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Assessment of Information and Communication Technologies (ICTS) Among Cassava Farmers in Anambra State, Nigeria

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A B S T R A C T

The study assessed the Information and Communication Technologies (ICTs) among cassava farmers in Anambra State, Nigeria. Structural interview instruments, validated by experts in agricultural extension were used to collect data from 300 respondents through convenience method. Descriptive statistics such as frequency counts, percentages and mean scores were used, and Pearson Product Moment Correlation was used as inferential statistical tool. The results showed that majority of the respondents were female, aged, married with good level of education and a wide range of farming experience. Moblie phones, radio and television ranked the most sources of awareness and utilized ICTs in receiving agricultural information related to cassava production. The result indicated that the respondents rated market information, pest management and access to credit as highly relevant to cassava production activities. The major constraints to the respondents' full participation in cassava production were, high cost of ICTs, inadequate access, technical know-how, and high level of poverty among the resource poor farmers. The result of the Pearson Product Moment Correlation analysis showed positive and significant relationship between all the selected socio-economic characteristics considered and level of utilization of ICTs. The study suggested easy affordability and accessibility of ICT facilities to cassava farmers by government and non-governmental agencies. Finally better skill acquisition on the use of ICTs to be made available to cassava farmers for maximum production and utilization, as well benefit immensely from the potentials of ICTs for improved living standard of life.

Keywords: Information, Communication, Technology, Cassava, Farmers.

INTRODUCTION

Generally, agriculture is an information-intensive industry. The sector draws upon infinite sources of widely dispersed, locally contextualized knowledge and a considerable body of research materials. It relies upon continuous flow of information from local, regional and world market[1]. Information and communication technologies (ICTs) are new technologies that cannot be ignored in Africa especially for development in all sectors, agriculture inclusive. This is because, ICT is one of the main driving forces that can bring about development and change in this present digital age[2]. It was in the light of this that[3] noted that the great transformation in the lives of the people, especially in the developing countries depends on advances in ICTs. Infact, ICTs are what rural dwellers need to climb to the heights developed countries had reached. The recent development in ICT has broken national and international barriers and turned the world into a global village, making information available to everyone, everywhere and at any time it is needed[4].

Information and communication is the scientific, technological and engineering disciplines and the management technologies used in handling of information, processing and application related to computers. ICTs covered a wide range of equipments and services, and in agricultural extension, the ICTs in use include; radio, television, mobile phones, short message services(SMS), world wide web (www), search engine, camera, video, e-mail, computer, contact data base and systems, CD-Rom, DVD, rural radio and web publishing, to mention but a few[5,6] opined that ICTs have great impact on productivity, product differentiation, competitive advantage, effective communication and employment opportunity in productive sectors of the economy. Do to these, developing countries should maximize the potentials of ICTs for immense development purposes in agriculture.

Interestingly, information has become one of the most important factors of production, and there is no doubt that this trend will continue. In this present information age, it is knowledge accumulation and application that will drive development and create unprecedented opportunities for economic growth and for poverty reduction. It has been estimated that effective integration of ICTs in different sectors of the economy will augment economic growth rate by 2-3 percent. Having timely and relevant information, especially marketing information on transport availability, new marketing opportunities and the market prices of farm input and output is fundamental to an efficient and productive agricultural economy[7].

However, the major task of ICTs in agricultural development is the transfer of improved technologies to end-users (farmers). According to[8] the farmers are constrained to obtain information from various sources of information. There are still very serious limitations in ICT application, particularly in the rural areas, despite the world-wide ICT revolution. These limitations according to[6] includes; low level of ICT readiness, poor ICT infrastructures, erratic and unstable power supply, limited and high cost of telephone services, limited access to computers and internet, lack of communication policy by government, high level of rural poverty, high level of illiteracy, policy inconsistency and commercialization of radio stations among others. Given the urgent need for current agricultural knowledge and information system (AKIS) by farmers, the use of conventional communication methods

such as farm radio and home visit and the use of contact farmers for extension information delivery is counterproductive. This therefore calls for the use of ICTs by agricultural providers for the benefits of farmers. ICTs is often viewed as the "wheel" of economic activities since it facilitates the economic growth. Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. Many countries of the world now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education alongside reading, writing and numeracy[4].

Nigeria remains the world leader in cassava production with the annual production ranging from 30 to 40,000, 000 metric tons. This production output are in the hands of the small scale farmers who cultivate from 0.5 to 5 Hectares of land. Also cassava production has increased over the years because of its multifarious uses as the starch-rich roots[9]. [10]observed that cassava is used as an important cash crops to farmers that engage in its production as a means of livelihood. Cassava is used almost exclusively for consumption as 95% of the total cassava outputs produced is used as food. Cassava production has been transformed from being a staple food to a source of income as well to some people[2]. [11]stated that there has been tremendous increase in the current cassava output in Nigeria in order to meet the increasing demands both locally and internationally. In the light of the above,[12] and[13] succinctly opined that cassava production activities have the potential to improve the nation's economy as Nigeria has been consistently ranked as the world's largest producer.

ICTs can bring about new information services to rural areas, where farmers will have much greater control of these resources. However, there is still dearth of knowledge and information and new technologies in agriculture that is yet to be exploited. Therefore access to such new information is a crucial requirement for sustainable agricultural development especially in cassava industry[14]. Presently, it is still quite unclear whether cassava farmers in Anambra State are adequately exposed to ICTs related to cassava production activities. However, with the explosion in ICTs in the world, there is expectation that knowledge producers would be substantially empowered to channel information to farmers. This is because how far farmers progress in whatever they are doing, depends largely on the awareness, accessibility, utilization and relevance to accurate and reliable information. It is against this backdrop that the study was designed to provide answers to the following questions.

(1) What is the level of ICTs awareness among the respondents?.
(2) What is the extent of utilization of ICTs by the respondents?
(3) What is the relevance of ICTs to cassava production activities?
(4) What are constraints to utilization of ICTs among the respondents?

Generally, the study assessed the ICTs among cassava farmers in Anambra State, Nigeria. Specifically, the objectives include to;

(a) Ascertain the level of ICTs awareness among the respondents
(b) Determine the level of utilization of ICTs among the respondents
(c) Ascertain the relevance of ICTs to cassava production activities
(d) Identify the constraints to the utilization of ICTs by the respondents; and
(e) Ascertain the relationship between selected socio-economic characteristics of the respondents and level of utilization.

METHODOLOGY

The study was carried out in Anambra State, Nigeria. All the cassava farmers in the State constituted the population for the study. The state is made of 21 Local Government Areas (LGAs) and four agricultural zones of Aguata, Awka, Out-ocha and Onitsha. The major crops grown in the area include; yam, cassava, maize, cocoyam, cowpea/bean, plantain/banana, pepper, okro, tomatoes, vegetables among others. A list of all the registered cassava farmers was obtained from Agricultural Development Programme (ADP) of the State Ministry of Agriculture and Natural Resources. Using the convenience sampling method adopted from[15], 2 Local Government Areas (LGAs) were randomly selected from each of the four agricultural zones in the state, giving a total of eight Local Government Areas based on the concentration of cassava producers. Two town communities were randomly selected from the eight Local Government Areas, giving a total of 16 town communities and finally 20 cassava farmers were randomly selected from each of the 16 town communities, thus yielding a sample size of 320 cassava farmers. However, 300 questionnaires were properly filled and used for further analysis. For proper understanding and interpretation of the questions in the questionnaire, the researcher liased with the staff of ADP in each of the selected agricultural zones and they helped to recruit extension agents that assisted in data collection. The extension agents were trained and mobilized as enumerators for the data collection while the researcher supervised the exercise.

Data for the study were collected from primary sources, the primary data were collected using well-structured questionnaire that was validated by experts in agricultural extension. Data were collected on socio-economic characteristics of the respondents, level of awareness of ICTs, level of utilization, relevance of ICTs to cassava production and as well as the constraints of ICTs among cassava farmers.

To determine the level of awareness of ICTs among cassava farmers, a list of available ICT technologies was listed and respondent's level of awareness was measured using quantitative judgment such that the level is said to be very low if percentage awareness indicated by the respondents is between 0-29, low if 30-44, moderate if 45-59, high if 60-74 and very high if 75-100 as stated by[16].

To ascertain the level of utilization of ICT among the respondents, a list of available ICTs was compiled and rated on 3 point Likert type scale, with response options of used regularly = 3, occasionally = 2, rarely = 1. The mean cut off point is 2.00. This implies that any mean score that is equal to or higher than 2.00 is most often used by the respondents while those that are less than 2.00 are categorized as not often used.

To determine the relevance of ICT tools to cassava production activities, a list of possible cassava production activities was compiled and measured on a 4 point Likert type scale of very relevant = 4, relevant = 3, fairly relevant = 2 and not relevant = 1, with a mean cut-off point of 2.50. This means that mean score of 2.50 or more is categorized as relevant while any mean score that is less than 2.50 is not relevant.

To identify the major constraints to the use of ICTs by cassava farmers, three point Likert – type scale was used. The response options and values was weighed as follows: very serious = 3, serious = 2, and not serious – 1, with a mean cut-off point of 2.00. The following decision rule was used.

X1.00 – 1.49 = not serious
X2.00 – 2.49 = serious
X3.00 – 3.49 and above = very serious.1

This implies that mean score of 2.00 is regarded as major constraint while mean score of less than 2.00 is regarded as a minor constraint to the use of ICTs by cassava farmers in the area. Data collected were analyzed using percentage, mean statistics and Pearson Product Moment Correlation (PPMC).

RESULTS AND DISCUSSION

Profile of cassava farmers

The result of the socio-economic characteristics of the respondents as shown in table 1 revealed that majority (77.33%) were female while 22.67% were male. This implies that cassava production is dominated by female farmers in the study area. This finding is in line with the observation of[17] that women are known to be more involved in agricultural activities than men in sub-saharan Africa countries, including cassava production. The result also indicated that most (39.33%) of the respondents were within their productive age bracket of 41-50 years and the mean age was found to be 42.31 years. This is an indication that cassava production is mainly done by young people who are active and within their productive age group. This finding is similar to that of [18] who reported that people within this age range constitute the major work force that can be productive. The result further indicated that majority (70.67%) of the respondents were married while only 19.33% and 10.00% were single and divorced respectively. This is an indication that the respondents should be careful in the use of appropriate information retrieved from different information and communication technology (ICT) in respect of cassava production, in order to meet up with the family responsibilities. The results in table 1 further revealed that majority (80.00%) of the cassava farmers were literate while 20.00% had no formal education. This result tallies with that of[19] that, high percentages of cassava farmers in South West and North West agro-ecological zones are literate. This attribute is expected to influence their perception about ICT awareness and utilization. Literate individuals are keen to get information and use it. Also, literacy level of cassava farmers could afford them the opportunity of learning new things and use of research findings[2]. Also the result revealed that the respondents had acquired a wide range of farming experience as a higher percentage (35.33%) had between 11 to 20 years of farming experience with a mean year of farming experience of 18.5 years. This finding is in consonance with [18] that the higher the farming experience, the more the farmer would have gained more knowledge and technological ideas on how to tackle farm production problems and the higher would be his output and income. Also a greater proportion (40.00%) indicated high number of household size with mean average of 9 persons. This implies that the respondents had reasonable family labour that could help in farming activities. Household size in traditional agriculture determines the availability of labour and level of production[20]. The farm size of most (40.00%) of the respondents were less than 1 hectare, with a mean farm size of 1.94 hectares, indicating that farming activities were dominated by small-scale farmers. The result further showed that majority (55.00%) of the respondents belonged to 3-4 social organizations, which is generally considered as an important variable that enhances farmers' adoption of new practices. This could influence the rate of adoption of innovation by farmers since they are more likely to be exposed to ICT messages that are related to cassava production than their other counterparts due to group dynamic effect.[21] observed that promotion of farmers' organizations and reinforcing capacities of the producers will enhance access to

improved services. This has implication for extension organization to encourage farmers to form groups to enable them gain better access to resources for improved agricultural production and productivity.

Level of awareness

The result as shown in table 2 revealed that majority of the respondents indicated that there were numerous ICT facilities as sources of receiving agricultural information related to cassava production. Majority (93:33%), of the respondents indicated very high awareness on the existence and availability of mobile phones, followed by high awareness on radio (71.67%) and moderate awareness on television (58.67%). This implies that majority of the respondents are aware of the potentials, opportunities, and benefits of ICTs as a means of receiving agricultural information especially on cassava production.[22] observed that over the past decade, mobile phone coverage has spread rapidly in developing countries of Africa, Asia and Latin America. Mobile phone significantly reduces communication and information costs to poor farmers in developing countries. This not only provide new opportunities for rural farmers to obtain access to information on agricultural technologies but also to use these media tools in agricultural extension systems.

Level of utilization of ICTs.

The result of the weighted mean score (WMS) analysis in table 3 on the level of utilization of ICT facilities in the study area showed that the respondents utilized mobile phones (m=2.84), radio (m=2.69), and television (m=2.30) regularly in their farming activities, since their mean scores were greater than the cut-off point of 2.00. Others were not regularly utilized in the study area since their mean scores were below the decision point. This implies that the respondents use more of conventional ICTs such as telephone, radio and television for obtaining technological agricultural information on cassava production activities more than the contemporary ICTs such as computer and internet. Another possible explanation of this could be due to various advantages attached to these ICT facilities which others do not have such as personal interaction, accessibility, maintenance, language literacy clarity and avoidance of time wasting. [23] enumerated the strength of mobile phone as a communication tool to be language and literacy independent and the use of mobile phone can aid proper time management by avoiding the risk of traveling long distance. This finding is in agreement with[24], who reported that farmers recorded high level of usage of conventional ICTs in her work on access and application of ICT among farming household of Southeast Nigeria. Also[25] observed that the effective use of ICTs have significant positive impacts on agricultural production, marketing and post-harvest activities that can improve the livelihood of poor rural families which in turn can contribute to poverty reduction. The position of internet in table 3 is in line with the observation of [7] that internet is one of the least explored sources of information and is an indication that the respondents are still dependent on conventional sources of information.

Relevance of ICT to Cassavation production

The relevance of ICTs in farming determines the respondents' skills in the use of the various technologies in farming activities. Table 4 showed the mean score of the respondents on the relevance of ICT to cassava production activities in the study area. The most areas of relevance of ICTs as indicated by the respondents include; Market information (m=3.53), pest management (m=3.33), access to credit

(m=3.27), improved varieties (m=3.20), and cassava stem selection (m=3.13). The results indicated that ICT is relevant to cassava production activities, both in pre-planting and post-planting operations. The fact that ICT is relevant to marketing of cassava production is in line with the findings of [26] that marketing information is one of the most relevant ICT services which could be offered to farmers in developing countries. Also [27] observed that marketing information is an important and new aspect of agriculture in developing countries. This is known to have a great potential of promoting agricultural products both locally and internationally.

Constraints to use of ICTs by cassava farmers

The result as shown in table 5 indicates the identified constraints to the use of ICTs by cassava farmers in the study area. High cost of ICT facilities (m=3.33), and inadequate access (m=3.20), were the most serious variables considered by the respondents to have hindered their effective use of ICT facilities in the area. The enhancement of production can be brought about by improving capacity in terms of enhancing access to information, as the recent development in the field of agriculture can be readily obtained through effective and efficient use of ICT facilities. [28] argues that ICTs that might benefit agricultural sector is only possible if there is universal access and the fruits of such universal access must be unlimited.

Relationship between selected socio-economic characteristics of cassava farmers and the level of utilization

The result of Pearson Correlation analysis establishing positive or negative relationship between socio-economic characteristics of the respondents and level of utilization of ICT facilities were as presented in table 6. The result revealed that age ($r=0.475$; $p<0.05$), income per annum ($r=0.384$; $p<0.05$), educational level ($r=0.457$; $p<0.05$), and years of farming experience ($r=0.246$); $p<0.05$) all exhibited positive and significant relationship with the level of use of ICTs. This implies that all the selected variables considered had significant influence on the utilization of ICTs among the cassava farmers in the area. That is, as the cassava farmer advances in age, the level of use of ICTs increases. This may be due to intrinsic characteristics such as innovative process. This finding is in collaboration with the assertion of[29] that age is a significant variable, moderating effect on the relationship between the behavioral intentions towards user's acceptance of ICT. Also, as the income of the cassava farmers increases, the tendency to procure ICT facilities becomes high. There exist positive and significant relationship between years of education and use of ICTs. This implies that, the higher the years of education, the more knowledgeable the farmers will be in the technicalities involved in the use of ICT tools. The positive and significant relationship of years of farming experience with the use of ICTs, indicates that the higher the years of farming experience of respondents, the more knowledge gained in the utilization of ICT facilities.

CONCLUSION AND RECOMMENDATION

The study found out that women, aged with a good level of education and high interaction among members dominated cassava production activities in the study area. The farmers indicated mobile phones, radio and television as their most sources of awareness and utilization of information and communication technologies in receiving agricultural information related to cassava production. Market information, pest management and access to credit were

variables that were highly rated relevant by the respondents in cassava production. The major constraints to the respondents' full participation in cassava production were high cost of ICTs, inadequate access to ICTs, technical know-how, and high level of poverty among the rural farmers. Pearson correlation analysis showed that there were positive and significant relationship between the selected socio-economic characteristics and level of utilization of ICTs among the respondents. It was suggested that affordability and accessibility of ICT facilities should be made possible to cassava farmers by both government and non-governmental agencies in the country. Finally, better skill acquisition on the use of ICTs to be made available to cassava farmers for maximum production and utilization, hence benefit highly from the potentials of ICTs for improved living standard of the cassava farmers.

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Table 1. Distribution of respondents by socio-economic characteristics

Variable	Frequency	Percentage	Mean
Gender			
Male	68	22.67	
Female	232	77.33	
Age (years)			
Less than 30	32	10.67	
31 – 40	98	32.67	
41 – 50	118	39.33	
51 – 60	52	17.33	42.31
Marital status			
Married	212	70.67	
Single	58	19.33	
Divorced	30	10.00	
Educational level			
No formal education	60	20.00	
Primary education	120	40.00	
Secondary education	88	29.33	
Tertiary education	32	10.67	
Years of farming experience			
1 – 10	62	20.67	
11 – 20	106	35.33	
21 – 30	98	32.67	
31 and above	34	11.33	18.5
Household size			
1 – 5	52	17.33	
6 – 10	120	40.00	
11 – 15	83	27.67	
16 and above	45	15.00	9.7
Farm size			
Less than 1	120	40.00	
2 – 3	116	38.67	
4 – 5	45	15.00	
6 – 7	19	6.33	
Membership of social organization			
1 – 2	108	36.00	
3 – 4	165	55.00	
5 – 6	27	9.00	

Source: Field survey 2014.

Table 2. Distribution of respondents by level of awareness

ICT tools	Frequency	Percentage	Decision
Mobile phones (handsets)	280	93.33	Very high
Radio	215	71.67	High
Television	176	58.67	Moderate
Print media	120	40.00	Low
Computer	112	37.33	Low
Internet	100	33.33	Very low
Flash drive	65	21.67	Very low
CD/Audio CD	13	4.33	Very low
CD-Rom	5	1.67	Very low

Source: Field survey 2014
Multiple responses recorded.

Table 3. Distribution of respondents by Level of ICT utilization

ICT tools	Level of utilization				
	Regularly	Occasionally	Rarely	WMS	Rank
Mobile Phone	271(90.33)	20(6.67)	9(3.00)	2.84	1st
Radio	228(76.00)	50(16.67)	22(7.33)	2.69	2nd
Television	135(45.00)	123(41.00	42(14.00)	2.31	3rd
Print media	14(4.67)	133(44.33)	153(51.00)	1.54	4th
Computer	15(5.00)	121(40.33)	164(54.67)	1.50	5th
Internet	13(4.33)	119(39.67)	168(56.00	1.48	6th
Flash drive	9(3.00)	112(37.33)	179(59.33)	1.43	7th
CD/Audio CD	6(2.00)	110(36.67)	184(61.33)	1.40	8th
CD – Rom	2(0.67)	93(31.00)	205(68.33)	1.32	9th

Source: Field survey, 2014
Figures in parent these are percentage
WMS = Weighted mean score.

Table 4. Mean score of relevance of ICT tools to cassava production activities

Activity/operation	Mean score	Rank	Remark
Market information	3.53	1st	relevant
Pest management	3.33	2nd	relevant
Access to credit	3.27	3rd	relevant
Improved varieties	3.20	4th	relevant
Cassava stem selection	3.13	5th	relevant
Land preparation	2.87	6th	fairly relevant
Fertilizer application	2.73	7th	fairly relevant
Best planting technique	2.60	8th	fairly relevant
Processing technique	2.53	9th	fairly relevant
Use of agro-chemicals	2.50	10th	fairly relevant
Transportation	2.33	11th	fairly relevant
Best time to harvest	2.27	12th	fairly relevant
Packaging	1.87	13th	not relevant
Storage	1.50	14th	not relevant
Weather forecasting	0.83	15th	not relevant

Source: Field survey, 2014

Table 5. Mean score constraints to the use of ICTs by cassava farmers

Constraints	Mean score	Rank	Remark
High cost of ICT facilities	3.33	1st	Very serious
Inadequate access	3.20	2nd	Very serious
Technical know-how	2.70	3rd	Serious
High level of rural poverty	2.63	4th	Serious
Poor communication policy by government	2.33	5th	Serious
Poor power supply	2.23	6th	Serious
Poor network reception	2.07	7th	Serious
Language barrier	1.07	8th	Not serious

Source: Field survey 2014

Table 6. Pearson Correlation analysis of the relationship between selected socio-economic characteristics of the respondents and level of utilization of ICTs

Variable	Correlation	P-value	Remark
Age	0.475 xxx	0.000	S
Income per annum	0.384 xxx	0.001	S
Education level	0.457xxx	0.000	S
Years of farming experience	0.246 xxx	0.005	S

Source: Field survey, 2014
xxx: Significant at 1% level
S = Significant