency	Percentages (%)
1.	High cost of recharge cards	10	13.16
2.	Network/signal problems	30	39.47
3.	Loss/theft of mobile phones	08	10.53
4.	Lack of electricity to charge mobile phones	15	19.74
5.	Technical problem	06	7.89
6.	Limited coverage	03	3.95
Total		76	100

Table 3 showed that the major problem faced by most of the horticultural crop farmers in the use of mobile phones in the rural areas is poor network (39.47%) and it was also, observed that sometimes, rural horticultural farmers have to climb trees, hills and so on to set network received networks. Perhaps this might be due to service provider focus on towns and cities with high population and patronage. However, if this assumption is true, it means that low population density of rural areas discourages service provider from setting up their mass. Lack of electricity to charge phones (19.74%), high cost of recharge cards (13.16%) Which agree with (17) that high cost of recharge cards limiting the Use of mobile phones in the rural community. Theft/loss of handsets (10.53%), limited coverage (5.26%) and fraud (3.95%) were some of the challenges faced by the horticultural crop phone users. However, farmers noted that dependence on power from generators was expensive, those who use generators to recharge phone batteries see it as a good business.

3.4 Test of Hypothesis

H_0^1 : There is no significant relationship between selected socio-economic characteristics of rural horticultural farmers and their perception on the contribution of mobile phone to improvement of rural livelihood

Table 4 Regression Analysis on Selected Socio-economic Characteristics and Horticultural Crops Farmers' Perception of the use of Mobile Phones for Livelihood Improvement.

Variable	Regression Coefficient	Table Values	Decision
Constant	0.20902	18.39	–
Age	0.2965	1.422**	Significant
Household Size	0.1805	0.78*	Significant
Educational Status	0.297	0.16**	Significant
Years of Possession	-0.4393	0.51	Not Significant
S=24.33	R.Sq=52.2%	R.Sq(adj) 50.0%	

Table 4 shows that the age, household size, education status are the most important variables, explaining horticultural crop farmers' perception of the contribution of mobile phone to improvement of rural livelihoods and they were all significant ($P < 0.05$). This also emphasized the importance of education, family size and age in the use of mobile phone to the improvement of rural livelihood.

4.0 CONCLUSION AND RECOMMENDATION

4.1 Conclusion

The study shows that mobile phones have contributed immensely to the improvement of rural horticultural crop farmer's livelihood through better social contacts, reduced transport cost, obtaining help in emergency situations, obtaining market prices of farm inputs when necessary. However, poor network, lack of electricity to charge handsets and high cost of recharge cards are hampering the effective utilization of mobile phones for maximum benefits in rural areas.

4.2 Recommendation

Based on the above findings, it is recommended that Federal Government should improve electricity supply to rural farm communities and provides economic incentives, such as tax deductions for imported equipment, for mobile service providers to expand their mobile service coverage in rural/horticultural production areas. Furthermore, the state and local government should improve rural electricity supply to enable rural horticultural crops farmers utilize the full potentials of mobile phones.

REFERENCE

1. Gubbin J., Buyya, R., Marusic, S., and Palaniswami, M. (2013). Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions. *Future Generation Computer Systems*.29(7):1645-1660.
http://www.academia.edu/1829377/Research_Methodology-
2. International Communication Union (2006). *World Telecommunication/ICT Development Report: Measuring ICT for Social and Economic Development*. ITU, Geneva.
3. Hwang, J., Shin, C., and Yoe, H. (2010). Study on an Agricultural Environment Monitoring Server System Using Wireless Sensor Networks. *Sensors*. 10(12): 11189-11211.
4. Oluyaire, B. (2018). *Assessing of social media for agricultural information, dissemination among farm youth in rural communities of FCT, Nigeria*. M. Phil thesis; Dept. of Agricultural extension and Rural Sociology Obafemi Awolowo University Ile-Efe, Osun State.Pp15
5. Samuel, J. Shah, N. and Hadingham, W. (2005). "Mobile Communications in South Africa, Tanzania, and Egypt: Results from Community and Business Surveys," In *Africa: The Impact of Mobile Phones. Moving the Debate Forward: The Vodafone Policy Paper Series* (3):44-52.
6. Mundy, P and Sultan, J (1999). *Information Revolution: Information and Communication Management is Changing the lives of Rural People*. The Netherlands Technical Centre for Agriculture and Rural Cooperation (CTA). Pp19
7. Waveman, L., Meschi, M and Fuss, M (2005). *Vodafone Policy Paper: The Impart of Telecoms on Economic Growth in Developing Countries*
http://www.vodafone.com/assets/files/en/AIMP_09032005.pdf

8. Information for Development Program (2006). Impact of Mobile Phones on Rural Livelihood Assets in Rural Nigeria. A Case Study of Ovia North East Local Government Area. In Onwuemele, Andrew (Eds.). *Jorin* 9 (2). ISSN: 1596 -8308. www.transcampus.org. www.oyol.info/journals/jorind.
9. Sood, A.D (2006). The Mobile Development Report: The Socio-Economic Dynamics of Mobile Communication in Rural Areas and their Consequences for Development. <http://cks.in/mdr/Mobile%20Development%20Report.Updated.pdf>.
10. Lanjouw E. and Lanjouw, B. N. (2001). Effective utilization of information communication technology (ICT): resources for national development. *Nigerian Journal of Unity and Development* 2(1). :) 24-27
11. Donnei, F. (2002). "Going wireless: behavior and practice of new mobile phone users "; Proceedings from the 2000 ACM Conference on Computer Supported Cooperative Work, Philadelphia, PA, ACM Press,
12. Otegbeye G.O. Owonubi, J.J., Oviasuyi, P.K. (2001). Interspecific variation growth of Eucalyptus growing in Northern Nigeria. *Proceeding of 27th Annual conference of Forest Association, Nigeria*. Pp. 12-16
13. NPC (2006). Nigerian Population Commission of Nigeria Bulletin. Pp 13.
14. Sodimu, A.I., Apah, J., Usman, M.B., Suleiman, R.A. and Lapkat, G. L (2020). Medicinal Utilization of *Hydrocotyle asiatica* Linn. In Kaduna North Local Government Area of Kaduna State Nigeria. *European Journal of Medicinal Plant*. 31 (1) 70-76. ISSS:2231-0894 DOI:10.9734/ejmp/2020/V31.130207. www.journalejmp.com.
15. Sodimu, A.I., Akinyemi, O., Adejoba, O. R and Akande, M. T (2010). Constraint and Profitability Assessment of Modern Beekeeping Technology in Kudan Local Government Area of Kaduna State. *African Journal of Agricultural Research and Development*. Vol.3, No:3. Pp 7-10. ISSN: 2141-0097.
16. Sodimu, A.I., Adebayo, O.O., Olorukooba, M.M. and Sambo, B.E. (2006). Problems Faced by Leafy Vegetable Farmers in Chikun Local Government Area of Kaduna State, Nigeria. *International Journal of Food and Agricultural Research* Vol. 3. No.1. Pp 80 – 84. ISSN: 0189-7136
17. Odiaka, E.C (2012). Mass Media Usage. Lambert Academic Publishing GMBH and Co.KG, Germany.

UNDER PEER REVIEW