Perceived effect of the utilization of information and communication technologies (Icts) on cassava production in Cross River State, Nigeria

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Abstract

This study explored the perceived effect of Information and Communication Technologies utilization on cassava production in Cross River State, Nigeria. The study was specifically designed to assess farmers' perceptions on the utilization of ICT utilization for cassava production, investigate the factors that drive cassava farmers' use of ICTs and identify the constraints to the use of ICTs by the respondents. A multi-stage sampling procedure was used to sample 190 cassava farmers in the study area. Data obtained were analyzed using descriptive statistics such as means, ranking and inferential statistics such as binary logit regression model. Results of the perception statements revealed that most farmers used ICTs because they help them to know where to obtain farm credit/loan ($\bar{x}$ = 2.84), it was also observed that ICT tools helped farmers to know where and when to sell their products ($\bar{x}$ = 2.64). The results further showed that education (P= <0.03), income (P= <0.00), availability of complimentary service (P= <0.02), comparative advantage (P= <0.03) and access to agricultural information and innovation (P= <0.04) were significant drivers of the use of information and communication technology for cassava production in the study area. Low adoption and utilization ($\bar{x}$= 4.38), high cost of ICT tools ($\bar{x}$ = 4.37), high level of poverty ($\bar{x}$ = 3.68), epileptic power supply ($\bar{x}$= 3.67) were some of the constraints to the utilization of ICTs for cassava production.The study recommended that there is need for increase in extension visitation and contact with farmers to bridge knowledge gap on effective utilization of ICTs.

Keywords: Utilization, Information and communication technology, cassava production

Introduction

Agriculture is the driving force of rural economies and there is an urgent need to develop and promote sustainable development to improve the livelihoods of farming communities, (Corral *et al.*, 2017). Poverty reduction and sustainable food production to feed an ever-increasing population are the most important challenges which developing countries are currently facing, (Muhammad *et al.*,2019).

These concerns have raised worries among development experts and academicians from all over the globe on how to provide food on a sustained basis (Ehrlich and Harte, 2015).

In developing countries of the world, a wide variety of information sources are being used by farmers to get updated knowledge about farm practices to maximize farm profit thereby improving livelihoods (Ashraf *et al.*, 2015). These sources may be a face-to-face exchange of information between individuals or use of Information and Communication Technologies (Rehman andElahdo, 2006). Information and Communication Technologies (ICTs) according to (Arokoyo, 2015) are the technologies that facilitate communication and the processing of information by electronic means. This definition encompasses the full range of ICTs from radio and television to telephones (fixed and mobile), instant messaging, e-bulletins, computers and the internet which are the potential tools that could be used by arable crop farmers to improve their farm productivity (Arokoyo, 2015).

Proper information delivery on cassava production through effective ICT tools to the farmer is absolutely imperative to the sustainability, productivity and marketability of agricultural produce. In addition, a well-informed society is more responsive to government policies, willing to adopt innovations, and eager to participate in the nation's rural development programmes. Information is the most important facilitator and core of the marketing system as it is a sine qua non for agricultural development (Farhad*et al.*, 2011). Hence, farmers need access to information in order to improve the quality and quantity of the agricultural products marketed. This study becomes important as it tends to focus on the perceived effect of Information and Communication Technologiesutilization on cassava production in Cross River State, Nigeria. Consequently, the following objectives were put forward:

1. To assess farmers' perception on the use of ICT for cassava production;
2. To ascertain the factors that drive cassava farmers' use of ICTs for cassava production;
3. To identify the constraints to the use of ICTs by the respondents.

Research methodology

Study Area

This study was carried out in Ikom agricultural zone, Cross River State. The zone comprises six (6) agricultural blocks namely: Abi, Boki, Etung, Ikom, Obubra and Yakurr. Ikom agricultural zone shares boundary with the Republic of Cameroun to the East, Obanliku and Obudu to the North, Ebonyi State to the West and Biase and Akamkpa to the South, Cross River State Geological Agency (CRSGA, 2010). It covers an approximate landmass of 16,280.02km^2 (CRSGA, 2010). The area is approximately 25m above sea level, with an annual temperature range of 27^{0}C-33^{0}C, while rainfall varies between 1500mm-2000mm per annum (CRSGA, 2010). The zone has a tropical rainforest vegetation. It houses some largest world's virgin forests and remains the center of environmental

conservation concern. The main economic activities in the zone

are farming, fishing, hunting and trading. The major food crops produced here are cassava, yam, rice, potatoes, maize, bush mango, oil palm, vegetables, cocoyam etc.

Sampling and Sampling Technique

The population of this study comprised all registered cassava farmers in Ikom agricultural zone.A multi stage sampling procedure was used. Stage one entailed the use of purposive sampling to select major cassava producing agricultural blocks in the zone. These blocks are Obubra, Yakurr, Abi and Ikom. Stage two entailed the use of simple random sampling to select five cells out of the eight cells that make up each block, giving a total of 20 cells. Stage three involved the selection of 10% of registered cassava farming households from each of the selected cells using simple random sampling. Data from Cross River Agricultural Development Project (CRADP), showed that there are 1,900 registered cassava producing households. Simple random sampling was then used to select 10% of the registered household heads, giving a sample size of 190. A structured questionnaire was used to illicit information from the farmers. Data obtained were analyzed using both descriptive (means and ranking to analyze objectives 1 and 3), and inferential statistics (binomial logit regression model was used to analyze objective 2).

Model Specification

Binary Logit Regression Model was used to analyzed the factors that drive cassava farmers' use of ICTs for cassava production.

The model specification is given thus:

$$Y = \beta o + \beta 1\ X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X7 + \beta 8X8 + \beta 9X9 + \beta 10X10 + \beta 11X11 + \beta 12X12 + e \quad (1)$$

Where;

Y = Use of ICTs by cassava farmers (Dummy: 1 Use of ICT and 0 Not used)
X1 = Age (years)
X2 = Farmers Income monthly (Naira)
X3 = Sex of respondents (1=Male, 0=Female)
X4 = Household size (Number of persons in a household)
X5= Level of education (Years spent in school)
X6 = Years of farming experience (Years)
X7 = Connectivity (Yes=1, No=0)
X8 = Availability of complimentary services (Yes=1, No=0)
X9 = Possession of mobile phones (Yes=1, No=0)
X10 = Comparative advantage (Yes=1, No=0)
X11 = Access to agricultural information and innovation (Yes=1, No=0)
X12 = Access to credit and loan (Yes=1, No=0)
β1 – β12 = Regression coefficients
β0 = Regression constant
e = error term.

Results and discussion

Results on farmers' perception on the use of ICT tools for cassava production are presented on Table 1. From the results, farmers perceived that ICTs helped them to know where to obtain farm credit/loan ($\bar{x}$ = 2.84) and was ranked 1st on the list of perception statements.

This finding agrees with that of OgbuaborandNwosu (2017), who asserted that credit and loan increased farm output significantly. Cassava farmers' need loans in cassava production to help them invest more in farming activities. Farmers also perceived that ICTs help them to know when and where to get their products ($\bar{x}$ = 2.64), this was ranked second. Access to information on farm input will help farmers to improve productivity. Pandey (2017), also affirmed that access to information and production inputs are basic ingredients for increasing farm productivity. The implication of these results is that ICT tools help cassava farmers to have an in depth knowledge in cassava farming methods and techniques, as they serve as useful sources of agricultural information to farmers. Farmers also perceived that ICT tools also connects them with extension agents ($\bar{x}$ = 2.62), and it helps them to locate source of input for cassava production ($\bar{x}$= 2.55). Umar *et al.* (2015) in their study stressed the role of technologies in improving cassava productivity, as the technologies are important tool for agricultural production.

Farmers' perception that ICTs help them to receive information timely ($\bar{x}$= 1.45), helps in decision making ($\bar{x}$ = 1.43) and creates awareness in cassava farming ($\bar{x}$= 1.41), were ranked 10th, 11th and 12th respectively.

Results of the drivers of ICTs use is presented on Table 2. The results show the coefficients and P-values of some socio-economic characteristics of farmers and institutional variables, significant at 0.05 level. These variables were Education (with coefficient of -0.44 and P =<0.03), Income (with coefficient of 0.00 and P =< 0.00), Availability of complimentary service (with coefficient of -0.71 and P= <0.02), Comparative advantage (with coefficient of 0.18 and P= <0.03), Access to agricultural information and innovation (with coefficient of -0.36 and P= <0.04).The fact that education was significant (P = <0.03) at 5% level means that as farmers' years of schooling increased, it led to an increase in cassava production. This is probably because, increase in education leads to increase in the ability to manipulate ICT gadgets as well as use of knowledge derivedfrom them. This result agrees with Yaseen*et al.*, (2016), who found a positive correlation between education and ICT use by farmers. The implication is that educated farmers can interpret information and use it for decision making in cassava production. The fact that income of the farmers was significant (P = <0.00) implies that an increase in farmers' income will lead to an increase in their use of ICT tools. This will probably mean that as farmers rely on farm income to finance farm operations, however, the lack of financial support to farmers will

result to decrease or no use of ICT tools for cassava production. Availability of complimentary services (P = <0.02) was significant at 5% level. This is because the use of ICT for cassava production must be complimented by public services like electricity, internet availability etc. This view is supported by Ajani and Agwu (2012) who asserted that consistent power failure and poor internet connectivity prevented the use of ICT for arable crop production.

Comparative advantage of using ICT tools was also significant as P = <0.03. ICT tools may technically equip farmers with knowledge and make them efficient without necessarily relying on extension agent for information about cassava farming. This result agrees with Anyoha*et al.* (2018) who noted that the use of ICTs for arable crop production is of comparative advantage to the extension officer as it can be very time-effective in the dissemination of relevant agricultural information to farmers to aid agricultural extension services in Nigeria. Access to agricultural information and innovation was also seen as a significant driver of the use of ICT for cassava production as P= <0.04. Farmers need to be updated with timely information and technologies that can boost cassava production. Poorly disseminated information, knowledge and innovation as a result of certain constraints may hinder agricultural development of any community Li (2013). The result also agrees with Olaniyi and Ismaila (2016) who also reported that new approach for improving access to relevant agricultural information could be achieved through the use of information and communication technologies. Similarly, this result also agrees with the work done by Aguilar-Gallegos *et al.* (2017), on 'information network that generate economic value', where they asserted that, exchange of information among farmers improve adoption of agricultural technologies. Accessibility of agricultural information and innovations keep cassava farmers updated about better ways of production that will increase cassava production.

The results on the constraints to the use of ICTs for cassava production are presented on Table 3. The most serious constraints faced by cassava farmers in the use of ICTs were low adoption and utilization of ICTs ($\bar{x}$= 4.38), access to credit sources ($\bar{x}$= 4.37), high cost of ICT tools ($\bar{x}$ = 4.37), high level of poverty among farmers ($\bar{x}$ = 3.68), lack of awareness ($\bar{x}$ = 3.68), epileptic power supply ($\bar{x}$= 3.67), readability problem ($\bar{x}$ = 3.30), lack of effective training ($\bar{x}$ = 3.31), illiteracy level of farmers ($\bar{x}$ = 3.11) and lack of connectivity ($\bar{x}$= 3.10). The constraints listed above will affect the number of farmers using ICTs for cassava production. The implication is that cassava farmers will not be able to exploit the opportunities that ICT tools present for cassava production, consequently, farmers yield will remain low. The finding is in line with Akinnusi*et al.* (2018) who reported high level of illiteracy as a major constraint to ICT utilization by farmers. Oyeyinka and Bello (2013), also reported high cost of ICTs as a major barrier affecting its utilization by farmers. Ani*et al.*, (2015) also reported high cost of ICT tools and services, high level of illiteracy and

readability problem of farmers as constraints to the utilization of ICTs. This result further supports that of Ajani and Agwu (2012), who found consistent power failure and poor internet connectivity as hindrances to the utilization of ICTs for cassava production.

On the other hand, complexity of ICT tools ($\bar{x}$ = 1.96), lack of extension agent's conviction ($\bar{x}$ = 1.62), inadequate infrastructural facilities ($\bar{x}$= 1.40), and low computer literacy among cassava farmers ($\bar{x}$= 1.17), were all seen as not serious constraints faced by respondents in the utilization of ICTs for cassava production. Complexity nature of some ICT tools may contribute to farmers not using them. Farmers may resort to getting information about cassava production from friends and family members.

Conclusion

The study on the perceived effect of the utilization of Information and Communication Technologies (ICTs) on Cassava Production concludes thatICT tools help farmers to know where to obtain loan/credit, ICTs also help farmers to know where and when to sell their products. ICT tools also connect farmers with extension agent. ICT tools help to promote relationship and interaction between farmers and extension agent; and ICT help farmers to locate source of cassava production input, were all seen as some of the perceived effect of ICT utilization for cassava production.However, education, income, availability of complimentary public service, comparative advantage and access to agricultural information and innovation were all seen as drivers of ICTs for cassava production.

Recommendations

Based on the findings of the study, the following have been recommended:

i. Farmers should be given opportunity through extension agent to learn skills needed on the use of ICT tools for better cassava production.
ii. Complimentary public services should be provided in rural areas, as this will encourage the usage of ICT tools.
iii. More awareness should be created on the use of ICT tools for cassava production.

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Table 1: Farmers' Perception on the use of ICT for Cassava Production

S/N	Perception Statements	SA	A	D	SD	Mean	Rank
1.	Helps me to know where to obtain loan/credit	38	91	54	7	2.84**	1st
2.	Helps me to know where and when to sell my product	30	82	57	21	2.64**	2nd
3.	It connects me with extension agents	38	64	65	23	2.62**	3rd
4.	Help me to locate source of input for cassava production	23	75	76	16	2.55**	4th
5.	It promotes relationship and interaction between me, extension agents and other farmers	29	71	63	27	2.54**	5th
6.	Helps me to understand in details cassava farming methods	29	71	63	27	2.54**	5th
7.	Makes planning easier	40	48	40	62	2.34	6th
8.	Motivates me into expanding my farmland	15	67	19	89	2.04	7th
9.	Informs me on how to get farm inputs like fertilizer	12	34	44	100	1.78	8th
10.	Aids in decision making	8	33	37	112	1.67	9th
11.	Helps me to receive information timely	4	15	44	127	1.45	10th
12.	Helps in decision making	10	6	40	134	1.43	11th
13.	It creates awareness on cassava farming technologies	12	14	13	151	1.41	12th

n = 190

Source: Field survey data, 2024

SA = Strongly Agreed, A = Agreed D = Disagreed, and SD = Strongly Agreed

Table 2: Result of Binomial Logit Regression Analysis

Variables	Coeff	Exp(B)	P-value
Constant	3.80	44.81	0.06
Sex	-0.39	0.67	0.27
Age	-0.02	0.99	0.95
Education	-0.44	0.63	0.03**
Household size	0.07	1.08	0.56
Years of farming experience	0.06	1.06	0.18
Income	0.00	1.00	0.00**
Connectivity	-0.66	0.51	0.09
Availability of comp. services	-0.71	0.48	0.02**
Possession of mobile phones	0.71	2.04	0.21
Comparative advantage	0.18	1.20	0.03**
Access to Agric info.andinnov.	-0.36	0.69	0.04**
Access to credit and loan	0.26	1.30	0.59
-2 Log likelihood	208.741		
Cox & Snell R Square	0.546		
Nagelkerke R Square	0.528		

Source: Field survey data, 2024

Table 3: Constraints to the use of ICTs for cassava farming

S/N	Constraints	SA	A	U	D	SD	Mean	Rank
1.	Low adoption and utilization	65	124	1	0	0	4.38**	1st
2.	Access to credit sources	64	123	1	0	0	4.37**	2nd
3.	High cost of ICT tools	60	127	1	0	0	4.37**	2nd
4.	High level of poverty	3	137	29	21	0	3.68*	3rd
5.	Lack of awareness	11	129	29	21	0	3.68**	3rd
6.	Epileptic power supply	128	12	29	20	1	3.67**	4th
7.	Readability problem	2	84	79	19	6	3.30**	5th
8.	Lack of effective training	3	83	79	20	5	3.31**	6th
9.	Illiteracy level of farmers	1	64	83	39	3	3.11**	7th
10.	Lack of connectivity	2	63	83	39	3	3.10**	8th
11.	Negative attitude of farmers	0	64	62	53	11	2.94	9th
12.	Less concentration of ICTs In rural areas	0	33	71	64	22	2.61	10th
13.	Lack of knowledge on how To use the tool	1	22	66	60	41	2.40	11th
14.	Inadequate support from Organization and government	0	50	23	27	90	2.17	12th
15.	High cost of maintenance	17	9	23	63	78	2.0	13th
16.	Traditional beliefs/practices	11	0	4	148	27	2.05	14th
17.	Complexity of using ICT	0	0	1	87	54	1.96	15th
18.	Lack of extension agents Conviction	0	0	7	104	79	1.62	16th
19.	Inadequate infrastructural Facilities available	0	0	0	72	118	1.40	17th
20.	Low computer literacy Among cassava farmers	0	0	0	33	157	1.17	18th
n =				190				

Source: Field survey data, 2024.