

UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR EXTENSION SERVICE DELIVERY AMONG FARMERS IN OGBOMOSO AGRICULTURAL ZONE OF OYO STATE

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ABSTRACT

This paper investigated farmer's utilization of ICT for Extension Service Delivery among Farmers in Ogbomosho Agricultural zone of Oyo State. Multistage sampling technique was used to select 240 respondents through schedule for the study. Findings showed that the farmers were still in their active years with mean age of 45.9 years and majority being married (84.9%). Mostly used ICT were radio and mobile phone which were used to source information on market price, input supplies, market for produce, input prices, linking middlemen and buyers and timely production information. About 67% of the female had poor use of ICTs. There was a digital divide between male and female. Constraints faced in the use of ICTs include poor electricity supply (69.6%) and high initial purchase cost of ICT device (62.3%). Age had a negative significant relationship ($t = -2.28$) with ICT use while years spent schooling and income had positive significant influence ($t = 3.77$) in the use of ICT among farmers at $p = 0.05$. Extension service should ensure that information given to the farmers especially through ICT result in increased productivity that will guarantee increased income for the farmers so that they get more interested in using ICTs to get information.

Keywords: Farmers, utilization, information, communication, technology, extension

Introduction

Agriculture is an important sector in Nigeria and developing countries at large with majority of the rural population in developing countries depending on it. The sector experiences major challenges of enhancing production in a situation of dwindling natural resources necessary for production (Stienen, 2007) and climate change. In view of problems faced in the agricultural sector, traditional public-sector extension services over years used a variety of extension programmes to overcome barriers to technological adoption without much success (Anandajayasekeram *et al.*, 2008). The old extension service delivery system that was meant to pass on research outputs to farmers in Africa has proved inefficient, and most of these institutions have inadequate machinery in terms of manpower and capacity to share and disseminate outputs widely to small-scale farmers and other actors (Anderson and Fader, 2004). Such is the Training and Visit (T&V) extension delivery adopted in Nigeria agriculture which has faced the challenge of low ratio of Agricultural Extension Agent to farmer due to inadequate extension personnel (Iorliam *et al.*, 2012).

The number of extension agents has been going down while that of farmers has been increasing. Nonetheless, there is need for a comprehensive and

well-articulated agricultural extension program which ensures adequate and timely delivery of services to farmers if meaningful growth is to be achieved in the agricultural sector (Omotesho *et al.*, 2012). To achieve this, Information and Communication Technologies (ICT) play an important role in addressing challenges and uplifting the livelihoods of the rural poor (Stienen *et al.*, 2007). In the context of changing paradigms in agricultural extension, where linear information flows are being replaced by pluralistic information flow, new actors such as NGOs, private companies, national agricultural research centres, universities and international donors are emerging in the technology transfer pathway. The potentials of ICT to make agricultural extension more effective appear undeniable (Omotayo, 2005; Aker, 2010).

Information and Communication Technology (ICT) refers to a technology employed in the form of tools, equipment and application support which helps in the collection, storage, retrieval, use, transmission, manipulation and dissemination of information as accurately and efficiently as possible for the purpose of enriching knowledge, developing communication and decision making as well as problem solving ability of the user. This facilitates delivery of instruction, as well as learning process itself (Babu, 2013). According to

Arokoyo (2005), ICTs in agricultural extension have capacity to reach a large target audience, make the extension systems and structures more efficient through better management of information and scarce resources, provide information on weather forecast, serves as warning system for disease/pest outbreaks and other disasters before they occur. Furthermore, it provides timely and sensitive market information and can be used for community mobilization learning and action. ICTs are useful for networking among and between the key stakeholders in Research-Extension-Farmers-Inputs-Linkage System (REFILS). Therefore ICTs offer the ability to increase the amount of information provided to all participants in the agricultural sector and to decrease the cost of disseminating the information (Kurtenbach and Thompson, 2000).

In Nigeria, the use of ICTs is becoming evidently important in the Agricultural sector as the Federal government in 2012 introduced the Growth Enhancement Support Scheme (GESS), which was designed to deliver government information on subsidised farm inputs directly to farmers via GSM phones. This development shows a need for alternative sources of information rather than a face-to-face, technology-driven information service (Richardson, 2003). An understanding of ICTs used by the farmers will enable extension agents know the type of ICTs to use in extension service delivery to efficiently disseminate information to the farmers.

The objectives of the study were to describe the socio-economic characteristics of the farmers, investigate the level of use of ICTs by gender, determine the information accessed through various ICTs and identify constraints experienced by the farmers in the use of ICT.

Methodology

The study was carried out in Ogbomoso Agricultural zone of Oyo State. The zone comprises Ogbomoso North, Surulere, Ogo-Oluwa, Ogbomoso South and Oriire Local Government Areas (LGAs). Each of these LGAs forms a block in Agricultural Development Programme (ADP) structure of the state. The geographical location of Ogbomoso is Latitude 81°N and Longitude 3.29°E. The mean temperature of the area is 26°C. The estimated population of Ogbomoso zone during the 2006 population census was about 1,200,000. The study area has vast fertile arable land that is good for cultivation of both food and cash crops. The main agricultural produce in the area include tomatoes, yam, maize, cassava, oil palm, tobacco, cocoa, cashew etc. The major occupation of the people in the zone is farming. The population of the study was farmers.

Multi-stage sampling procedure was used to select the respondent for the study. The first stage was a random sample of a block from the zone to arrive at Oriire and Surulere blocks. The second stage involved the random sampling of five villages from each of the selected blocks namely; Samo, Ikoyi, Ahoro-Dada, Oloya and Bosunla in Oriire blocks while villages sampled in Surulere were Mayin, Iresadu, Bayaoje, Oko and Gambari. The last stage involved the random sample of 24 farmers from each village to give a total of 240 farmers for the study. However, 237 instruments were eventually used because information provided in 3 instruments was not sufficient for data analysis. To determine the level of use of ICTs among the farmers, respondents were required to indicate the extent of use of ICTs to obtain information which was measured using a 3-point rating scale of highly used-2; fairly used-1 and not used - 0. The cut-off of the mean point was 1.5. Therefore, ICT tools with mean scores above 1.5 indicated they had been well used by the respondents. To ascertain the perceived constraints militating against effective use of ICTs by the farmers, they were asked questions on a number of constraints and also to state the extent to which such constraints hinder effective use of ICTs by the farmers. This was also measured on a 3-point rating scale of serious constraints-2, mild constraints-1 and not a constraints-0 with the cut-off of the mean point as 1.5. Constraints with mean above 1.5 were perceived by farmers to be very serious. Frequency count, percentage and mean scores were also indicated. OLS regression was used to estimate the relationship between ICT utilization and socio-economic characteristics.

Results and Discussion

Socio-economic characteristics of the respondents

The distribution of the socio-economic characteristics of respondents are as shown on Table 1. More than half (53.9%) of the farmers were between 31-50 years. The mean age of the farmer was 45.9± 11.9 years. This implies that the farmers were still in their youthful years and can still do farm work and this might be an indication of dire need of agricultural information to boost their farming operation. About 66% of the respondents were male while 34.2% of the respondents were female. This implies that more males are interested in farming than the female in the study area. Majority (84.8%) of the respondents were married. This indicates that majority were likely to have an enhanced sense of responsibility that will prompt them for information for increased productivity. Also, 58.6% of the respondents were members of an association while 41.4% were not members of association. This implies that most of

the respondents had opportunity to be exposed to ICT through the association they belonged.

About 40% of the farmers earned ₦3,000 and less while the mean monthly income of the farmers was about ₦11,191 ± ₦13,120. About 57% had between 11-20 years of farming experience

with mean of 21 ±11.7 years. Majority of the respondents were involved in the cultivation of cassava (92.4%) and maize (84%), while 59.1% and 43.0% were involved in the cultivation of yam and vegetables, respectively as shown on Table 1.

Table 1: Distribution of respondents based on socio-economic characteristics

Socio-economic Characteristics		Frequency	Percentage
Age (years) Mean= 45.86 SD=11.9	21-30	27	11.3
	31-40	56	23.6
	41-50	72	30.3
	51-60	39	16.4
	61-70	31	13.1
	>70	02	0.8
	Total	237	100
Sex	Male	156	65.8
	Female	81	34.2
	Total	237	100
Marital status	Married	201	84.8
	Widow	20	8.4
	Single	12	5.1
	Separated	4	1.7
	Total	237	100
Years spent schooling Mean=4.6 years SD=3.8 years	No formal education	67	28.3
	Primary education	146	61.6
	Secondary education	14	5.9
	Tertiary education	10	4.2
	Total	237	100
Association membership	Yes	139	58.6
	No	98	41.4
	Total	237	100
Income Mean=₦11,191.22 SD=₦13,120.7	≤3,000	93	39.2
	3,000.01-9,000	28	11.8
	9,000.01-15,000	41	17.3
	15,000.01-20,000	50	21.1
	≥20,000	41	17.3
	Total	237	100
Farming experience (years) Mean =21.0 years SD=11.7 years	≤10	59	24.8
	11-20	72	30.4
	21-30	62	26.2
	31-40	36	15.1
	41-50	08	3.3
	Total	237	100
	Types of crops cultivated*	Cassava	219
Maize		199	84.0
Cowpea		30	12.7
Yam		140	59.1
Vegetables		102	43.0

Source: Field survey, 2013 * Multiple responses

Level of use of available ICTs in obtaining agricultural information.

The result in Table 2 shows that the most used ICT tools by the farmers were mobile phone (73.4%) and radio (68.4%). The result shows poor use of other ICTs. This result is contrary to the findings of Arokoyo (2005) who found that radio

and television have been the major ICTs used in agricultural extension delivery in Nigeria. This implies these two ICT tools would be very effective for extension information dissemination. Training should be organized on the poorly used ICTs so that the farmers can benefit from them and have wide variety of avenues to source for information.

Table 2: Distribution of respondents based on their use of ICTs to obtain information

ICT tools	Highly used (%)	Fairly used (%)	Not used (%)	Mean
Television	3.4	24.9	71.7	0.32
Radio	68.4	20.7	11.0	1.57
Newspaper	2.5	22.8	74.7	0.28
Bulletin	0.8	6.3	92.8	0.08
Internet	0.8	3.4	96.6	0.05
Camera	0.0	3.4	96.6	0.03
GSM/ Mobile phone	73.4	12.2	14.3	1.59
Poster	2.5	30.0	67.5	0.35

Source: Field survey, 2013.

Level of use of ICT according to gender

The result on Table 3 shows that majority of the female (66.7%) had poor use of ICTs while only about 48% male had poor use of ICTs. However, more than half (51.9%) of the males had

good use of ICTs while very few females (33.3) had good use of ICTs. This result shows there is a digital divide between male and female in the use of ICTs.

Table 3: Level of use ICT according to gender

Level of Use	Male	Female	Pooled
Poor ICT use	75 (48.1)	54 (66.7)	54.4
Good ICT use	81 (51.9)	27 (33.3)	46.6

Source: Field survey, 2013

The ICT tools used to access Agricultural Information

The result on Table 4 buttresses the result on Table 2 which shows that radio and mobile phone are the most used ICTs. The farmers used the ICTs to source for information on market price, input supplies, market for produce, input prices, linking middlemen and buyers and timely production information. Alternatively, only radio was used to source for information on market price,

weather, financial service, pest and disease control, improved credit access, improved awareness of agricultural event and news while mobile phone alone was used by most of the farmers to source for information on extension visit meetings, farmer’s association meeting and enhanced timeliness of information. This agrees with the finding of Qaisar *et al.* (2011) who opined that ICTs are recently integrated into dissemination of agricultural information to farmers.

Table 4: Distribution of respondents according to ICTs used to access agricultural information

ICT tools/ information	Television (%)	Radio (%)	Newspaper (%)	Bulletin (%)	Internet (%)	GSM (%)	Poster (%)
Market price information	6.8	65.4	6.8	0.8	1.3	63.3	5.1
Weather information	27.8	76.4	3.4	1.7	0.8	21.1	4.6
Financial services	13.1	59.9	10.1	0.8	1.7	38.8	7.2
Input sourcing	16.0	66.2	11.0	2.1	3.0	54.4	12.2
Pest and disease control	15.6	65.4	5.5	1.3	3.0	37.6	7.6
Extension meeting	3.4	30.8	1.3	0.4	0.4	62.0	3.8
Farmer’s association meeting	4.2	33.8	1.3	0.8	0.4	51.5	4.2
Land registration	4.6	30.8	1.7	0.8	0.4	30.0	3.8
Government services	16.9	47.7	7.6	0.4	2.5	25.3	6.3
Access to market	13.1	53.2	3.8	0.4	0.4	54.0	3.0
Input prices	5.1	51.5	3.4	0.8	0.4	50.2	5.1
Linking middlemen and buyers	9.3	48.5	3.8	0.8	3.4	60.3	2.1
Timely production information	14.3	53.6	5.5	0.4	3.8	50.6	4.6
Improved access to credit information	8.4	51.5	3.0	0.4	1.3	41.8	1.3
Enhanced decision making	5.1	44.3	0.0	0.4	1.3	47.7	4.2
Improved awareness of agric. event and news	15.6	62.9	9.3	0.4	3.4	41.8	5.9

Source: Field survey, 2013

Constraints to use of ICTs

About 60% of the farmers were highly constrained in the use of ICTs. The constraints include poor electricity supply (69.6%), high initial purchase cost of ICT device (62.3%), cost of subscription (55.7%), network fluctuation (54.9%), lack of training and inability to use ICTs (54.0%) and low level of education (52.3%). Using a cut-off point of 1.5, the farmers are severely constrained by problem of power supply and high initial purchase cost of ICT device (Table 5). However, all these constraints should be tackled to encourage

farmers in the use of ICTs because the development of networks and use of low-cost ICTs enhances timely access to accurate and reliable information (Qaisar *et al.*, 2011). The GESS programme in Nigeria which is implemented to provide farmers with mobile phones is an initiative in good direction and should be sustained. The result further showed that about 60% of the farmers were severely constrained in the use of ICT while about 40% were mildly constrained.

Table 5: Distribution of respondents according to constraints to use of ICTs

Constraints to use of ICTs	Serious constraints	Mild constraints	Not a constraints	Mean	Ranks
High purchase cost of ICT tools/device	62.3	30.8	6.8	1.56	2
Inadequate access to ICT	46.0	41.6	12.2	1.34	6
Cost of subscription	55.7	35.4	8.9	1.47	3
Cost of maintenance	46.8	39.7	13.5	1.33	7
Low level of education	52.3	38.4	9.3	1.43	4
Lack of training and inability to use ICTs	54.0	35.4	10.5	1.43	4
Problems of power supply	69.6	26.6	3.8	1.66	1
Network fluctuations	54.9	31.2	13.9	1.41	5
Inability to purchase ICT tools and equipment	47.3	36.3	16.5	1.31	8
Mild constraint	96(40.5)				
Severe constraint	141(59.5)				

Source: Field survey, 2013

Determinants of ICT Use among the farmers

The relationship between the personal characteristics of the farmers and their utilization of information and communication technology for extension services is as shown on Table 6. The result of OLS regression shows that there is a significant relationship between age ($t=-2.28 \leq p=0.05$) and income per month ($t=3.77 \leq p=0.05$) and their utilization of ICT. Age with a negative relationship implies that the older the farmers, the more they are unlikely to use ICTs to obtain information. This also means that they are not likely to receive information through ICTs. However, the use of ICTs will be a good channel for disseminating information since majority are in their youthful years.

The positive and significant relationship with income implies that as the income of farmers

increases, the more they are likely to use ICT. Extension services should ensure that information given to the farmers especially through ICT results in increased productivity that will guarantee increased income for the farmers so that they get more interested in using ICTs to get information. This is similar to the findings of Akinbile and Alabi (2010) that the more respondents use ICT, the higher their income. Also, the number of years spent in highest education was significant meaning that the higher the number of years spent schooling, the more the farmers use ICT. The R^2 value was 0.738, meaning that 73.8% of variability in the dependent variable (ICT use among farmers) was explained by the explanatory variables. The F-ratio is equally significant which means that the model fits the data.

Table 6: OLS Regression Estimates of determinants of ICT use among farmers

Variable	B	Std. Error	t	Sig.
(Constant)	7.417	2.950	2.514	0.026
Age	-0.105	0.046	-2.275	0.040**
Income per month	0.000	0.000	3.767	0.002**
Number of years spent schooling	0.018	0.087	0.204	0.842
Association membership	-1.470	1.133	-1.298	0.217
Number of years spent in school	0.071	0.033	2.181	0.030**

F-ratio =9.149, $R^2 = 0.738$

Conclusion and Recommendations

The study concludes that the farmers were in their active years and would be in dire need of ICT to enhance their agricultural activities. Digital divide exist between male and female as female farmers had poor ICT use. Mostly used ICTs were radio and mobile phone to source for information on market price, input supplies, market for produce, input prices and timely production information. Problems of power supply, high purchase cost of ICT tools/device and cost of subscription were perceived by the respondents to be the most serious constraints to the use of ICTs by the farmers the existence of these constraints are blocks to the effective use of ICTs. Based on the findings, the following recommendations are made: management of Agricultural Development Programme (ADP) and government should set up projects that will adequately make ICT trainers and training materials available with concerted efforts on women in agriculture. Programmes that will ensure the provision of needed ICTs should be intensified. Policies that encourage affordable production and assemblage of ICTs should be established; and stakeholders (Government and Non-governmental organization) should work more on rural electrification.

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