EFFECTS OF USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) ON FARMERS' AGRICULTURAL PRACTICES AND WELFARE IN ORLU AGRICULTURAL ZONE OF IMO STATE, NIGERIA

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Abstract

The aim of this study was to ascertain the effects of the use of Information and Communication Technologies (ICTs) on farmers' agricultural practices and welfare in Orlu Agricultural Zone, Imo State. Data were collected with structured questionnaire distributed to 130 respondents randomly selected from the 10 extension blocks in Orlu Agricultural Zone. Percentages, bar graphs, mean scores, standard deviation, presented in frequency table and Likert type scale were used to analyze the data. The result obtained showed that ICT devices available in the area included radio, mobile phones, television, and newspapers among others. However, radio is the most readily available ICT device (99.2%), followed by mobile phone (97.7%). It was also observed that ICTs have significant effects on the farmers', agricultural practices and welfare as indicated by a high mean score on the statements. Several factors constrained the use of ICT devices. Among these factors were erratic power supply (98.5%), low level of education (93.1%), language barrier (92.3%), lack of ICT skills (91.5%), low income of farmers (88.5%), unavailability of ICT centers (82.3%) and high cost of ICT facilities (79.2%). This study thus recommended that Government should provide financial support to farmers through the provision of interest free loans to enable them acquire and use the technologies. Government should improve rural infrastructures particularly electricity supply in the study area. The rural dwellers should be given the requisite skills required for information management. They should be exposed to practical computer training for the enhancement of ICT use.

Keywords – ICTs, Farmers, Welfare, Agriculture, Nigeria

Introduction

Agriculture is a vital sector for the sustained growth of developing countries, especially agriculture-based countries such as those in sub-Saharan Africa. Equally important, a significant portion of the world's population – 86 percent of rural inhabitants—still depends on agriculture for employment and sustenance (World Bank, 2007). Demand for food is increasing, too. The Food and Agricultural Policy Research Institute (FAPRI)

estimates that an additional 6 million hectares of maize and 4 million hectares of wheat plus a 12 percent increase in global maize and wheat yields will be needed to meet demand for cereals alone in the next decade (Edgerton, 2009). Demand for meat is expanding as incomes rise, creating competition for land and other resources. Increasingly unstable weather and temperatures require adaptive agronomic techniques to meet the demand.

Agriculture is the predominant activity in most of the zones in Nigeria, percentage of persons working in agriculture ranges between 24.4 and 85.1 percent across zones in Nigeria. With respect to states, the activity ranges between 2.4 and 91.7 per cent, majority of states having over 50 percent (CBN, 2000). Increases in agricultural output brought about by increasing land and labour productivity, will make food cheaper; benefit both rural and urban poor people who spend much of their income on food. Under right conditions, increase in agriculture productivity causes the incomes of both small and large farmers to increase and generate employment opportunities. These increases in income is particularly important because the proportion of people mainly dependent on agriculture for their income remains high; ranging from 45% in East and South Asia, to 53.2% in Asia and 63.5% in Sub-Saharan Africa (Ogen, 2007). The agricultural sector has a traditional role to play in the path of economic development. But in an economy like Nigeria, the agricultural sector has suffered set back in recent times, which has been attributed to widespread poverty and insecurity experienced today. Though, no so-called developed nation today actualized this status solely by agricultural transformation, but in many, conscious efforts on agriculture at the early stage of development played a critical role in economic development. Increasing productivity will bring about increased incomes of the farmers and non-farmers, because the proportion of people nearly directly or indirectly involved in agriculture and agricultural products for their income remains extremely high. Therefore, the provision of basic agricultural information is aimed at increasing the efficiency of agricultural markets and income for improved farmers' welfare.

Information and communication technologies (ICTs) play inevitable roles in every aspect of human activities today, including agriculture. The key players in agriculture are the farmers, and their ability to use the technologies defines the role of

ICT in agriculture generally (Nwagwu and Opeyemi, 2015). ICT use by farmers is now on the increase globally. In increasing access and exchange of information, ICT offers the potential to increase efficiency, productivity, competitiveness and growth in various aspects of agricultural sector. Farmers who engage in commercial agriculture on a large scale might be expected to be using cameras, computing devices, digital imaging, the Internet and Wide Area Networking (WAN), Wi-Fi, SMS, WAP (Wireless Access Protocol) based internet access using cellular telephony, and digital media and DVD, among others (Nwagwu and Opeyemi,2015). Those who engage in agriculture on a small scale utilize various other forms of ICT such as mobile phones, computers, and the internet etc.

According to Munyua (2008), Information and knowledge play a central role in rural agricultural development. In emphasizing the role of information and knowledge, information and knowledge is described as prime productive resources. The Food and Agriculture Organization of the United Nations (2000) advances a corresponding view to this perspective in its assertion that "information and knowledge play a key role in ensuring food security and sustainable development". World Bank (2002), cited in International Institute for Communication and Development (IICD), 2006), also takes the position that "information and Communication technologies are a key input for economic development and growth". Information and communication technologies are key enablers of globalization. They allow for the efficient and cost-effective flow of

information, products, people and capital across national and regional boundaries. ICT is not a panacea for rural development problems, but it has the potential to help the rural people to leap over some of the traditional barriers to development, by improving access to information, expanding the market base, enhancing employment opportunities

and making government services work better (Swanson &Rajalathi, 2010).

Historically, agricultural service delivery in developing countries started with production-oriented limited extension services for export crops. The attention was diverted in the fifties to food production and improved farming techniques (Anandajayasekeram, 2008). It is widely accepted that ICT is an important element within the array of market and non-market entities and agents that provide human capital enhancing inputs, as well as flow of information that can improve farmers' and other rural peoples' welfare. ICT is widely expected to be a useful tool contributing to development around the world (UNDP, 2005). It is also found that ICT allows efficient and transparent storage, processing and communication of information and that entrepreneurial innovation in this field may affect economic and social change (Kaushik, 2004). According to Richardson (1997), ICT kiosks, ICT-equipped intermediary organizations and mobile phones are expected to play an important role in strengthening the more complex and time-urgent pathways of information and knowledge-sharing on which agricultural innovations depend.

Given that the future of food depends to such a great extent on small-scale agriculture, governments and development partners are focusing on how to increase productivity in sustainable ways through new technologies that smallholders can use. Irrigation management, biotechnologies, pest management and eradication, soil assessment, improved nutrient and land management, improved market access, and innovative storage facilities are all strategies for increasing smallholders' agricultural productivity and improving their access to markets, but the challenge lies in ensuring that smallholders can obtain and use them. ICT provides an incredible opportunity to reach farmers with the technical information they require to increase yields. Good farming practices maximize chances of a good harvest. In the past, conventional farming practices treated entire farms as homogeneous units even though they are often variable in productive potential. This view is changing as technology allows producers to measure soil nutrient status, crop potential, pasture health, and water-use efficiency at specific sites within a field. ICTs like digital soil maps provide extensive soil information that can be stored and accessed online. GPS, satellite imagery, remote sensors, and aerial images help to assess soil and land variations, and mobile applications and the Internet can disseminate the information quickly. Therefore, in the study area, the above is not known and the information on effects of use of ICTs on farmers' agricultural practices and their welfare is yet to be established and this is why this study was carried out. The main objective of this study is to determine the effects of use of Information and Communication Technologies (ICTs) on farmers' agricultural practices and welfare in Imo State, Nigeria. The specific objectives of this study include to:

i. describe the socio-economic characteristics of the farmers in the study area;
ii. identify ICT devices available to the farmers;
iii. determine the effects of use of ICTs on farmers' welfare and agricultural practices;
iv. identify perceived constraints facing the respondents' use of ICT devices.

Methodology

The study was carried out in Orlu Agricultural zone of Imo state. The state is in South-east Nigeria. Imo state is divided into three (3) senatorial districts of Owerri, Orlu and Okigwe politically and demarcated along three Agricultural Zones namely; Okigwe, Owerri and Orlu (IMSG, 2001). The state is made up of twenty-seven (27) Local Government Areas (LGAs) and its capital is Owerri. Orlu Agricultural Zone is made up of eleven (11) LGAs. Imo state lies within latitudes $4^0 45N$ and $7^0 15N$ and longitudes $6^0 50^0 N$ and $7^0 25^0 E$ with an area of around 5,100sq/km. It is bordered by Abia State on the East, by the River Niger and Delta State on the West, by Anambra State to the North, and River State to the South (IMSG, 2001). The estimated population of Imo State as of 2016 was 4.8million

and the population density varies from 230-1,400 people per square kilometer (NPC, 2006). It lies within the tropical rain and evergreen forest with a tropical climate that is humid all year round. The rainy season spans from March to October and is bimodal with a two-week break in rainfall in August (August break). The main annual rainfall in the state is 20,00m while the annual temperature is between 25^0C and 28^0C with relative humidity of about 98% during the rainy season and between 50% and 60% during the dry season. The major arable crops grown are cassava, yam, plantain/banana, maize, melon, sweet potato and vegetables such as okra, pepper, tomato and *telfairia*. Orlu agricultural zone has 10 extension blocks and 107 extension circles manned by extension agents. All ICT user farmers in the zone constitutes the population of the study. A list of all registered ICT user farmers in the zone was obtained from the ADP office in the zonal headquarters. The list has a total number of 1,300 ICT user farmers and 10% of the total number was randomly selected which gave a total sample size of 130 ICT user farmers**.** The study made use of both primary and secondary data. The primary data were collected from field investigation or survey using structured questionnaires and an interview schedule. Secondary data sources were utilized to provide background information and other necessary information to achieve some objectives of the study. Such secondary data includes textbooks, reports, journals, publications and proceedings. Enumerators were trained and used. Basically, data were analyzed using descriptive statistical tools such as mean, standard deviation, and percentages. This was used to analyze objectives 1, 2, 3. A four (4) point Likert type scale of Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD) assigned values of 4, 3, 2 and 1 was used to analyze objectives 3 and 4 which is mathematically represented as:

$$4+3+2+1 = \underline{10} = 2.50$$

$$\qquad\qquad 4 \qquad 4$$

Therefore, a mean of 2.50 and above was adjudged okay and accepted while any value below 2.50 was not accepted.

Results and Discussions

Socioeconomic Characteristics of Respondents

The socioeconomic characteristics of the respondents investigated in this study included; Sex, Age, Major occupation, Educational attainment, Marital status, Farm size, household size, Membership of social organization, No of organizations belonged and their monthly income level. Table 1 showed that 55.4% of the respondents were males while 44.6% were females. This implies that both the males and the females are involved in agriculture in the area but the percentage of males is greater and this could be attributed to the dominance of the male folks in agriculture and related businesses as owners of land and as family heads who take decisions for the family. Fig. 2 shows the distribution of respondents according to their age. The result obtained showed that the respondents with the highest percentage (30.0%) were within the age bracket of 51-60. In the same vein, 27.7% and 26.2% of the respondents were within the age range of 41-50 and 61-70 respectively. The figure further showed that only 13% of the respondents were within the age range of 31-40, while the least percentage of the respondents with 3.1% were above 70. The mean age was 53 years. It implies that majority of the respondents are still in their middle age. They are active to perform farm operations and have the capacity to search for relevant information required to do well in their agribusiness.

Entries in the table above showed that the occupation of the respondents were mostly farming with 59.2% followed by trading with 15.4%. Also, 13.8% of the respondents were self-employed, while 11.5% were civil servants. It further shows that only 3.8% of the respondents engaged in other forms of occupation besides the named ones. Data

from Table 1 indicated that 47.7% of the respondents had secondary education, 29.2% had primary education, and 11.5% had tertiary education, while 10% had adult education. Only 1.5% of the respondents as shown in the table had no formal education. This implies that the respondents in the area of study acquired the basic education needed for better understanding and usage of ICT devices that will enable them to enhance productivity. This sample thus, is a literate sample. This tells why the farmers are information

conscious and can manipulate ICT devices. It agrees with Asiabaka (2002) that the resultant effect of lack of education is resistance to change especially in the spread of information on agricultural innovation that are meant to change the lives of farmers positively.

Again, majority (76.2%) of the respondents were married, 13.1% of them were widowed and 4.6% divorced. On the other hand, only 6.2% of the respondents were single. This indicates that the respondents in the study area were mainly married people. Table 1 showed also that the highest number of the respondents (50%), had farm size within 0.5-1.0 hectare, this is followed by 39.2% of the respondents having farm size within 1.5-2.0 hectare, while 10.7% of the respondents have farm size above 2.5-3.0ha. The mean of the farm size is 1.4ha. This indicates that the respondents are small scale farmers with little cultivable lands which are gotten mostly through inheritance.

Most of the respondents (62.3%) had a household size of 5-8, followed by 25.4% of the respondents having a household size less than 5, while, only 12.3% had household sizes above 8. The mean household size was six (6) persons. This implies that the household distribution is large, as such, provides more labour for farming and large household size may also help to access more agricultural information. Figure 1 showed that

majority of the respondents (75.4%) belonged to one social organization or the other, while 24.6% of them do not belong to any social organization. Farmers belong to and participate in associations or social groups in order to relate and interact with their fellow farmers and also get and share information among themselves. It is also believed that when they participate in their organizations and associations, they are likely to acquire leadership potential that can help them in disseminating information on important techniques or innovation and also have good administrative structure within the organization. The respondents who also play leadership roles in those organizations are likely to be exposed to important information related to farm innovation and would adopt more innovation than their counterparts due to group dynamics effects (Asiabaka, 2002).

The table showed also that 24.6% of the respondents did not belong to any organization, greater percentage (64.4%) belonged to one or two organizations, while only 10.8% belonged to three or more organizations. This indicates that, majority of the respondents are members of at least one organization. This could be attributed to the fact that, since the farmers must be informed or learned in order to manipulate ICT devices, they thus belong to and participate in organizations so as to get and also share knowledge and information together. Greater proportion (60.0%) of the respondents earned between ₦ 21,000 to 40,000, followed by a proportion of 25.4% who earned between ₦41,000 to 60,000, while 9.2% earned below ₦21,000. Also, only 5.4% of the respondents earned above ₦60,000. The mean income was ₦31,000. The result shows that 30.8% of the respondents who earned above ₦40,000 could readily afford three square meals per day, train their children in schools and also afford most ICT facilities than the greater percentage (69.2%) of the respondents who earned below ₦40,000.

Table 1: Socioeconomic Characteristics of Respondents

Attribute	Frequency	Percentage (%)
Sex		
Male	72	55.4
Female	58	44.6
Income (N)		
< 21,000	12	9.2
21,000-40,000	78	60.0
41,000-60,000	33	25.4
Above 60,000	7	5.4
Marital status		
Single	8	6.2
Married	99	76.2
Divorced	6	4.6
Widowed	17	13.1
Household size		
1-4	33	25.4
5-8	81	62.3
Above 8	16	12.3
Education level		
Adult school	13	10.0
Primary	38	29.2
Secondary	62	47.7
Tertiary	15	1.5
No formal	2	
Major Occupation		
Farming	77	59.2
Trading	20	15.4
Self-employed	18	13.8
Civil servant	15	11.5
Farm size		
0.5-1	65	50.0
1.5-2	51	39.2
2.5 & above	14	10.7
Farming Experience		
1-20	14	11.7
20-40	80	66.7
40 & above	26	21.6
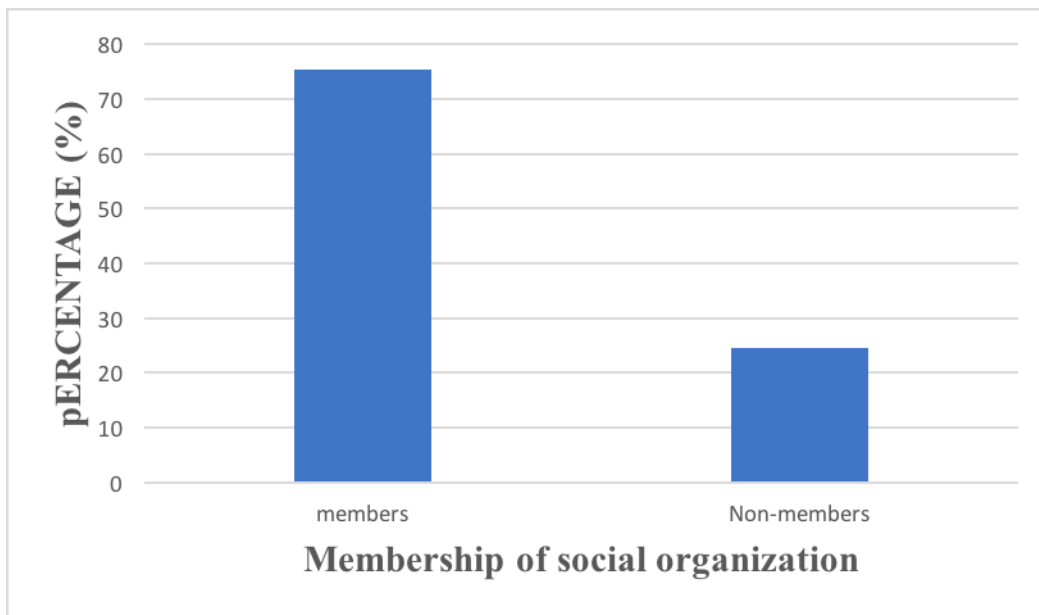
Fig. 1: Distribution of respondents by membership of social organization
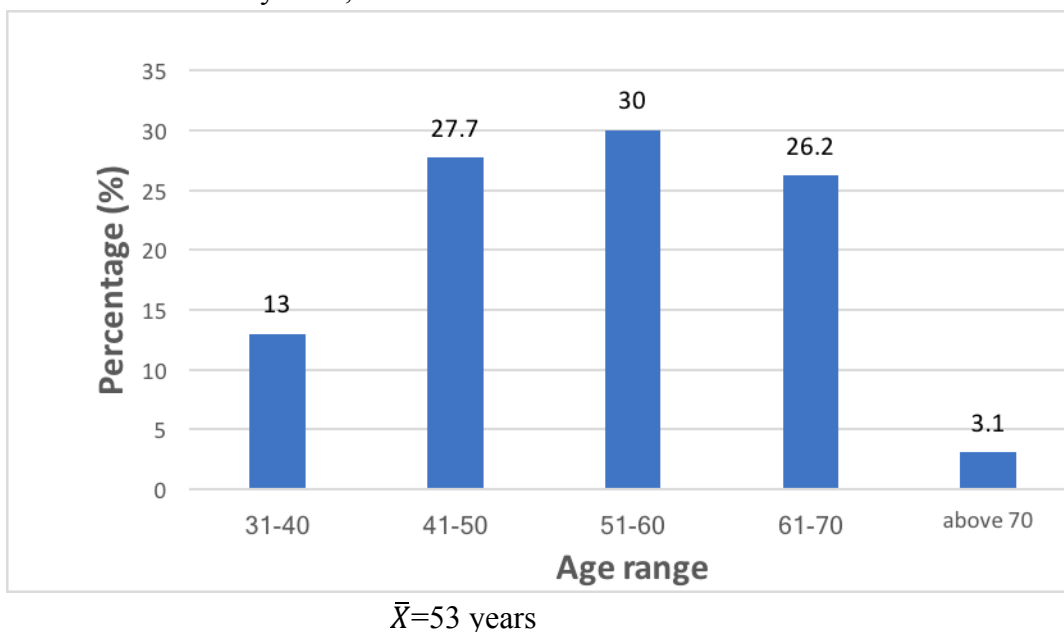Source: Field Survey Data, 2016

$\bar{X}$=53 years

Fig. 2: Age distribution of respondents

ICT Devices Available to the Farmers

Table 2 showed that different ICT devices were available in the study area. It was discovered that radio, mobile phone and television are the most available ICT devices in the area since they had percentages of 99.2, 97.7 and 76.1% respectively. This implies that these devices are the most sources of technological information and innovation dissemination in the area. This is in line with a study on ICT roles for poverty reduction among urban poor in Zimbabwe, where Bowora and Chazovachii (2010) revealed that the respondents in the informal sector bracket lacked the knowledge and exposure to ICTs other than cell phones, radios and televisions. Newspapers with 57.7% indicates that it is also readily available for use, since agricultural information can be sourced from them. Magazines, and computers with close average percentages of 30.8 and 29.2 respectively also

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indicate that information can be sourced through them, but they are not readily available since few respondents had computers in which they can source information. On the other hand, the internet and e-mail users are 23.1% and 21.5% respectively which also shows that they are not readily available but to some extent, still serve as a means of getting information. This could be due to high cost of subscription or poor network coverage. Digital camera and CD-ROM have the least percentages of 2.3 and 3.1 respectively. This shows that they are the least available ICT devices by which the farmers source information in the area. In all, the result shows that radio is the most readily available device and this agrees with (Sida, 2005) who indicates that radio is unique in that it is relatively inexpensive to set up, it is estimated that more than 50% of all households in developing countries have ready access to radio receivers, receiving broadcasts does not require literacy, and it can use indigenous languages even if the population served is small. This accounts for its usefulness on a regular basis.

Table 2: Distribution of available ICT devices to the farmers

Available ICT devices	**Frequency	Percentage (%)
Mobile phone	127	97.7
Television	99	76.1
Radio	129	99.2
Computer	38	29.2
CD-ROMs	4	3.1
Internet	30	23.1
Newspaper	75	57.7
Magazine	40	30.8
Digital camera	3	2.3
E-mail	28	21.5

**multiple responses   Source: Field survey data 2016

Effects of ICT Use on Agricultural Practices

Table 3 showed the effects of ICT use on respondents' agricultural practices. The respondents showed positive response (agree) to all the listed effects of use of ICTs. The respondents improved in the following areas; adoption of soil conservation practices($\bar{x} = 3.20$), ability to adopt better land use practices ($\bar{x} = 3.14$), ability to use and apply manure/fertilizer ($\bar{x} = 3.05$), supply chain/risk management ($\bar{x} = 2.95$), better residue/organic matter management($\bar{x} = 2.85$), ability to monitor pest/disease outbreak($\bar{x} = 2.83$), ($\bar{x} = 2.82$), to know effective planting strategy on steep slopes ($\bar{x} = 2.82$), improved/timely weeding ($\bar{x} = 2.74$), use of appropriate planting material ($\bar{x} = 2.67$), proper land preparation technique ($\bar{x} = 2.71$), planting seeds at right rate and date ($\bar{x} = 2.58$), planting at right depth/density ($\bar{x}=3.01$), and improve crop and land rotation course ($\bar{x}=3.76$). Thus, the findings agree with the implication that good farming practices maximize chances of a good harvest. Digital soil maps give practitioners a good picture of soil fertility, vulnerability, and potential. Statistically testing soil maps against other data on human or policy variables (like demographics, land administration, farming practices, and climatic changes) allows researchers and others to explore causes of soil damage and forms of restoration.

Table 3: Effects of Use of ICTs on Agricultural Practices.

Effects on Agricultural Practices	Mean ($\overline{X}$)	Standard Deviation (S.D)
Ability to adopt soil conservation practices	3.20	**0.84**
Ability to adopt better land use practices	2.82	**0.78**
Better residue/organic matter management	2.85	**0.92**
Ability to know how to store properly	3.14	**0.83**
To know effective planting strategy on steep slopes	2.82	**0.91**
Ability to monitor pest/disease outbreak	2.83	**0.95**
Ability to use and apply manure/fertilizer	3.05	**0.88**
Improved/timely weeding	2.74	**1.07**
Supply chain/risk management	2.95	**0.85**
Use of appropriate planting material	2.67	**0.75**
Improve land preparation technique	2.71	**0.69**
Planting seeds at right depth/crop density	3.01	**1.05**
Planting appropriate seed rate/date	2.58	**0.59**
Improve crop and land rotation course	3.76	**0.89**

Source: Field survey data 2016 **Decision rule:** Mean effect ($\bar{x}$) ≥ 2.50 = Agree

Mean effect ($\bar{x}$) < 2.50 = Disagree

Effects on Respondents Welfare

Table 4 showed that use of ICTs has significant effects on the farmers' welfare as seen in the high mean response of the respondents. The effects included access to ready market ($\bar{x} = 3.33$), access to nutritious food (2.8), education of children ($\bar{x} = 2.97$), access to micro-credit ($\bar{x} = 3.20$) and reduce transportation/information cost ($\bar{x} = 3.12$).

In accessing high-value markets, smallholder farmers need real time information on markets and prices. Through the information provided by the mobile platforms, farmers are able to know which markets to take their products to for better prices which will ultimately reflect in their profit levels. ICT interventions attract attention because they are

more effective in communicating knowledge to farmers in rural areas and they facilitate access to markets. Farmers with more access to markets receive high output price, pay low input price, receive higher incomes and realize high gross margins than those with poor access to agricultural markets. Again, increased income $(\bar{x} = 3.02)$, education of children $(\bar{x} = 2.97)$, bought more equipment for farming $(\bar{x} = 2.91)$, access to nutritious food $(\bar{x} = 2.86)$, bought more household items $(\bar{x} = 2.78)$ and built more houses $(\bar{x} = 2.68)$ were positive effects of ICT use. This means that robust positive results exist between use of ICT [mainly mobile phones] for information search and increased income among farmers. The farmers' incomes are expected to increase with the farmers access to real time information made available by the mobile platforms. This is because farmers can make better decisions due to their knowledge of prevailing prices, available markets, and hence their increased bargaining power. Other effects were increase yield $(\bar{x} = 2.73)$, efficient supply chain $(\bar{\bar{x}} = 2.65)$, reduced production wastage $(\bar{x} = 3.02)$, improved farm processing/marketing $(\bar{x} = 2.87)$ and finally, use of quality healthcare

services $(\bar{x} = 2.56)$. ICT use made the above possible and since providing price information to farmers could be beneficial by increasing their bargaining power when they negotiate with traders, (Jaleta and Gardebroek, 2007) they should get better prices for their produce, which, in turn, should translate into higher consumption.

One of the factors impeding the magnitude of returns smallholder farmers make from their produce is the high transaction costs. Transaction cost in this case is the cost of doing business or cost of exchange between farmers and buyers. Lack of information between the farmer and the buyer makes trade more costly (Okello et al, 2012). In a study that compared transaction costs throughout an extended period, 15.2% of the total cost of farming was transactional, and of that, 70% was informational (De Silva and Ratnadiwakara, 2008). It is therefore easy to understand how mobile phones can reduce farmers' transaction costs. Time costs, search and screening costs for buyers and transport costs of farmers are also reduced. ICT-based MIS (market information service) is expected to reduce these transactions costs by reducing the asymmetry of information and uncertainty related to trade

Table 4: Effects of Use of ICTs on their welfare.

Effects on their Welfare	Mean ($\overline{X}$)	Standard Deviation (S.D)
Access to ready markets	3.33	0.71
Access to nutritious food	2.86	0.88
Education of children	2.97	0.96
Increase income	3.02	0.93
Built more houses	2.68	1.02
Bought more household items	2.78	1.04
Bought more equipment for farming	2.91	0.95
Use of quality healthcare services	2.56	0.98
Access to micro-credit	3.20	0.76
Reduces transportation/information cost	3.12	0.86
Increased yields	2.73	0.65

	2.65	0.85
Efficient supply chains	2.65	0.85
Reduced production wastages	3.02	0.78
Improved farm processing/marketing	2.87	0.65

Source: Field Survey Data 2016
Decision rule: Mean effect $(x) \geq 2.50$ = Agree, Mean effect $(x) < 2.50$ = Disagree

Constraints Affecting Respondents' Use of ICT Devices

Entries in the table above shows that the most perceived constraints limiting respondents use of ICT devices are; erratic power supply (98.5%), low level of education (93.1%), language barrier (92.3%), lack of ICT skills (91.5%), low income of farmers (88.5%), unavailability of ICT centers (82.3%) and high cost of ICT facilities (79.2%). Other constraints that also affect the respondents' use of ICT devices include; poor benefit of using ICT (67.7%), inadequate time for farmers (65.4%), lack of ICT training (63.8%), general lack of awareness on the importance of ICT in agriculture (63.1%) and lack of exposure to ICT devices (46.2%). This affirms the claims of FAO (2000), that the update and harnessing of information is limited by the lack of trained personnel or lack of access to know how. Meanwhile, the least constraints indicated by the respondents as regards to their use of ICT devices are; poor network coverage (30.0%), lack of service shops in the area (20.0%), lack of durable ICT devices (17.7%), high cost of internet subscription (20%) and broadcast at odd hours (14.6%). This shows that all the perceived constraints listed above affect the respondents use of ICT devices however, some have huge effect while others pose less effect. Electricity and power supplies are absolute prerequisites to using contemporary ICT systems. Bertolini (2004) had earlier observed that several obstacles hinder ICTs usage in developing countries, especially in areas of access to telephone and electricity networks.

Table 5: Constraints affecting their use of ICT devices

Constraints	**Frequency	Percentage (%)
Erratic power supply	128	**98.5**
Low level of education	121	**93.1**
Language barrier	120	**92.3**
Lack of ICT skills	119	**91.5**
Low income of farmers	115	**88.5**
Unavailability of ICT centers	107	**82.3**
High cost of ICT facilities	103	**79.2**
Inadequate time for farmers	85	**65.4**
Age limit of farmers	78	**60.0**
Lack of ICT training	83	**63.8**
Lack of exposure to ICT facilities	60	**46.2**
Poor network coverage	39	**30.0**
Lack of durable ICT devices	23	**17.7**

Lack of service shops in the area	26	**20.0**
Broadcast at odd hours	19	**14.6**
High cost of internet subscription	26	**20.0**
Poor benefits in using ICT	88	**67.7**
General lack of awareness of the importance of ICT in agriculture.	82	**63.1**

Source: Field survey data 2016   ****multiple response**

Conclusion

From the study, one can conclusively say that radio and mobile phone, followed by television were the most accessed and utilized ICTs among the respondents. There was a high perception of positive effects of ICT on agricultural practices and their welfare, however, the use of these ICT devices are limited by some factors. Therefore, there is need to encourage ICT user farmers in the area, by making available all that are necessary for successful ICT usage, including training in order to promote maximum gain and utilization of technological knowledge and information which will lead to improved farming practices, increased productivity as well as improved standard of living of the farmers. We recommend the following-

i. The rural dwellers should be given the requisite skills required for information management. They should be exposed to practical computer training for the enhancement of ICT use.

ii. Establishment of call centers to cater for those that prefer calling to texting is necessary and should be considered and developed if funds are available.

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