

UTILIZATION OF ICTS IN ACCESSING COCOA BEANS MARKET INFORMATION BY CROSS RIVER STATE FARMERS

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Abstract

The research work investigated farmers' level of use of Information and Communication Technologies (ICTs) in accessing cocoa beans market information in Cross River State, Nigeria. Sixty farmers were selected using random systematic sampling technique. Pertinent information was collected with structured questionnaire. Data were analysed with descriptive statistics and Pearson Product Moment Correlation (PPMC). Results reveal that 90% of the respondents used mobile phone while 85% used radio to access cocoa beans market information. Frequency of use for mobile phone (75%) and radio (35%) were on weekly basis. The major market information used for ICTs were cocoa beans sales price (88.3%), quality (85%), value addition (78.3%) and certification (75%). Cocoa beans sales price was accessed regularly, while certification of cocoa beans was occasional. Major constraints to the utilization of ICTs were poor electricity supply and internet services. Income ($r=0.279$, $p=0.021$), cocoa farm size ($r=0.300$, $p=0.020$) and age ($r=-0.301$, $p=0.019$) correlated significantly with extent of using ICTs in accessing cocoa market information by farmers. Efforts should be made by internet providers to ensure optimum internet connection for improved ICTs used by farmers in sourcing cocoa market information.

Key words: ICT use, cocoa farmers, market information, farmers' income

INTRODUCTION

Information and Communication Technologies (ICTs) represent medium like radio, television, fixed and mobile telephones, computer and internet. Messages communicated through these means gets to the recipients faster and quick [2]. Nigeria's teledensity (a measure of the penetration of telephone lines within a territory), which is an indicator of a country's ICT potentials, grew from near zero at the turn of the millennium to 107% by 2015. The country has been ranked as the largest and fastest growing in terms of telecom in Africa; and among the 10 fastest growing telecom markets in the world [13]. Globally, the revolution of ICTs has opened greater opportunity for efficient information sharing in the agricultural sector. The application of ICTs by farmers for agricultural activities is gaining popularity in every sphere of human endeavor. The emergence of e-

agriculture has inherent potentials to overcome the limitations of rural-urban dichotomy and consequently improve farming households' food and nutrition security, farm income and poverty reduction.

There have been improvements in agricultural practices over the years in Nigeria. This could be attributed to access to information, improved farming techniques and other needed resources. The use of ICT has potential in bridging the information gap among farmers especially, cocoa farmers. This will elicit assess to cocoa beans market information, farm inputs and government policies directly required for optimum productivity.

Farmers need information to organize their production activities, make decision and identify market outlets for their farm produce. Cocoa is a major agricultural export crop and a top foreign exchange earner for Nigeria [3]. It provides stable income and creates jobs for

farmers, processors, marketers, researchers and other stakeholders in the value chain. Irrespective of the economic importance, access to credible market information remains a crucial issue in sustaining cocoa business among farmers. In Cross River State, cocoa production is a major activity that provides livelihood for farmers and other actors in agricultural sector. Therefore, the desire to promote better access to information in improving the socio-economic condition of farmers is a top priority of agricultural extension and rural advisory service providers. Agricultural extension professionals are well positioned to organize information to advance the socio-economic landscape of stakeholders in agriculture value chains to exit poverty [9]. The sustainability of food security can be enhanced through mobile-based phone technology. This has been exploited and leveraged to provide farmers with relevant, accurate, timely and consumable agricultural information ranging from farm preparation to pre-harvest and post-harvest crop and farm produce management [5]. They include information on precision farming, pest and disease control, irrigation, market availability and produce pricing, access to credit facilities and extension services.

Agricultural marketing is germane to cocoa production. It is the performance of all the business activities involved in the flow of goods and services from the point of initial agricultural production to the ultimate consumers [6]. This involves all the stages of operation and movement of commodities from the farmers to the consumers. These include assemblage of goods, storage, transportation, processing, grading, and financing. Cocoa farmers along the cocoa value chain are faced with the challenges of middlemen who buy cocoa beans usually less than the official international market price. The market price before sales is usually not known to the rural farmers. Farmers feel cheated and dissatisfied when they do not have prior knowledge of market prices for their cocoa.

The middlemen ceased this opportunity and take undue advantage of buying the farm produce at cheaper prices directly at the farm

gate and later sell to the final consumers at an exorbitant price. Unfortunately, the Cocoa Marketing Board which supposed to regulate their production activities was dissolved by the Nigerian government in 1986. The cocoa sub sector was liberalized and since then, farmers find it difficult to access coordinated information on market structure, improved seedlings, credit, recommended pesticides and standard quality requirements. The limitation in obtaining information about cocoa marketing has been identified as a constraint to farmers' productivity and enlargement across the world. It was observed that in Nigeria, there is an inefficient market information system; leading to a wide gap between farmers and end-users [15]. Therefore, the application of ICTs by cocoa farmers is playing a vital role in accessing relevant information that will enhance productivity and increase livelihood.

It is against this backdrop that farmers' level of use of Information and Communication Technologies (ICTs) to access cocoa beans market information was investigated in Cross River State. The specific objectives are to:

- Determine some farmers' socio-economic characteristics.
- Identify the type of ICTs farmers utilise to access cocoa beans market information.
- Assess how ICTs are frequency used by farmers to access cocoa beans market information.
- Examine the use of ICTs to obtain cocoa market information from farmers.
- Determine the constraints to utilization of ICTs in accessing cocoa market information by farmers.

It was hypothesized that there is no significant relationship between some socio-economic characteristics of farmers and the level of using ICTs in accessing cocoa beans market information.

MATERIALS AND METHODS

The study was carried out in Cross River State, Nigeria. It is the second largest cocoa producing State which has boundaries with Benue State in the northern part. In the West, the state maintains boundaries with Enugu

and Abia. In the eastern end, Cross River shares border with Cameroon. Akwa-Ibom and the Atlantic Ocean also have their boundaries with the State at the southern part. The State has a mean annual temperature of 30°C and annual rainfall of 1,300-3,000mm [12]. The main crops grown are cassava, yam, rice, plantain and banana. Others include cocoyam, maize, cocoa, rubber; groundnut and palm produce [12].

The sample for the study was purposively selected across four communities in Boki and Etung Local Government Areas due to prominence of cocoa production. The communities include Biakwan and Orimekpong in Boki, Ajassor and Effraya in Etung. A systematic random sampling was used to select 60 farmers based on list of cocoa farmers obtained from Cocoa Association of Nigeria. Thirty farmers each

were chosen from the selected communities to ensure equal representation. Information was collected from the farmers using structure questionnaire. Data were subjected to descriptive and inferential statistics. Data were analysed with Statistical Package for Social Sciences (SPSS) software to obtain the Pearson Product Moment Correlation PPMC (r). The r and p-values at (P< 0.05) were used to understand which variables were significant and not significant in terms of tested hypothesis of the study.

RESULTS AND DISCUSSIONS

Cocoa farmers' socio-economic characteristics

Majority of the cocoa farmers constitutes 80% male, while 20% were female (Table 1).

Table 1. Cocoa farmers' socio-economic characteristics *N=60*

Variables	Frequency	Percentage	Mean
Sex			
Male	48	80	
Female	12	20	
Age (years)			
≤ 34	7	11.7	
35-40	29	48.3	
41-45	16	26.7	40.35
46 and above	8	13.3	
Educational Status			
Primary	10	16.7	
Secondary	43	71.6	
Tertiary	7	11.7	
Number of years spent schooling			
3-9	6	10.0	
10-16	49	81.7	
17-23	2	3.3	
24-30	1	1.7	12.93
31-37	1	1.7	
38 and above	1	1.7	
Cocoa farm size (Hectares)			
1-2	30	50.0	
3-4	23	38.3	
5-6	2	3.3	3.11
7-8	1	1.7	
9 and above	4	6.7	
Estimated annual income (₦)			
Less or equal to 500,000	7	11.7	₦1,139,000.00M (\$3,163.89)
501,000,000-1,000,000	30	50.0	
1,000,001-1,500,000	15	25.0	
1,501,000-2,000,000	6	10.0	
Above 2,000,000	2	3.3	

Source: Field survey, 2018.

It means that more men dominated cocoa production in the study area. Average age of farmers was 40 years implying that they were more of youths engaged in cocoa farming. Majority (71.6%) had secondary education

which could influence their use of ICT in obtaining market information. It implies that most of them had a moderate level of education. This is in tandem with [14]. They pointed out that educational status was related

to the use of ITCs by farmers in Edo State. The average farm size of farmers was about 3 ha which suggests small holdings with an estimated annual mean income of One Million One Hundred and Thirty-Nine Thousand Naira only (₦1,139,000). This is equivalent to Three Thousand, One Hundred and Sixty-Three Dollars Eighty-Nine Cents (\$3,163.89). The income realized could facilitate sourcing cocoa market information using ICTs in order to improve the socio-economic lives of the farmers. Such information has proved to increase farmers' revenues, potentially enabling their move from subsistence to revenue generating farming [7].

Type of ICTs used to access cocoa beans market information by farmers

Cocoa farmers in the study area used Mobile phone (90.0%), Radio (85.0%), Internet (21.7%) and other ICT platforms in sourcing for cocoa market information (Fig. 1).

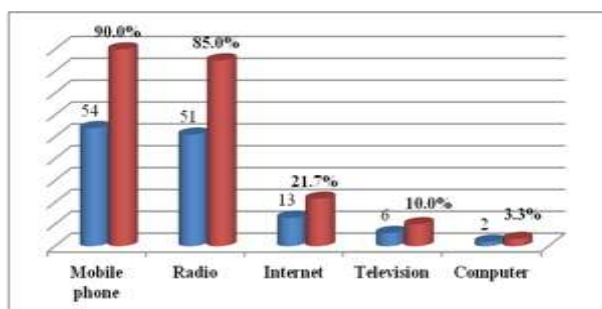


Fig. 1. ICTs used to access cocoa beans market information by farmers $N=60$

Figures without percentages are frequencies

Source: Field survey, 2018.

Mobile phone and Radio were the popular ICTs used. This finding agrees with [11] who reported that mobile phones when combined with other ICTs have high impact on agriculture. Furthermore, [8] pointed out that Radio provides adequate information on how to get and sell their agricultural commodities.

Level of use of ICTs to access cocoa beans market information

Results in Table 2 revealed that 75% and 35% of cocoa farmers used mobile phone and Radio respectively on a weekly basis. Majority of the farmers did not use computer (93.3%), Television (83.3%) and internet (78.3%) regularly.

It suggests that Mobile phone and Radio were the ICT platforms frequently utilized to access cocoa beans market information by respondents.

This is in line with the study of [10]. They reported that Mobil phone and Radio were highly used to access cocoa information.

Table 2. Distribution of farmers' level of use of ICTs to access cocoa beans market information

Level of use of ICTs	Frequency	Percentage
Mobile phone		
None	6	10.0
Daily	6	10.0
Weekly	45	75.0
Monthly	3	5.0
Radio		
None	9	15.0
Daily	3	5.0
Weekly	21	35.0
Monthly	27	45.0
Internet		
None	47	78.3
Daily	1	1.7
Weekly	7	11.7
Monthly	5	8.3
Television		
None	53	88.3
Daily	2	3.3
Weekly	4	6.7
Monthly	1	1.7
Computer		
None	56	93.3
Daily	1	1.7
Weekly	1	1.7
Monthly	2	3.3

Source: Field survey, 2018. Note: $N=60$.

Cocoa market information obtained with ICTs and frequency of sourcing

In Table 3, the major market information obtained using ICT platforms were to know local sales price of cocoa beans (88.3%), cocoa value addition (78.3%), cocoa certification (75%) and bagging dried cocoa beans with standard jute bags. Accessing local sales price was obtained always, while others were sourced occasionally. The implication is that price was a major determinant in using ICTs to obtain necessary information for producing cocoa by farmers. Utilization of ICT for agricultural activities has played a greater role in inspiring and attracting rural youths into agribusiness activities as it makes market information accessible [16].

Table 3. Cocoa market information obtained with ICTs and frequency of sourcing *N=60*

Market information & frequency of sourcing	Yes	F	%
Know current international price of cocoa	16(26.7)	-	-
None		44	73.3
Occasionally		13	21.7
Always		3	5.0
How to know current market demand for cocoa	15(25.0)	-	-
None		45	75.0
Occasionally		12	20.0
Always		3	5.0
Know local sales price of cocoa beans	53(88.3)	-	-
None		5	8.3
Occasionally		26	43.3
Always		29	48.3
Cocoa beans quality	51(85.0)	-	-
None		8	13.3
Occasionally		32	53.3
Always		20	33.3
Certification of cocoa beans	45(75.0)	-	-
None		14	23.3
Occasionally		40	66.7
Always		6	10.0
Cocoa value addition	47(78.3)	-	-
None		15	25.0
Occasionally		38	63.3
Always		7	11.7
Bagging cocoa beans with standard jute bags	47(78.3)		
None		20	33.3
Occasionally		31	51.7
Always		9	15.0

Source: Field survey, 2018.

Note: Figures in parentheses are percentages F Frequencies % Percentages

Constraints faced by farmers in using ICTs to access cocoa market information

Poor electricity supply (96.7%) and internet connectivity (56.7%) were the major constraints encountered by farmers in using

ICTs to access market information of cocoa. The high cost of internet services (55%), poor extension services (50%) and high cost of buying ICT were minor constraints (Table 3).

Table 4. Constraints to utilization of ICTs in accessing cocoa market information

Constraints	Major	Minor	Not a constraint
Poor electricity supply	58(96.7)	1(1.7)	1(1.7)
High cost of internet services	15(25.0)	33(55.0)	12(20.0)
Low knowledge of ICT use	5(8.3)	18(30.0)	37(61.7)
High cost of buying ICT	20(33.3)	30(50.0)	10(16.7)
Poor internet connectivity	34(56.7)	20(33.3)	6(10.0)
Poor extension services	4(6.7)	30(50.0)	26(43.3)

Source: Field survey, 2018 Note: Figures in parentheses are percentages and others are frequencies.

However, 61.7% of the farmers claimed that low knowledge of ICT use was not a constraint. By implication, poor electricity supply and internet services posed serious limitations to farmers in using ICT to access cocoa market information. This result is supported by [1].

Hypothesis Testing: Relationship between some farmers' socio-economic characteristics

and the level of using ICTs in accessing cocoa beans market information. The results in Table 5 reveal that estimated annual income ($r=0.279$, $p=0.021$), cocoa farm size ($r=0.300$, $p=0.020$) and age ($r= -0.301$, $p=0.019$) correlated significantly with extent of using ICTs in accessing cocoa market information by farmers. The implication is that the higher the income realised from the sale of cocoa

beans, the more farmers will use ICT to source for information at improving cocoa marketing and production. Income is an important variable motivating farmers in accessing and using ICT platforms for cocoa production. The study of [4] corroborated this finding. They found that there was positive association between ICTs usage and farmers' income. Consequently, a higher farm size would translate to more utilisation of ICTs for information access on cocoa market. This situation enhances regular ICT application in agricultural production. The inverse and

significant relationship between age and level of ICT usage implies that as the age of respondents' increases, the use of ICTs decreases. Therefore, access to cocoa market information through ICT was determined by age. However, there was no significant relationship between numbers of years spent schooling and level of using ICTs in accessing cocoa market information by farmers. The youths used Mobile phone and Radio more than the elderly farmers. [16], shows that young farmers use ICT more often than adult farmers in Nigeria.

Table 5. Relationship between some farmers' socio-economic characteristics and level of using ICTs to access cocoa beans market information

Variables	r-value	p-value	Decision
Estimated annual income	0.279	0.021**	S
Cocoa farm size	0.300	0.020**	S
Age of farmers	-0.301	0.019**	S
Number of years spent schooling	-0.025	0.849	NS

Source: Field survey, 2018.

Note: S=Significant NS=Not significant **Significant at P< 0.05

CONCLUSIONS

The application of ICTs to access cocoa beans market information by farmers revealed that Mobile phone and Radio were commonly used. Major information sourced include: knowing current cocoa beans price, beans quality, certification, value addition and bagging dried cocoa beans with standard jute bags. Income was an important variable motivating farmers in using ICT platforms for cocoa production. Poor electricity supply and internet connectivity were serious constraints to ICT usage by Cross River State farmers. Efforts should be made by internet providers to ensure optimum internet connection for improved ICTs used by cocoa farmers in sourcing cocoa market information.

REFERENCES

[1]Abdulrahman, S., Abubakar, M. C., Suleiman, H. A., Mohammed, M., Idris, J., 2017, Application of ICT in Agriculture: Opportunities and Challenges in Developing Countries. *International Journal of Computer Science and Mathematical Theory* 3(1): 8-18.
 [2]Agboola, A. F., 2013, From Indigenous Knowledge System to Agricultural Marketing: Case Study of

Traditional Rural Markets in Osun State, Nigeria. In D. O. Torimiro, A. A. Eludire, & S. K. Subair (Eds.), *Proceedings of the International Stakeholders Meeting on E-Agriculture for Productivity and Poverty Alleviation in Africa* pp. 217-219. Held in the Center for In-service and Continued Education, Botswana College of Agriculture, Gaborone, Botswana.
 [3]Arene, C. J., Nwachukwu, E. C., 2013, Response of Cocoa Export Market to Climate and Trade Policy Changes in Nigeria. *Journal of Agriculture and Sustainability* 4(2): 245-277.
 [4]Asenso-Okyere, K., Mekonnen, D. A., 2012, The Importance of ICTs in the Provision of Information for Improving Agricultural Productivity and Rural Incomes in Africa. Working paper of the United Nations Development Programme, Regional Bureau for Africa, WP 2012-015: January 2012: 1-32.
 [5]Awuor, F. M., Otanga, S. A., 2019, Farmer centred large scale e-surveillance and control of crop pests in Kenya *Journal of Agricultural Informatics*. 10(1), 33-44. <https://doi.org/10.17700/jai.2019.1.1.500>.
 [6]Bello, R. O., 2000, Effect of Oyinladun Radio Programme on Farmers Awareness of Marketing Outlets in Oyo State, Nigeria. M.Sc. Dissertation, Department of Agriculture Extension and Rural Development. University of Ibadan, Ibadan.
 [7]Carvalho, A., Klarsfeld L., Lepicard, F., 2011, Leveraging Information and Communication Technology for the Base of the Pyramid Innovative business models in education, health, agriculture and financial services. A report prepared by Hysra hybrid consulting. https://www.ghdonline.org/uploads/Hysra_Report_IC

T_for_the_BoP.pdf: 29-30, Accessed on 8th March, 2019.

[8]Fadairo, A. O., Oyelami, B. O., 2019, Listenership of *Latoju Oja* Radio Extension Programme among Farmers in Oyo State, Nigeria. *Journal of Agricultural Extension* Vol. 23(1): 66-78.

[9]FAO, 2011, The role of Information and Communication Technologies (ICTs) in the improvement of Agricultural value chains. <http://www.fao.org/docrep/017/ap851e/ap851e.pdf>, Accessed on 20th May 2019.

[10]Kemi, A. O., Quadri, A., 2016, Assessment of the relevance and utilization of ICT in increasing production among cocoa farmers in Ondo State Nigeria. *International Journal of Scientific & Engineering Research* 7(11): 1401-1410.

[11]Kiambi, D., 2018, The use of Information Communication and Technology in advancement of African agriculture. *African Journal of Agricultural Research* 13(39): 2025-2036.

[12]Nigeria Galleria, 2019. Brief History of Cross River State, https://www.nigeriagalleria.com/Nigeria/States_Nigeria/Cross-River/Brief-History-of-Cross-River-State.html, Accessed on 7th March, 2019.

[13]Nigerian Communications Commission (NCC), 2016, Nigeria has achieved 100 percent Teledensity. *The communicator*, Vol. 18, No. 3, September, 2016. www.ncc.gov/thecommunicator/index.php?option=com_content&view=article&id=888&itemid=5, Accessed on 5th September, 2019.

[14]Okoedo-Okojie, D.U., Omoregbee, F.E., 2012, Determinants of Access and Farmers' use of Information and Communication Technologies (ICTs) in Edo State, Nigeria. *J. Appl. Sci. Environ. Manage.* 16(1): 41-44.

[15]Uwandu, C.N., Thomas, K.A., Okoro, C.M., 2018, Utilization of Agricultural Information Sources and Adoption of Animal and Crop Technology among farming Households in Imo State, Nigeria. *Journal of Agricultural Extension* 22(1): 143 – 155.

[16]Yami, M., Feleke, S., Abdoulaye, T., Alene, A. D., Bamba, Z., Manyong, V., 2019, African Rural Youth Engagement in Agribusiness: Achievements, Limitations and Lessons. *Sustainability Journal*. 11(185): 1-15

