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Access and Use of Information and Communication Technology among Cassava Farmers in Obudu, Cross River State, Nigeria

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Abstract:

Information Communication Technologies have the potential to increase farmers' access to information which is paramount in enhancing agricultural production in Nigeria and the world over. The study examined access and use of ICTs among cassava farmers in Obudu Local Government Area of Cross River State, Nigeria. Data were collected from 120 randomly selected cassava farmers using a structured questionnaire. Data were analyzed using percentages, frequencies and mean scores. Results showed that majority of farmers were males (81.7%), married (77.2%), educated (60%), members of social organizations (81.7%) with small farms (53.3%) and low cassava income (65%). Findings also indicated that radio (M=2.05), television (M=2.09) and mobile phones (M=1.5) were most accessible ICTs and constituted those often utilized by cassava farmers. Constraints to access and use of ICTs by farmers were low income earning (M=1.65), poor access to ICT training (M=1.63), poor access to ICT infrastructure (M=1.45) and lack of time (M=1.40), among others while their perceived best strategies for improving access and use of ICT facilities included formation of cooperative societies (M=1.67), availability and accessibility of internet facilities (M=1.66), access to credit facilities (M=1.65), training of farmers on use and maintenance of ICT facilities (M=1.62) and availability of infrastructural facilities (M=1.60). The study concluded that cassava farmers had poor access to ICT facilities, particularly modern ICT tools, hence, their low-level utilization and limited access to agricultural information. It recommended the need for those interested in cassava enterprise development to promote access and use of ICTs among farmers for increased production and productivity which is expected to enhance their income and standard of living.

Keywords: access, use, information and communication technologies, cassava farmers, Obudu, Nigeria

1. Introduction

Agriculture is an important sector with the majority of the rural population in developing countries including Nigeria depending directly or indirectly on it (Diao, Hazell, Resnick & Thurlow, 2007). The sector faces major challenges of enhancing production in a situation of dwindling natural resources necessary for production. The growing demand for agricultural products especially cassava, however, offers opportunities for producers to sustain and improve their livelihoods. Achieving agricultural development in the 21st century depends on the wide use of Information and Communication Technologies (ICTs). The role of ICTs to enhance food security and support rural livelihoods is increasingly recognized and was officially endorsed at the World Summit on the Information Society in 2005 (International Institute for Communication and Development (IICD, 2007). Although, it is a relatively new phenomenon, evidence of the contribution of ICTs to agricultural development and poverty alleviation is becoming increasingly available. According to IICD (2007) increase in efficiency, productivity and sustainability of small scale farms have been observed in areas where ICTs have been making a significant contribution in agricultural sector.

ICTs can be defined as those technologies used in collecting, processing, storing, retrieving, disseminating and implementing data and information using microelectronics, optics, and telecommunication and computers (FAO, 1993). They are also defined as those technologies that facilitate communication and the processing and transmission of information by electronic means for the benefits of its users (Technical Centre for Agricultural and Rural Cooperation (CTA, (2003).

The use of ICTs in agricultural extension and rural development is significant especially now that its use has witnessed an upsurge in almost all areas of rural life in several African countries where it has provided a medium for adequate access to agricultural information, despite the persisting problems of access, connectivity, literacy, content and costs (CTA, 2003). Stakeholders in agriculture can access information and knowledge about agriculture and food production through ICTs. ICTs also improve market access through the awareness of up-to-date market information on prices for commodities, inputs and consumers needs, which can improve farmers' livelihood substantially and has a dramatic impact on their negative position. Such information is important in making decision about further crops and commodities, about best time and place to sell or buy agricultural produce. Furthermore, ICTs enable rural communities to interact with other stakeholders, thus reducing social isolation. They widen the perspective of local communities in terms of national and global development, open up new business opportunities and allow easier contact with friends and relatives as well as help eliminate the gap between agricultural knowledge and rural communities. As observed by UNESCO (2002), many countries of the world now regard understanding ICT and mastering its basic skills and concepts as part of the core of education alongside, reading, writing and numeracy. ICTs used in agricultural extension according to Odame, Hafkin, Weseler & Boto (2002) and Arokoyo (2005) include radio, television, fixed and mobile phones, short message services (SMS), world wide web (www), search engines, packet digital assistants, cameras, video, e-mail, computer, contact data bases and systems, CD-Rom, DVD, rural radio and web publishing, among others.

Despite the importance of ICTs to agriculture, rural farmers in Nigeria, including cassava farmers have not been able to substantially adopt them to increase productivity. Reasons advanced for this scenario include low level of ICT readiness, poor ICT infrastructure, 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 (Arokoyo, 2011).

Nevertheless, Nigeria is the largest producer of cassava tubers in the world with the production of about 45 million metric tonnes of the world's production of 249 million metric tonnes in 2010 (FAO, 2010). These production outputs are in the hands of small scale farmers who cultivate between 0.5 and 5 ha of land (Karim, Fasasi & Oyeyinka, 2009). According to Nneoyi, Henry, Walter & Ebingha (2008), cassava is one of the most important sources of carbohydrate and accounts for about 70% of the total calories intake of more than half of the population in Nigeria. Most families in the country consume the storage roots in various forms such as gari, flour, fufu, starch, fresh and dry flakes (abacha) and tapioca. Cassava has gained increased industrial, economic and nutritional importance over the years because of the multifarious uses of the starch-rich roots (Karim, Fasasi & Oyeyinka, 2009).

Cassava farming has been transformed from being a staple food to a source of income as well. Cassava farmers therefore, must access and use ICTs to optimize production in order to meet the increasing demand both locally and internationally. Due to the ignorance of new development in agriculture and the marginal response to improved farm practices resulting to low agricultural productivity and low standard of living among farmers in rural communities of Nigeria, efforts have been directed by governments, media stations, NGOs and individuals in the dissemination of farm information. This is to create awareness among farmers of the available agricultural practices and persuade them to adopt them. But as revealed by Balderama (2009), there is a dearth of knowledge and information on new technologies in agriculture that is yet to be exploited especially in most of the developing countries including Nigeria. It is expected that there should be a flow of knowledge and new information from various research institutes to the farmers. However, there exists a great problem in the transfer of information from the research institutions to the national extension systems and a greater one in disseminating to farmers. This means that there is a divide in knowledge between delivery institutions and rural farmers. This gap in knowledge is further heightened by the fact that farmers' access to and use of new ICTs is limited in the rural areas. In addition, it is doubtful if rural farmers in Obudu use ICTs in obtaining information required for enhanced cassava production. As a result, this study examined cassava farmers' access to and use of ICTs in Obudu LGA of Cross River State, Nigeria.

The specific objectives of the study were to: (1) describe the socio-economic characteristics of cassava farmers in the study area; (2) determine cassava farmers' access to ICTs; (3) determine cassava farmers' use of ICTs; (4) identify the factors militating against access and use of ICTs by cassava farmers; and (5) determine the strategies for improving access and use of ICTs by cassava farmers in the study area.

2. Methodology

The study was carried out in Obudu Local Government Area of Cross River State, Nigeria. Obudu is located at an altitude of 1,575 metres above sea level and has a unique temperature, climate and vegetation with temperature ranging between 7° C and 15° C all year round. It lies within latitude 64°N and longitude 91°E. Obudu LGA is located in the heavy rainforest vegetation with the rainy season starting from early March-early December while the dry season begins from late December-late February. The famous Obudu cattle ranch is located in the north west of Obudu LGA. The LGA is made up of two districts and ten council wards with a total population of about 180, 000 people comprising 60,000 men, 80,000 women and 40,000 children (National Population Commission, 2006). The main occupation of the inhabitants is subsistent farming, some are civil servants, some are involved in businesses while others are engaged in tourism activities. The main crops produced by the farmers include yam, rice, cassava, cocoyam, melon, groundnut, cocoa, banana, plantain and assorted vegetables (Nwahia, Omnona, Onyeabor & Balogun, 2012).

Multi-stage sampling procedure was employed in selecting the sample for the study. Firstly, out of the two constituencies that make up Obudu Local Government Area, constituency one was purposively selected for the study as it constitutes the constituency with high cassava cultivation. Secondly, using simple random sampling technique, three council wards (Ipong, Agiaba-Begiaka and Begiaden) were selected from the five council wards that make up the constituency. Thirdly, two villages per council ward and twenty farmers per village were randomly selected to give a total sample size of one hundred and twenty respondents. Data were collected using a structured questionnaire and analyzed using frequency, percentage and mean scores.

3. Results and Discussion

3.1. Socio-Economic Characteristics of the Respondents

Results of the socio-economic characteristics of the respondents are depicted in Table 1. The results revealed that 81.7% of the farmers were males while 18.3% were females. This implies that males dominated cassava production in the study area. The finding concurs with the study of Olaniyi, Adetumbi & Adereti (2013) who reported that cassava production in Nigeria was dominated by males. It however disagrees with the report of Ebukiba (2010), Udensi *et al.* (2011) and Eze & Nwibo (2014) who found that females constituted a greater percentage of those who were engaged in cassava production in Akwa Ibom, Abia and Delta States respectively.

The age range for majority (40.9%) of farmers was between 20 and 40 years, 34.2% were within the age bracket of 41-50 years while 25% were aged above 50 years. This implies that cassava farming is dominated by young people who are within the productive age group. They are more likely to be active and may possess the capacity to use innovation. This finding agrees with study of Akinbile & Alabi (2010) who reported that population within this age group is productive, energetic and constitutes the major agricultural work force.

Findings of marital status showed that majority (77.2%) of respondents were married while a few (14.2%; 3.3%; 5.0%) were single, divorced and widowed respectively. Married people dominate cassava production in Obudu LGA. The predominance of married persons in cassava production implies that it is a source of livelihood for the farmers and their families since marriage is often associated with occupational stability and responsibility. The result corroborates the finding of Udensi *et al.*, (2011) who reported that married people dominate agricultural activities in Abia State, Nigeria. Farmers in the study area are, therefore, considered to be responsible to take any rational decisions in accessing and using ICTs.

The educational attainment of the respondents revealed that majority (60%) were literate while about 40% were non-literate. This suggests that cassava cultivation is in the hands of enlightened people. Similar results were reported by Oyekanmi & Okeleye (2007) and Olaniyi, Adetumbi & Adereti (2013) in southwest Nigeria. This attribute is expected to influence farmers' access and utilization of ICTs as literate individuals are keen on getting information and using it.

Results on farm size indicates that slightly more than half (53.3%) of the respondents had farm sizes of between 1 and 3 hectares while 46.7% had farm sizes of between 4 and 6 hectares. The result suggests that small-scale farmers dominate cassava farming in the study area. The finding agrees with the study of Okoedo-Okojie & Omoregbee (2012) who found that 41.5% of farmers had farm sizes 1.1-1.5 hectares in their study of determinants of access and farmers' use of information and communication technologies in Edo State, Nigeria.

The results further showed that majority (43.3%) of the respondents have been farming cassava for up to 10 years, 34.2% had 11-20 years, 13.3% had 21-30 years while 9.2% had farming experience of above 30 years. This suggests that the respondents have been farming cassava long enough for them to improve on their productivity. This concurs with the study of Eze & Nwibo (2014) who reported average of 10 years of cassava farming experience in Delta State, Nigeria. As noted by Nwaru (2004), the longer the years of 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. Nevertheless, farmers need further information on improved cassava technologies through access and use of ICT facilities to enhance their production and productivity for improved income and standard of living.

The social organisation membership showed that majority (81.7%) of farmers belonged to one social organisation or another while a few (18.3%) were not members of any social organization. Membership of a social organization is a good platform for socialization and diffusion of novel technologies as well as access to production inputs. It can also be a forum where farmers can easily access and learn to use ICTs.

Result on cassava farm income showed that majority (65.0%) of the respondents earned more than one hundred thousand naira (N100,000.00 (506.33 USD in 2015) per annum. This is an indication that income from cassava farming is low, hence, farmers do not possess the financial muscle required to purchase and utilise ICT tools which will enable them have access to information on improved cassava technologies for enhanced production and productivity. Farmers with high income levels are in a better position to afford communication facilities and therefore tend to be more informed of farm technologies and market prices.

Characteristics	Frequency	Percentage
Gender		
Female	22	18.3
Male	98	81.7
Age (years)		
20 – 30	08	6.7
31 – 40	41	34.2
41 – 50	41	34.2
51 above	30	25.0
Marital Status		
Single	17	14.2
Married	93	77.2
Divorced	04	3.3
Widowed	06	5.0
Educational Status		
No formal education	48	40.0
Primary	37	30.8
Secondary	28	23.3
Tertiary	07	5.8
Farm Size (ha)		
1 – 3	64	53.3
4 – 6	56	46.7
Cassava Farming Experience (years)		
1 – 10 years	52	43.3
11 – 20 years	41	34.2
31 – 40 years	16	13.3
Above 40 years	11	9.2
Membership of Social Organizations		
No	22	18.3
Yes	98	81.7
Cassava Farm Income (N)		
≤ 100,000	42	35.0
>100,000	78	65.0

Table 1: Distribution of Cassava Farmers According to Socio-Economic Characteristics (n=120)

Source: Field survey, 2015

3.2. Access to ICTs by Cassava Farmers

The mean scores and standard deviations of access to ICTs by cassava farmers are presented in Table 2. The results indicated that out of 16 ICTs listed, farmers reported access to only 3. These are radio (M = 2.05), television (M = 2.09) and mobile phones (M = 1.5). The finding revealed that most cassava farmers in the area did not have access to many new ICT facilities and would likely not be aware of major agricultural findings. All the standard deviations were less than 1.0 which is an indication that almost all the respondents' individual scores with regard to their opinion on the level of access to ICTs did not differ much from the mean scores. This result agrees with the study of Agwu, Uche-Mba & Akinagbe (2008) who reported that majority (67%) of farmers do not have access to ICT tools. As observed by United Nations Development Programme (UNDP, 2001), lack of access to ICTs could result in underdevelopment. ICTs are very efficient in information transfer and their accessibility could make information dissemination on improved cassava production technologies efficient, leading to increased productivity. The poor access to new ICTs observed in the study area could be attributed to unavailability of ICT tools and lack of awareness on their usage.

ICT Facilities	Mean	Std. Deviation
Radio set	2.05	1.091
Television	2.09	0.907
Landline	0.50	0.860
Mobile phone	1.52	1.053
Computer	0.98	1.085
E-mail	0.75	0.891
Internet	0.74	0.865
Twitter	0.61	0.919
Digital camera	0.91	1.045
Video recorder	0.56	0.896
Video player	0.95	1.028
CD ROM	0.42	0.588
Photocopy machine	0.56	0.765
Printer	0.60	0.749
Scanner	0.93	1.035

Table 2: Mean Distribution on Access to ICTs by Cassava Farmers (n=120)

Mean Access ≥ 1.5

Source: Field survey, 2015

3.3. Use of ICTs by Cassava Farmers

Use of ICTs connotes the harnessing of the potentials of information technology devices for information generation and dissemination. The type of ICTs used by cassava farmers in the study area is presented in Table 4. The results showed that mobile phones (M=1.80), video player (M= 1.68), television (M= 1.55) and radio sets (M=1.53) were the ICTs often used by the respondents. Those that were sometimes used by farmers included computer (M=1.08), Internet (M=1.10), CD ROM (M= 1.33), photocopy machine (1.39), printer (M=1.02), scanner (M=1.00) and e-mail (M=1.15) while digital camera (M=0.38), video recorder (M= 0.58) and twitter (M=0.53) were never used. All the standard deviations were less than 1.0. This is an indication that almost all the respondents' individual scores with regard to their opinion on the level of use of the ICT tools did not differ much from the mean scores. The results revealed a very low-level utilization of ICTs by cassava farmers in the study area. This could be attributed to lack of ICT facilities, poor information on ICT use and low financial base of cassava farmers which would enhance their purchasing power. The finding is corroborated by the study of Akpabio, Okon & Inyang (2007) who observed low level utilization of ICTs among farmers in Nigeria.

ICT Facilities	Mean	Std. Deviation
Digital camera	0.38	0.530
Video player	1.68	0.830
Video recorder	0.58	0.770
Radio sets	1.53	0.100
Television	1.55	0.098
Twitter	0.53	0.071
Mobile phone	1.80	0.763
Computer	1.08	0.852
Internet	1.10	0.773
CD ROM	1.33	0.640
Photocopy machine	1.49	0.635
Printer	1.02	0.102
Scanner	1.00	0.100
e-mail	1.15	0.054

Table 3: Mean Distribution on Use of ICTs by Cassava Farmers (n=120)

Often used: ≥ 1.50 ; Sometimes used: 1.00-1.50; Never used: < 1.00

Source: Field survey, 2015

3.4. Farmers' Perceived Constraints on Access and Use of ICTs

The major constraints to access and use of ICTs by cassava farmers included low income (M= 1.65), poor ICT training (M = 1.63), poor access to ICT infrastructure (M = 1.45) and lack of time (M= 1.40). Other serious constraints included illiteracy (M=1.33), lack of necessary skills in the use of ICTs facilities (M= 1.30), lack of internet facilities in the study area (M = 1.30), unavailability of ICTs facilities (M= 1.28), lack of extension services on ICTs (M = 1.24), lack of awareness of ICTs

facilities (M = 1.20) and frequent power failure (M= 1.16) (Table 4). The findings revealed that most cassava farmers faced several constraints in access and use of ICTs. All the standard deviations are less than 1.0 which is an indication that almost all the respondents' individual scores with regard to their opinion on the constraints did not differ much from the mean scores. The results agree with the report of Bertolini (2004) who had earlier observed that several obstacles hinder ICTs usage in developing countries, especially in areas of access to telephone and electricity networks. Therefore, a lot has to be done in order to incorporate ICTs into agriculture in the study area.

Constraints	Mean	Std. Deviation
Non-availability of ICTs facilities	1.28	0.788
Low income	1.65	0.765
Frequent power failure	1.16	0.694
Lack of necessary skills in the use of ICTs facilities	1.30	0.565
Poor ICTs training	1.63	0.661
Lack of awareness on of ICTs facilities	1.20	0.630
Lack of extension service on ICTs	1.24	0.722
Poor access to ICTs infrastructure	1.45	0.564
Illiteracy	1.33	0.747
Lack of time	1.40	0.660
Lack of internet access in rural areas	1.30	0.717

Table 4: Mean Distribution on Perceived Constraints to Access and Use of ICTs (n=120)
Mean \geq 1.0

Source: Field survey, 2015

3.5. Farmers' Perceived Strategies of Improving Access and Use of ICTs

The perceived strategies of improving access and use of ICTs facilities by cassava farmers are depicted in Table 5. The respondents perceived that the best strategies of improving access and use of ICTs facilities are formation of cooperative society to improve farmers' access to ICTs facilities (M=1.67), access and availability of internet facilities in rural areas (M=1.66), access to credit facilities (M=1.65), deployment of ICTs staff to the rural areas to maintain and enlighten cassava farmers (M=1.62), availability of infrastructural facilities (electricity, roads, etc.) (M=1.60). Other strategies include adequate policies to enhance ICTs development in the rural areas (M=1.59), reduction in the cost of ICTs facilities (M=1.58), training of cassava farmers on the importance and use of ICTs (M=1.58), extension agents should be knowledgeable in ICTs to be able to educate farmers (M=1.58), and availability of ICTs hardware and software (M=1.51). When the above strategies are put in place, access and use of ICTs facilities by cassava farmers in the study area would be enhanced.

Strategy	Mean	Std. deviation
Access and availability of internet facilities in rural areas	1.66	0.476
Reduction in the cost of ICTs facilities	1.58	0.512
Availability of infrastructural facilities (electricity, roads, etc.)	1.60	0.492
Training of cassava farmers on the importance and use of ICTs	1.58	0.496
Extension agents should be knowledgeable in ICT to be able to educate farmers	1.58	0.496
Availability of ICTs hardware and software	1.51	0.708
Adequate policies to enhance ICTs development in the rural areas	1.59	0.494
Cassava farmers should have access to credit facilities	1.65	0.545
Formation of cooperative society to improve farmers access to ICTs facilities	1.67	0.540

Table 5: Respondents' Perceived Strategies of Improving Access and Use of ICTs (n=120)

Mean \geq 1.0

Source: Field survey, 2015

4. Conclusion and Recommendations

The study concluded that most cassava farmers in Obudu LGA of Cross River State, Nigeria were predominantly males, young, married, educated, members of social organizations, smallholder farmers with low income. Majority of cassava farmers had poor access to ICT facilities, particularly modern ICT tools, hence, their low-level utilization in the study area. The ICTs most accessible to farmers were also the ones often used and they included radio, television and mobile phones. Farmers faced numerous obstacles in their attempt to access and use ICT facilities. The most important of these constraints were low income, poor ICTs training, poor access to ICTs infrastructure and lack of time, among others. Farmers' perceived best strategies of improving access and use of ICTs are formation of cooperative society, availability of internet facilities in rural areas, access to credit facilities, awareness creation on use of ICTs and improvement in rural infrastructural facilities.

It is recommended that both government and non-government agencies involved in agricultural development should facilitate access and use of digital ICT tools among farmers for improved cassava production and productivity. In addition to the use of traditional dissemination channels such as radio and television, the frontline extension workers should be mobilized and encouraged by extension institutions in Cross River State and in Obudu LGA in particular, to use mobile phones (GSMs) and modern ICT tools to disseminate relevant agricultural information to cassava farmers. This may further attract more of the younger people into cassava farming in the study area.

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