ANALYSIS OF UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AMONG CASSAVA FARMERS IN ANIOCHA SOUTH LOCAL GOVERNMENT AREA OF DELTA STATE, NIGERIA

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ABSTRACT

Information and communication technology (ICT) is a major instrument of communication with implications for innovation adoption among farming households. This paper examines the utilization of ICTs in obtaining innovation information among cassava farmers in Aniocha LGA of Delta State, Nigeria. The specific objectives were to describe the socio-economic characteristics, identify the ICT accessed, determine the extent of use of the ICTs and estimate the factors limiting the access and usage of ICT by cassava farmers in the study area. Data were collected from 120 farmers using multi-stage sampling procedure. Analysis of the data was done using descriptive statistics and Pearson Product Moment Correlation. The findings showed that majority (79.2 %) of the respondents were female and married (67.5%). The major ICT used by the farmers were radio and mobile phones. Major factors limiting the farmers use of ICT included lack of technical know-how ($\bar{x} = 3.54$), high cost of modern ICTs ($\bar{x} = 3.41$), inadequate training ($\bar{x} = 3.38$) and lack of awareness ($\bar{x} = 3.21$). Correlation results showed a significant association between the age (r = -0.466*), level of educational (r = 0.363**) and family size (r = -0.535**) of respondents and their utilization of ICT gadgets. To increase cassava production and enhanced food security, the farmers should be encouraged to use ICT to source for innovation information. Also, modern ICT gadgets should be made available to cassava farmers at affordable prices and cassava farmers should be encouraged and trained in the use of available ICT gadgets to obtain valuable agricultural innovation information.*

Keywords: *ICT, analysis, utilization, cassava farmers*

INTRODUCTION

Cassava is one of the world's most important food crops with an annual output of over 34 million tonnes of tuberous roots (Onemolease, Ehilenboadiaye and Omoregie, 2021). In the tropics, cassava roots and leaves provide basic calories and income. In Africa over 600 million people are dependent on cassava for food (Apata, 2019). Cassava is produced majorly by small-scale farmers using simple farm implements. Bulk of the cassava produced is consumed while only about 5% is used in industries as raw materials. Cassava consumption in Nigeria is very high and provides about 80% of the total energy intake of her citizens (Onyenma and Aroyehun, 2020). As a food crop, cassava is tolerant to low soil fertility and drought as well as pest and diseases. Cassava production in Nigeria is all year round majorly by smallholder farmers. This enhances the availability of cassava products throughout the year. In Nigeria, bulk of the total national output of cassava comes from the South-South region where many households depend on it as their major source of food and income and Cassava also provides livestock feeds, as well as industrial raw material for producing bakery products and ethanol in cosmetic and drug industries (Belonwu, Onemolease and Igene,2020) .

The growing demand for cassava products throughout the world necessitates increased cassava production which can result from adoption of innovations from research into various areas of cassava production. This cannot be attained if research findings do not get to the end-users that is, the cassava farmers. The extension agents are grossly inadequate to meet the information needs of numerous farmers in different parts of Nigerian States(Albert and Joseph,2020). A plausible way to overcome this human resource shortage is by using Information, Communication and Technology (ICT) to access innovation information about different aspect of cassava production. The adoption of such innovations will certainly boost cassava production in the study area and Nigeria in general. Information, Communication and Technology (ICT) refers to a system of disseminating and managing information using computer, telephone and other audio-visual networks. ICTS gadgets majorly used in different parts of the world include but not limited to computers, telephones, televisions, radios satellite systems, internet and the social media. High usage of ICT by farmers to source for innovation information can enhance their productivity if adopted.

This research focuses on the following objectives:
1. examine the socio-economic characteristics of cassava farmers in the study area.
2. identify the ICT accessed by the farmers
3. determine the extent of use of the ICTs
4. determine factors limiting the access and usage of ICT by the farmers

Hypothesis

H_0:. There is no significant relationship between respondent's socio-economic characteristics and extent of their utilization of ICT in the study area

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METHODOLOGY

The study was conducted in Aniocha south LGA of Delta State, Nigeria. The purposive selection of Aniocha South local Government area of Delta state was because of the predominance of cassava farmers in the Area. Delta State lies between Latitudes 5'00' and 6'30'N of the equator and longitude 5'00' and 6'.45'E of the Greenwich Meridian and is accessible by minor and major roads. Cassava is one of the major crops grown in the area.

$$ r = \frac{N \sum xy - (\sum X)(\sum Y)}{[\sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]} $$

Multi-stage sampling procedure was used to select respondents for the study. In the first stage, three areas (north, central and southern parts) of the Local Government Areas (LGAs) were purposively selected. This was done to ensure a wide coverage and to ensure that all cassava farmers in the LGA were well represented. In the second stage two communities were randomly selected from the various areas (that is, two communities each from the north, central and southern areas of the Local government). This totaled six communities across the study area. In the third stage, 20 cassava farmers were randomly selected from each of the 6 communities to give a population size of 120 respondents used for the study. Data for the study were collected from both primary and secondary sources. The primary data was obtained from the field using a structured questionnaire that was administered to the respondents. This was complemented with oral interview for the non-literate farmers. The data collected were analyzed using both descriptive and inferential statistics. The former included frequency, percentages and mean statistics, while Pearson Product Moment Correlation, an inferential statistic, was used to test the relationship between cassava farmers socio-economic characteristics and ICT usage. The Pearson coefficient correlation seeks to measure the linear relationship between an independent variable(s) and a dependent variable. This relationship can be positive or negative. The correlation coefficient value lies between -1 and 1, where -1 represent perfect negative relationship and 1, perfect positive relationship between both variables. The mathematical representation of the correlation model is specified as: Where:

X = Independent Variables (xi – xn)

Y = Dependent Variable (ICT usage)

N = the number of pairs of scores

Σxy = the sum of the products of paired scores

Σx = the sum of x scores

Σy = the sum of y scores

Σx2 = the sum of squared x scores

Σy2 = the sum of squared y scores

Variables in the study were measured as follow:

Demographic Characteristics of Respondents
i.   Age: This was measured in years and categorized into groups
ii.   Gender: This was measured by asking respondents to indicate whether they are male (coded 1) or female (2)
iii.   Family Size: Respondents were asked to indicate the total number of people in their family\household. This was grouped and coded appropriately.
iv.   Farming background/Experience: Respondents were asked to indicate their farming experiences in years.
v.   Educational level of respondents': Respondents were asked to indicate their educational level.
vi.   Income level of Respondents: Respondents were asked to indicate their income group per annum. This was measured in Naira and coded appropriately.

Respondents Usage of ICT

A list of different ICT gadgets was given to the farmers to select from. The list was based on the ICT gadgets commonly used in Nigeria. Their responses were captured as either 'yes', or 'no'. To determine ICT use, the responses were aggregated per respondent and converted to percentage score by dividing the frequency of response by the total and multiply by 100. Respondents whose Scores are higher than 50% were considered to have a high usage and those whose aggregate responses was less than or equal to fifty percent (50%) was considered to have a low usage of ICT in seeking innovation information.

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RESULTS AND DISCUSSION

Table 1 shows that majority (79.2%) of respondents were female and 20.8% were male. This means that female farmers dominated cassava farming in the study area. This result agrees with the findings of Apata (2019), that female dominated their male counterparts in cassava production in Delta State and in the south-south region of Nigeria (Belonwu, Onemolease, Igene, 2020). Majority (67.5%) of respondents in the study area were married. The high percentage of married people in the study area indicates some family responsibility which may spur them to utilize ICT to increase their information base to enhance overall productivity and fend for their families. The modal age range is 36-55 years (60%) with the mean age 46 years, The modal age range is 36 - 55 years ,indicating an active and relatively youthful population . This result is similar to that of Onyemekihia,Onyeme komwu and Ehiwaro (2021),who reported a mean age of 44 years for arable crop farmers in Delta State. Being young means the respondents are likely to be disposed to use ICTs. The educational distribution of respondents indicated that most (85%) had formal education, with the majority (47.33%) having secondary education. It is expected that the high literacy level will facilitate their usage of ICT as their source of information (Akpan, 2016). Omoregie and Igbinosa (2015) also reported that the literate households are most likely to use ICT as their source of obtaining productive information in the farm business. Table 1 shows that majority (65%) of the respondents had 1-4 persons in their household, while the average household size was 4. The average family size of farming households in the study area is small being less than the national average of 5 (Kassie, 2017). Small family size means low financial burden.

Hence, respondents may be able to save enough money to procure ICT gadgets thereby increasing their accessibility and utilization of ICT to obtain information about cassava production techniques. This agree with Edomiekumo (2014) opinion that households with small family size will have higher propensity to save and accumulate capital which can be used for investment and expansion of their farm business.

Majority (90.8%) of respondents were engage in non-farm activities while 9.2% were into full-time farming. Onemolease *et al* (2021) opined that household diversification into non-farm activities developed naturally from diminishing returns to labour or land from market failures.

The monthly income of the respondents shows that a higher proportion (47.5%) of them earned ₦30,001 and ₦60,000. This suggests that the respondents' monthly income is fair especially when compared to the adjusted national minimum wage of ₦30,000. The table shows that majority (57.5%) of respondents had over 20 years farming experience, indicating that they had reasonable experience with cassava farming. According to Onemolease *et al* (2021), such experience impacts farmers managerial know-how and productivity.

Majority (80.88%) of the respondents were non-members of association. This puts them at a disadvantage and limited access to information from interpersonal sources. This means that farmers are likely to be limited in sourcing information from interpersonal networks, making their reliance and need for ICTs more imperative.

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Table 1: Percentage distribution of respondents according to their personal characteristics (N = 120)

Personal variables	Frequency (F)	Percentage (%)
Gender:		
Male	25	20.8
Female	95	**7**9.2
Marital status		
Single	39	32.5
Married	81	67.5
Age (Years)		
25 & below	24	20.0
26 – 35	8	6.7
36 – 45	42	35.0
46 – 55	31	25.8
>55	15	12.5
Educational level		
Primary education	20	16.7
Secondary education	70	58.3
University/polytechnic graduate	18	15.0
Vocational training	12	10.0
Family size		
1-4	78	65.0
5-8	42	35.0
Livelihood type		
Farming	11	9.2
Civil servant	4	3.3
Self employed	34	28.3
Trading	64	53.3
Others	7	5.8
Income level (N)		
30,000 & below	38	31.7
30,001 – 60,000	57	47.5
60,001 - 100,000	35	20.8
Farming experience(years)		
1 – 10	16	13.3
11- 20	35	29.2
21 – 30	28	23.3
31 – 40	33	27.5
>40	8	6.7
Membership of Association		
No	97	80.8
Yes	23	19.2

Source: Field Survey, 2021

Distribution of respondents according to ICT gadgets used to obtain innovation information
The result in table 2 shows that majority (94.2%) of respondents mostly obtain agricultural information through radio, mobile phone (85.0%) and television (69.5%) while only a few obtain theirs from computers (10%).. This agrees with the assertion of Ajibade and Alabi (2017) that cost of purchase, maintenance and technicality of operation made it difficult for most farmers to use computer as ICT gadget. Based on the mean score, the ICTs regularly used by the farmers are mobile phones (mean = 1.83), television (1.58) and radio (1.94). The result also shows that only 39.5% of the respondents uses the social media to a great extent to obtain cassava innovation information.

Table 2: Distribution of respondents according to ICT gadgets used to obtain innovation information

ICT tools	To a great extent (%)	To a lesser extent (%)	Not at all (%)	Mean	Rank
Radio	94.2	5.8	0.0	1.94	1st
Television	69.5	19.5	11.0	1.58	3rd
Mobile phones	85.0	5.0	10	1.83	2nd
Newspaper	30.0	45.5	24.5	1.01	5th
Computer	10	11.5	79.5	0.06	6th
Internet and other social media (Whatsapp, instagram, youtube etc	39.5	55.5	5.0	1.22	4th

Source: Field Survey, 2021

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Respondents experience in use of ICT gadgets

Table 3 shows that majority (62.5%) of respondents have been using ICTs for over ten years. This imply that they have at their disposal an instrument by which they can source for agricultural information on cassava production.

Table 3: Respondents experience in use of ICT gadgets

Experience (years)	Frequency	Percentage (%)
2-10	45	37.5
11-20	64	53.3
>20	11	9.2
Total	120	100

Source: Field Survey, 2021

Distribution of respondents on training in use of ICT gadgets

Table 4 result shows that majority (63.3%) of respondents had no training in the use of ICT gadgets. This may be the reason why majority were not using the more complex ICT gadgets like computer and internet as source of getting information about innovation in cassava production.

Table 4: Distribution of respondents on training of use of ICT gadgets

	Frequency	Percentage (%)
No	76	63.3
Yes	44	36.7
Total	120	100

Source: Field Survey, 2021

Factors limiting ICT use

Table 5 shows the factors limiting ICT use among the farmers. The major factors that limit ICT use in the study area according to the respondents included lack of technical know-how ($\bar{x}$= 3.54), high cost of modern ICTs ($\bar{x}$= 3.41), lack of training ($\bar{x}$= 3.38) and lack of awareness ($\bar{x}$ = 3.21)

Table 5: Distribution of respondents according to their perception of factors limiting ICT use.

	Very Low extent		Low extent		Great extent		Very great extent		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Mean	SD
Lack of technical know-how	0	.00	0	.00	55	45.83	65	54.17	3.54	.5
High cost of modern ICTs	4	3.33	0	.00	59	49.17	57	47.50	3.41	.7
Lack of awareness	7	5.83	4	3.33	66	55.00	43	35.83	3.21	.8
Low level of literacy	22	18.33	8	6.67	58	48.33	32	26.67	2.83	1.0
Poor/lack of network coverage	39	32.50	16	13.33	51	42.50	14	11.67	2.33	1.1
Maintenance Problems	43	35.83	16	13.33	42	35.00	19	15.83	2.31	1.1
Time constraint	43	35.83	16	13.33	42	35.00	19	15.83	2.31	1.1
Gender discrimination	50	41.67	52	43.33	8	6.67	10	8.33	1.82	.9

Source: Field Survey, 2021

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The relationship between respondent's socio-economic characteristics and their degree of utilization of ICT in the study area

Table 6 shows that age (r = -0.466) has a significant (p < 0.01) correlation with ICT use. The negative coefficient means that the younger respondents use ICT more than the older ones. Also, the educational level (r = 0.363) of respondents has a significant positive correlation with ICT usage. This imply that the higher the educational level of respondents the more their use of ICT. Family size of respondents (r = -0.535) has a significant negative correlation with ICT utilization. This means that farmers with smaller family size made greater use of ICT than those with large family size. This may be as a result of the large care burden on the large family finances due to the huge finances required to maintain large family size. This can reduce finances and reduce their ability to procure and use ICT gadgets

This result agrees with that of Ajibade and Alabi (2017) that families with large household size use ICT to a lesser extent because of the huge care burden necessitated by desire to meet the needs of the family in terms of provision of food, clothing, education amongst others. As a result, they may not be able to procure ICT gadgets. Farming experience (r = -0.320) have a significantly negative correlation with ICT use. This means that less experience farmers use ICT more than the more experienced farmers suggesting that they are more eager to get recent innovation on cassava production (like getting disease resistant, early maturing varieties) through different means including ICT. Income level (r = 0.204) of respondents has a significant positive relationship with ICT usage. This means that the higher the income level of respondents the higher their likelihood of using ICT. High income can boost savings and ICT gadgets can be procured from the money saved.

Table 6: Relationship between respondent's socio-economic characteristics and their utilization of ICT

Independent variables	ICT Utilization	Prob. Level
Age	-0.466[**]	0.00
Educational level	0.363[**]	0.00
Family size	-0.535[**]	0.00
Farming experience	-0.320[**]	0.00
Gender	0.05	0.59
Income level	0.204[*]	0.03
Membership of Association	-0.02	0.80

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

CONCLUSION AND RECOMMENDATIONS
Findings from the study established the fact that majority of cassava farmers in the study area were female and married. Also, the frequency of utilization of ICT among cassava farmers was high but limited to radio and mobile phones. The usage of ICT by cassava farmers was limited by lack of technical know-how, high cost of modern ICTs, inadequate training and low-level awareness. The study recommended that there should be enlightenment campaign on the benefits associated with the use of modern ICT gadget to obtain innovation information. Also, the government and concerned non-governmental agencies in the study area should provide soft loans to cassava farmers to purchase modern ICT gadgets (computers, internet facilities etc) at subsidized rate and they should be encourage and trained on the usage of ICT gadgets like computers and other electronic gadgets such as television and the internet facilities to obtain relevant information about cassava production. This will facilitate their acquaintance with other ICT gadgets not currently used by them. This will increase their information base and help to boost cassava production in the study area. Also, Government and concerned institutions should make ICT gadgets available and at affordable rate for the cassava farmers.

REFERENCE
Akpan S.B., Edet J.U and Ininfon V.P. (2016). Sustaining small scale farming. Evidence of poverty and income disparity among rural farming households in South_South Region of Nigeria. *International Electronic Scientific journal*, 7(43):35-48

Ajibade O, and Alabi, S. (2017). Community Radio in Nigeria: Issues and Challenges. *Covenant Journal of Communication* 4(1):26- 38

Albert.U.O and Joseph O.O (2020).Exploring Indigenous Knowledge for Sustainable Agricultural Development: The case for Agricultural knowledge and InformationSystem(AKIS) in Nigeria.

Apata, T.J. (2019). Analysis of cassava value chain in Nigeria: Pro_poor approach and gender perspective. *International Journal of Value Chain Management*, 10(3):219-237.

Belonwu, N.E., Onemolease, E.A., Igene C.A. (2020). Socio-Economic Determinants of Economic Diversification and Livelihood Activities Among Rural Women Dwellers in South-South Nigeria. *The Nigerian Journal of Agriculture and Forestry* (NJAF), 7(1), 23-33

Belonwun, E. (2018). Farmers' level of satisfaction with formal agricultural information source in Umuahia, Abia State. Nigeria. *Journal of Sustainable Agriculture and Environment*, 2(2):257-263.

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Kassie G.W. (2017). Agroforestry and farm income diversification: Synergy or trade-off; The case of Ethiopia. *Environmental Systems Research* 6(8):27- 37

Edomiekumo S. (2014). Income poverty in Nigeria; Incidence, gap, severity and correlates. *American Journal of Humanities and Social Sciences*, 2(1):1-9

Omoregie, O. and Igbinosa, L.A (2015). Enhancing Indigenous Agricultural Knowledge through effective Extension Services for Sustainable Agricultural Development. *A multi – disciplinary Journal of Arts and Social Science*s 3(1):51-58

Onemolease, E.A, Ehilenboadiaye, C.O. and Omoregie, O. (2021)..Perception of the role of Agricultural Extension Services by Cassava Processors in Edo State, Nigeria. *ADAN Journal of Agriculture* 2(1): 70- 81.

Onyenma, G. and Aroyehun, R. (2020). Technical efficiency in value addition to cassava among small scale fufu processors in Abia State, Nigeria. *Journal of Agricultural Economics and Extension Research Studies*, 8(3):78-8S.,

Onyemekihia, F.,Onyemekomwu, R.C. and Ehiwaro F.A. (2021).Farmers attitude towards Commercialized extension system in Delta State,Nigeria. ADAN Journal of Agriculture2(1):33-43