

# Use of Cell Phone by Farmers and its Implication on Farmers' Production Capacity in Oyo State Nigeria

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**Abstract**—Relevant agricultural information disseminator (extension agent) ratio of 1:3500 farm families which become a menace to agricultural production capacity in developing countries necessitate this study. Out of 4 zones in the state, 24 extension agents in each zone, 4 extension agents using cell phones and 120 farmers using cell phone and 120 other farmers not using cell phone were purposively selected to give 240 farmers that participated in the research. Data were collected using interview guide and analyzed using frequency, percentage and t-test. Frequency of contact with agricultural information centers revealed that cell phone user farmers had greater means score of X 41.43 contact as against the low mean X19.32 contact recorded by farmers receiving agricultural information from extension agents not using cell phone and their production was statistically significant at  $P < 0.05$ . Usage of cell phone increase extension agent contact and increase farmers' production capacity.

**Keywords**—Cell phone, contact, extension agents and production.

## I. INTRODUCTION

FOOD security is one of the major problem facing developing countries most especially Nigeria. Consequences, of this problem are evidence in malnutrition and untimely death of many people [1]. Statistics shows that as much as 1.4 million people in Nigeria as at 2004 were under nourished [2] in 2003, 70.2% of people lived below poverty line, life expectancy at birth was estimated at 43.6 years and children mortality rate was put at 198 children per thousand in Africa [1]-[3]. Also, out of 800 million people in the world that have no access to sufficient food to live a healthy and productive life about 180 million of them are found in Sub-Saharan Africa [4].

Food security in developing countries was traceable to insufficient investment in agricultural research and modern technology, inadequate extension services and weak linkages between researchers, extension and farmers. [5] indicated that lack of productive resources such as farm inputs and improved crop varieties contribute to hunger problem in developing countries.

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In order to profile solutions to hunger, researches proven and relevant agricultural technologies and technical information that will provide solutions to farmers needs and problems becomes pertinent to makes these solutions available to farmers, there should be a strong linkage communication between researcher extension and farmers subsystems. Hunger and malnutrition prevail in Nigeria because there are weak linkages between researcher, extension and farmers. [6] found that researchers or lecturer conduct researches with the motive of getting promotion with little consideration on what the farmer will gain from it could be traced to prevalence of hunger in Nigeria. There are many technologies with potentials to improve the economy of the rural farmer in Research Institutes that are kept in the files and shelf. In another dimension, an interactive forum for the research, extension and farmer sub-system is either in adequate or not efficiently done due to inadequate funding. Extension ratio to farmers 1:3000 farm families and inadequate to mobility are another constraints to dissemination of research proven and relevant agricultural technologies that aim at profile solution to hunger and malnutrition in Nigeria.

This situation undermines the timeliness of agricultural practices and need for timely delivery of agricultural information that will empower the farmers so that they will have control over their farming environment. In view of this, it becomes essential to establish strong linkages between the Nigeria agricultural research, extension and farmer sub-system in order to empower capacity of farmers in production. An essential step toward achieving this aim is establishment of good communication and information net work, through integration of ICT usage in the research, extension and farmer linkage systems.

Extension agencies can adequately serve the farmers with needed agricultural information in case ICT component such as mobile phone are employed alongside television and radio. [7] opined that there will be quick exchange of agricultural information between the extension agents and farmers if ICT components are integrated in delivery of agricultural information to farmers in Nigeria. In the same vein, extension agents will relay farmers' information needs to researchers and rapidly access large amount of information from the researchers through mobile phone for onward dissemination to farmers.

Several mask of services provider are erected along the road linking one town to anther, purchase of handset by famers and extension agents and telephone kiosk, centre in many rural areas in Nigeria make Global Mobile System (GSM) a means of bridging the gap between researcher, extension agents and farmers in Nigeria. Farmers and extension agents have been making use of GSM for more than a decade. It is now become necessary to examine the effect of using GSM on farmer's production level in Nigeria. In conducting this research, the following objectives are set to:

1. ascertain personal characteristics of the farmers using GSM and those that are not using GSM
2. determine accessibility of the farmers to call phone types of information they are receiving and sending using GSM.
3. establish the effect of using GSM on production capacity of farmers.
4. determine constraint to use of GSM by extension and farmer in Nigeria.

## II. MATERIALS AND METHOD

Oyo State is stratified into 4 administrative zones by agricultural development programme. Simple random technique was used to select 120 farmers using cell phone and 120 farmers not using cell phone from the four administrative zones give 240 farmers that participated in the research. Four extension agents using handset were purposively selected. Interview guide and structure questionnaires were used to collect data. Data were analyzed using inferential and non inferential statistics.

## III. RESULT AND DISCUSSION

### A. Personal and Socio-Economic Characteristic of Farmers

The entries in Table I indicated that majority (91.0%) of the farmers using cell phone were in the age bracket of 20-50 years as oppose to 21.6% of those that were not using cell phone in the same age categories. Male farmers 68.2% and 60.0% respectively predominant among the farmers using cell phone and those that are not using cell phone. Majority (68.3% and 77.0%) of cell phone user and non cell phone user respectively were married. Concerning farmers' educational status, 78.4% and 15.9% of cell phone user and non cell phone user respectively had above secondary education. Most (82%) of the cell phone user earned higher average income of N81,000 – N90,000 per annum as against 71.9% of the non cell phone user earning less than average income of N70,000 per annual as shown in Table IB. Greater percentage (89.0% and 94.6% ) of cell phone user and non cell phone users respectively were full time farmers and 61.7% of the cell phone user cultivated more than 10 hectare as against 72.5% of the non cell phone user that cultivated 1 hectare. Majority (74.2% and 76.7%) of the cell phone user and non cell phone, user respectively were crops farmers. Most (62.3% and 71.7%) of the cell phone user and non cell phone user practiced mixed farming as shown in Table IB.

The findings revealed that majority of the cell phone user belong to age bracket 20-50 years. The age category that is described by Dada *et al* (2006) as middle age of which farmers contributes economically and increase production capacity in order to support themselves and their children. More over they provide nutritious diets for themselves and their households to be more productive and stay healthy. Higher educational level, higher income level and desire of cell phone farmers to cultivate more than 10 hectares of land could be regarded as the indices which aid acquisition of cell phone, manipulation of cell phone to seek for relevant agricultural information by cell phone user. This assertion is in conformance with the finding of Hubbard (1995).

TABLE IA  
PERSONAL AD SOCIAL CHARACTERISTICS OF FARMERS`

Variables	Farmer using phone		Farmer not using phone	
	Freq.	%	Freq.	%
<b>Age</b>				
20-30	42	35.0	11	9.1
31-40	48	40.0	15	12.5
41-50	19	16.8	12	10.0
51-60	11	9.0	72	60.0
60	-	-	10	8.4
Total	120	100	120	100
<b>Sex</b>				
Male	82	68.3	72	60.0
Female	38	31.7	48	40.0
Total	120		120	
<b>Marital Status</b>				
Single	23	19.2	26	22.0
Married	82	68.3	92	77.0
Divorced	-	-	-	-
Widow	15	12.5	2	1.7
Total	120	100	120	100
<b>Education</b>				
No formal education	-	-	16	13.3
Adult Education	4	3.3	17	14.2
Primary	22	18.3	68	56.6
Secondary	68	56.7	9	7.5
Tertiary	26	21.7	10	8.9
Total	120	100	120	100
<b>Household size</b>				
1-5	24	20.0	22	18.3
6-10	86	72.0	87	72.5
11-15	10	8.0	11	9.7
Total	120	100	120	100

TABLE IB  
SOCIO-ECONOMIC CHARACTERISTIC OF FARMERS

Variables	Farmer using Cell Phone		Farmer not using Cell Phone	
	Freq.	%	Freq.	%
<b>Income Level Per Annual</b>				
₦60,000 – 70,000	4	3.0	86	71.7
₦71,00 – 80,000	8	7.0	24	20.0
81,000 – 90,000	98	82.0	10	8.3
100,001 – 111,000	10	8.0	-	-
<b>Agricultural Activities</b>				
*Farming	89	74.2	76	63.4
Non Farming	45	37.5	56	46.6
<b>Farming Status</b>				
Full Time	89	74.2	94	78.3
Part Time	31	25.8	16	13.3
< 1 hectare	11	9.2	87	72.5
2-5 hectares	15	12.5	22	18.8
6-10 hectares	74	61.7	11	9.2
11-15 hectares	15	12.5	-	-
>15	5	4.2	-	-
<b>Types of Farming Practiced</b>				
Crop farming	89	74.2	92	76.7
Livestock	56	46.7	24	20.0
Mixed Farming	76	63.3	86	71.7
Fishery	21	17.5	-	-
Snailery	14	11.7	-	-

\*Multiple response

#### B. Farmers Access to Cell phone

Table II indicated that 86% and 94% of farmers own cell phone and patronized commercial phone kiosks respectively in the study area. The implication of this is that commercial phone kiosks is an alternative means of receiving relevant agricultural information in case they did not want to make use of their cell phone. It could also be inferred from the result that farmers who own cell phone patronized cell phone kiosk because phone call charges per minutes using kiosks is lower than using personal handset in developing countries.

TABLE II  
FARMERS ACCESS TO CELL PHONE

Variable	Frequency	%
*Ownership	86	71.2
Neighborhood	21	17.5
Commercial Phone Kiosk	113	94.0
Friends	32	26.7

\*Multiple response

#### C. Frequency of making Contact with Agricultural Information Centers

It was observed that farmers using cell phone made greater number of contact as indicated by their mean number of contact 41.43 per annual as against lower mean number of contact of 19.32 per annual made by farmers that had contact with extension agents in Table IIIC. It could be inferred from this finding that farmers using cell phone are more informed than farmers making contact with extension agents. Experts have been found that cell phone, could be used as a tool to reduce extension farmers ratio of 1:2000 per farm families in Nigeria.

The finding further revealed that majority (71.2%) of the farmers listened to agricultural news by making use of their handset radio in Table IIIB. According to [7] radio is still 'a means of disseminating agricultural information to farmers in developing countries because it is widely accessible to rural dwellers.

TABLE IIIA

FREQUENCY OF DISSEMINATING RELEVANT AGRICULTURAL INFORMATION TO FARMERS USING CELL PHONE AND EXTENSION AGENT

Variable s	Frequency	Cell Phone		Extension Agent	
		Frequency	%	Frequency	%
Dial call	1-3	12	10	-	-
	4-6	72	60	-	-
	7-10	26	21.7	-	-
	> 10	10	8.3	-	-
Received call	1-3	12	10	-	-
	4-6	85	70.8	-	-
	7-10	3	2.5	-	-
	> 10	8	6.6	-	-
Send message	1-3	14	11.7	-	-
	4-6	74	61.7	-	-
	7-10	24	20.0	-	-
	> 10	8	6.6	-	-
Received message	1-3	11	9.1	-	-
	4-6	69	51.5	-	-
	7-10	35	29.2	-	-
	> 10	5	4.2	-	-
Radio message	1-3	86	71.2	-	-
	4-6	14	11.6	-	-
	7-10	18	15	-	-
	> 10	2	2.2	-	-
Reminder about	1-3	86	71.2	-	-
	4-6	15	12.5	-	-
	7-10	16	13.5	-	-
	> 10	3	2.5	-	-
Use of Cell calculator	1-3	85	70.8	-	-
	4-6	21	17.5	-	-
	7-10	11	9.1	-	-
	> 10	3	2.5	-	-

TABLE IIIB

FARM VISIT, DEMONSTRATION FARM, AND OFFICE VISIT

Valuable	Frequency	Cell Phone		Extension Agent	
		Frequency	%	Frequency	%
Farm visit	1-3	-	-	120	100
	4-6	-	-	-	-
	7-10	-	-	-	-
	> 10	-	-	-	-
Office visit	1-3	-	-	55	54.1
	4-6	-	-	45	44.1
	7-10	-	-	-	-
	> 10	-	-	-	-
Distribution of hand bill	1-3	-	-	101	-
	4-6	=	=	19	84.2
	7-10	-	-	-	-
	> 10	-	-	-	-

TABLE IIIC

FREQUENCY OF CELL PHONE AND OTHER INFORMATION SOURCES MEAN SCORES PER ANNUAL

Variable	Cell Phone	Extension Agent	Neighbor	Friends	Farm
Mean	41.43	19.32	9.52	1.78	0.5881
Std. Dev	11.421	8.5131	4.113	2.0031	2
Minimum	2	0.00	0.00	0.00	1.3882
Maximum	0.00	10	10	10	0.00
	10				10

#### D. Farmers' Production Level

Cell phone user mean crops production for maize X 41,240 tons, cassava X 121,450 tons and yam X 98,000 tons were greater than mean crops production maize X 16,522, Cassava X 21,151 and yam X 35,120 for non cell phone users livestock and fisher productions follow the same trend as indicated in Table IV. It could be deduced from this result why income per annual of cell phone users' farmers was higher than that non cell phone user. [8] deduced from his finding that income status of the households, affected the attainment of food and nutrition security. Hence living standard of the cell phone users cannot be compared with non phone users.

TABLE IV  
FARMER PRODUCTION CAPACITY

Variable Major Food Crops	Farmer using Cell Phone Means Productions (tons)	Farmer not using Cell Phone Means Production (tons)
Maize	41,240	16,572
Cassava	121,450	21,151
Yam	98,000	85,121
Livestock	No kept	No kept
Sheep & Goat	1,271	567
Poultry	Mean No Kept	Mean No Kept
Hen	5,600	2,580
Local Cockerel	1,215	416
Fisheries	Mean number of table size sold kg	-
Tilapia		18,115
Claims	4,211	
	38,121	

#### E. Constraint to Use of Cell phone

As it is observed in Table V, more than (60%) of the farmers consented those eight constraints in the table are the predominant constraints facing use of cell phone in Nigeria. In order for farmers not to be left out of the beneficial impact of GSM, solutions should be profile to these constraints in Nigeria.

TABLE V  
CONSTRAINTS TO USE OF CELL PHONE

Constraints	Frequency	Percentage
1. High call tariff	103	86.4
2. Fluctuating service	93	77.9
3. Erratic power supply	61	77.5
4. High cost of hand felt	92	76.6
5. Cost of recharge card	77	64.5
6. Net work coverage	82	68.2
7. Repair of Technical fault	84	70.1
8. Access to recharge purchasing centre	73	60.5

#### F. Production Capacity Difference between Cells Phone User and Non Cell Phone User

As shown in Table VI production capacity was statistically different between user of cell phone and non user of cell phone at  $p < 0.05$ . Higher production capacity recorded by cell phone user could be attributed to their frequency of contact with relevant agricultural information centers. This positive result is

not peculiar to Nigeria only. Empirical data showing integration of ICT in the rural development process show a significant impact on both economies and socio-economic status of dwellers of the rural communities. [10]-[11] reported successful use of cell phone and other ICT components for creation and monitoring of markets for more than 30 commodities in seven villages and monitoring of 25 important staple foods in 64 rural markets in Benin Republic.

TABLE VI  
TEST OF DIFFERENCE OF CROPS PRODUCTION CAPACITY OF CELL PHONE USER AND NON CELL PHONE USER

Variable	Group	Number of crops	Mean score	Calculate T-value	Television
Crops production capacity Maize	User of cell phone None user of cell phone	120	41.240	6.42	1.26
		120	16.572		

#### IV. CONCLUSION

An attempt has been made in this paper to examine the implication of using cell phone on farmers' production capacity in Nigeria with a view to identifying possible policy strategies for improvement. The paper observed that farmers using cell phone are well informed. Consequently they were able to make use of current production technique that lead to higher production level and income status, parameter for improving quality of farmers' livelihood status in the rural area. Suggested measure for improving use of cell phone should centre on provision of solution to mentioned constraints to use of cell phone in Nigeria. Provision of these solutions to constraints should be implemented as a package rather than the use of one of them. If solutions to constraints; to use of cell phone in this paper is effectively administered. It will go a long way towards mitigating the poor quality of rural life in Nigeria.

#### ACKNOWLEDGMENT

Author Bolarinwa, K. K. acknowledges Education Trust Fund, (ETF) for funding the presentation of the paper in an International conference and his University's management who selected him. Also Bolarinwa, K. K. would like to thanks Ms. Ebru Ardil for her assistance.

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