



**FARMER'S PERCEPTION OF THE EFFECTIVENESS OF
INFORMATION AND COMMUNICATION TECHNOLOGIES IN
DISSEMINATION OF AGRICULTURAL INFORMATION TO
RURAL FARMERS IN NIGER STATE, NIGERIA**

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ABSTRACT

The study assessed farmers' perception of the effectiveness of information and communication technologies (ICTs) in dissemination of Agricultural information to rural farmers in Bosso Local Government Area of Niger State, Nigeria. A multi-stage simple random sampling procedure was used to select 100 farmers from the study area. Data generated were analyzed using descriptive statistics. Results showed that 62% of the farmers were aware of the ICTs, 63% had access to ICTs, 41% owned radio, television, and mobile phone while 27% owned radio and mobile phone. The results further revealed that all ((100%) the farmers perceived ICTs as effective tools in extension service delivery. Also, 63% of the respondents considered access to mobile phone to be timely and relevant in accessing agricultural information. Mobile phone (40%) was ranked first as an effective means of accessing agricultural information by the farmers. It was also disclosed that television (32%) and mobile phone (40%) were the major factors leading to ICTs effectiveness. Erratic power supply (32.0%) and inadequate extension services (25%) were the major problems that militated against the use of ICTs among farmers in the study area. The study concluded that ICTs are effective tools in dissemination of agricultural information in the study area, and mobile phone was the most effective means of accessing agricultural information by the respondents due to its dual purpose. The study also concluded that erratic power supply and inadequate extension services are the major problems militating against the use of ICTs among farmers. It was recommended that in order for farmers to understand and appreciate the benefits of ICT to improved agricultural production, extension agents should educate farmers particularly on the use of mobile phone which is considered more accessible and convenient.

Keywords: Communication, Dissemination, Extension, Information, Technologies.

INTRODUCTION

Information and communication technologies (ICTs) generally refer to an expanding assembly of technologies that are used to handle information and aid communication. ICTs include hardware, software, media for collection, storage, processing, transmission and presentation of information in any format (i.e., voice, data, text and image), computers, the Internet, CD-ROMs, email, telephone, radio, television, video and digital cameras (Asenso-Okyere & Mekonnen, 2012). Information and communication technologies (ICTs) are essential in agricultural development and play inevitable role in every aspect of human activities today. The key players in agriculture are the farmers, and their ability to use the technologies defines the role of ICT in agriculture (Nwagwu & Opeyemi, 2015).



The important task of agricultural extension service is to facilitate exchange and sharing of agricultural information, knowledge, and skills. The transfer of agricultural information from research centers to farmers is very important as it helps farmers learn innovations which improve agricultural productivity (Osundu & Ibezim, 2015). The need for farmers to have access to relevant and current information on new agricultural practices is a vital issue to developing countries like Nigeria. According to Osundu and Ibezim (2015), most African countries have not devoted adequate attention to providing their citizens, including farmers, information which can improve access to finance, land and extension advisory services and the benefits that come along with these services. Therefore, information and communication technology (ICT) can be used as a medium in bridging the information gap to benefit the rural farmers.

Ogundele (2016) observed that the current ratio of one extension worker to 10,000 farmers is a threat to efforts of achieving food sufficiency in the country. This is an alarming situation considering the World Bank's standard ratio of between 1:800 and 1:1000. The current number of extension agents cannot effectively cover all farm families, particularly with the use of traditional extension methods. Constraining factors such as distance, bad roads, poor communication capacity, electrical problems, poor transportation facilities and inadequate funding pose great problems to effective communication of information to farmers. It is clear, therefore, that the traditional mode of transmitting research findings to farmers through face to face encounter only, no longer adequately handles time bound information that should circulate within the farming population.

Innovative changes brought into the field of agriculture scarcely reach the rural farmers who are the major stakeholders as far as food production is concerned. The outstanding problem lays in the fact that current research findings do not reach the farmers at the appropriate and convenient time. According to Levi (2015), the use of ICTs has the potential to enable rural farmers obtain up-to-date knowledge and information about agricultural technologies, best practices, market information, consumer preferences, weather, and soil-moisture conditions. It is against this background that the study accessed farmers' perception on the effectiveness of ICTs in dissemination of agricultural information and factors militating against the use of ICT in the study area.

MATERIALS AND METHODS

The Study Area

The study was conducted in Bosso local Government area (LGA) of Niger State. It is one of the 25 Local Government Areas (LGAs) in the State. Bosso LGA is made up of 10 wards and is predominantly inhabited by the Gbagyi tribe. Other tribes found in the area include Nupe, Hausa, Igbo, Yoruba, and Fulani. The major occupation of the inhabitants is farming with yam and maize being the major crops grown.

Sampling Procedure and Sampling Size

A three-stage sampling technique was used to select respondents for the study. First stage involved the random selection of two (2) wards out of the 10 wards in the study area. Two (2) villages were then randomly selected from each of the two (2) selected wards making a total number of four (4) villages. Finally, 25 farmers were randomly selected from each of the selected villages (Table 1).



Table 1: Sampling Frame and Size Selection Plan of the Study

LGA	Wards	Villages	Sample size
Bosso	Bosso Central I	Gbayiko	25
		Pyawu	25
	Maikunkele	Zhenuko	25
		Zhimi	25
Total	2	4	100

Method of Data Collection

Primary and secondary data were used for the study. Primary data was obtained using a combination of structured questionnaire and interview schedule.

Methods of Data Analysis

Descriptive statistics which included mean, frequency distribution and percentage were used in the analysis of the data. Likert 5-point scale was used to determine the perception of farmers on the relevance of ICTs to extension service delivery. The scales were: strongly agree = 5; agree = 4; undecided = 3; disagree = 2 and strongly disagree = 1. The values of the responses were added and further divided by 5 to obtain a mean score of 3.0, which was regarded as mean level of perception. Perception statements with means score of 3.0 and above was regarded as being perceived by the farmers to be effective, while those with mean score of less than 3.0 were regarded as being perceived not to be effective by the farmers.

RESULTS AND DISCUSSION

Awareness Sources and Types of ICTs Owned by Farmers

The result in Table 2 indicates that 62.0% of the farmers in the area were fully aware of the existence of ICTs in dissemination of agricultural information, whereas 38.0% of the farmers were completely unaware of ICTs. Osondu and Ibezim (2015) also observed a clear and favourable perception of farmers on the relevance of ICTs in extension service delivery. Several studies have indicated that farmers’ awareness of ICTs was dependent on their socio-economic characteristics and location (Osondu and Ibezim, 2015; and Chaula, 2014). The result indicated that 20% of the source of the awareness of the farmers came from their friends and family, 13% from extension agents, 23% from radio services and 6% from television programs. This is an indication that friends and family play an important role in information dissemination. Uwandu *et al.* (2013) reported family members (with a mean of 3.22) as the fifth source of agricultural information by the farmers in Imo State. In addition to the role played by the extension agents, radio, and television, 23% and 6%, respectively, also contributed towards creating awareness to the rural farmers. The result of Table 2 further indicated that 10% of the farmers owned only mobile phone, 22% have both television and mobile phone, and 27% have radio and mobile phone, while 41.0% have radio, television, and mobile phone. This is an indication that majority of farmers possess more than one type of ICT tool. Several studies have indicated that that majority of farmers in rural areas have access to ICTs such as Television, radio, and mobile phone which are the most important tools of communication which can be accessed by farmers for agricultural information and knowledge (Churi *et al.*, 2012; Olaniyi, 2013; and Chhachar *et al.*, 2014).



Table 2: Awareness Sources and Type of ICTs Owned by Farmers

Variables	Frequency	Percentage
ICT awareness:		
Yes	62	62.0
No	38	38.0
Source of awareness:		
Friends and family	20	20.0
Extension agent	13	13.0
Radio	23	23.0
Television	6	6.0
Neighbor	-	1.0
Types of ICTs own:		
Television	-	-
Radio	-	-
Mobile phone	10	10.0
Television & mobile phone	22	22.0
Radio & mobile phone	27	27.0
Radio, television, mobile phone	41	41.0

Source: Survey data, 2017

Accessibility and Use of Available ICTs by Farmers

Table 3 shows the accessibility and use of ICTs by farmers in the study area. The result indicates that a significant percentage (63%) of farmers in the study area has access to ICTs. However, out of this proportion, only 43% were able to utilize the ICT tools to access agricultural information while 23% of the farmers can access agricultural information via television and radio programs only. From the results of Table 3, farmers' dependence on radio for Agricultural information has been observed to be mainly due to the wide coverage of radio frequencies and availability of many radio stations (Olaleye *et al.*, 2009). Uwandu *et al.* (2013) and Ajayi (2003) posited that the use of radio as a source of agricultural information was one of the most popular among farmers in Nigeria. Farmer's common use of radio could be owing to the fact that many of the farmers can afford to purchase a transistor radio as it is cheap and easy to maintain with the use of batteries (Uwandu *et al.*, 2013). The result of the analysis further revealed that 13% of farmers' access agricultural information daily, 8% weekly, 22% monthly and only 4% annually. This is an indication that farmers are averse to accessing agricultural information using ICT tools despite their having access to it.



Table 3: Accessibility and Use of Available ICTs by Farmers

Variables	Frequency	Percentage
Access to ICTs:		
Yes	63	63.0
No	37	37.0
Programs (television and radio):		
Yes	23	23.0
No	67	67.0
Using ICTs to access agricultural information:		
Yes	43	43.0
No	57	57.0
ICT usage:		
Daily	13	13.0
Weekly	8	8.0
Monthly	22	22.0
Annually	4	4.0
Preferred language:		
Nupe	14	14.0
Hausa	14	14.0
Gbagyi	53	53.0
Yoruba	6	6.0
Igbo	6	6.0
Fulani	7	7.0

Source: Survey data, 2017

Farmers Perception on Effectiveness of ICTs in Extension Service Delivery

The result of the analysis on the perception of the relevance of ICTs in extension service delivery (Table 4) indicates that farmers have a favorable perception of the relevance of ICTs in extension service delivery. Majority of the farmers agreed with the statements that focus on the importance of ICTs in extension service delivery such as increase in contacts, time-saving contacts, increase in the pace of rural development and enhancement of sustainable rural livelihoods, and cost-effective service delivery. All the perception statements recorded mean scores above 4. The farmers however, also agreed with the statement that the cost of ICTs cannot justify the benefits. This is similar to the findings of Osondu and Ibezim (2015) who propose that farmers may hold this view considering the challenges regarding shortage of electricity and network access faced by the rural farmers. The positive perception of relevance of ICTs can stimulate the interest of farmers to access and use ICTs thereby enhancing agricultural production (Mahmud and Ahsan, 2016).



Table 4: Farmer’s Perception of the Effectiveness of ICTs in Extension Service Delivery

Perception statements	Strongly Agree (5)	Agree (4)	Un-decided (3)	Disagree (2)	Strongly Disagree (1)	Mean rating Max = 5
Increased contact between extension	50 (50.0)	50 (50.0)	0 (0)	0 (0)	0 (0)	4.50
Increased time-saving contact	70 (70.0)	30 (30.0)	0 (0)	0 (0)	0 (0)	4.70
Cost of ICTs cannot justify benefits	28 (28.0)	59 (59.0)	13 (13.0)	0 (0)	0 (0)	4.15
Will make extension service delivery more cost-effective	36 (36.0)	62 (62.0)	3 (3.0)	0 (0)	0 (0)	4.34
Will increase pace of rural development	44 (44.0)	53 (53.0)	3 (3.0)	0 (0)	0 (0)	4.41
Increase in production and farming income	57 (57.0)	43 (43.0)	0 (0)	0 (0)	0 (0)	4.57

Note: ≥ 3.0 = Effective and < 3.0 = Not Effective; Figures in parentheses are percentages
 Source: Survey data, 2017

Ranking of Effectiveness of ICTs

Table 5 shows the ranking of farmer’s perception of the effectiveness of the different ICTs (radio, television and mobile phone). The result indicates that majority of farmers (40%) consider Mobile phone to be the most effective. ICT applications such as calls and Short Messaging Services have been found to be used often by farmers (Mtega and Msungu, 2013). Studies have also indicated that an increase in number of phone users brings about an increase in total agricultural output (Ejemeyovwi *et al.*, 2017). This corroborates the assertion by Syiem and Raj (2015) that the usage trend in mobile phones is an indication that it can offer huge scope in the future if appropriately used for the purpose of agriculture and other rural development purposes. According to the farmers, mobile phone performs the task of both radio and television hence their perception of it as the most effective. Television was considered by about 32% of the farmers as most effective due to its capacity to display pictures and make sounds. According to Murty and Abhinov (2012), television played a very important role as a medium of diffusion of information about agriculture. Ali *et al.* (2016) asserted that farmers got information by watching the agriculture related programmes on television. About 28% of farmers however considered radio to be the most effective because it has more channels and capacity to cover wide areas compared to that of television and mobile phone.

Table 5: Ranking ICTs in Terms of Effectiveness

Categories	Frequency	Percentage	Ranking
Mobile Phone	40	40.0	1 st
Television	32	32.0	2 nd
Radio	28	28.0	3 rd

Source: Survey data, 2017



Ranking ICTs in Terms of Timeliness and Relevance

The result in Table 6 showed that majority of the respondents (63%) considers mobile phone to be most relevant and timeliest in accessing agricultural information. The main reason given is that it is easy to move around with because they are light; and they have many service providers, and thus can access the information at their convenience either at home or on their farms. Radio was ranked second followed by television. Syiem and Raj (2015) observed that the level of availability and accessibility of ICTs by the tribal farmers in North-East India was highest for mobile phones followed by television and radio, respectively. Because mobile phones are easily affordable and could be easily used by even illiterate farmers, they were highly accessed and most frequently used by majority of farmers. Despite the advantage of mobile phones, the result of the study revealed that radio was considered by about 37% of the farmers as most relevant and timely in accessing agricultural information. It was believed that even without regular electricity supply, radios can still be operated. Availability of many local stations is another factor that the farmers considered.

Table 6: Ranking ICTs in Terms of Timeliness and Relevance

Categories	Frequency	Percentage	Ranking
Mobile Phone	63	63.0	1 st
Radio	37	37.0	2nd
Total	100	100	

Source: Survey data, 2017

Problems Militating Against the Use of ICTs

Despite the importance and contributions that ICT has brought to Agricultural knowledge management in Nigeria, it is bedeviled by myriads of challenges. These challenges hinder the effective use of ICT as the most appropriate channel for agricultural knowledge management (Abdulsalam *et al.*, 2016). This is however, typical of all developing nations and not peculiar to developed countries.

Table 7 shows the result of the problems militating against the awareness and usage of ICTs among the respondents in Bosso LGA of Niger State. The result shows that majority (32%) of farmers consider erratic power supply to be a major challenge to use of ICTs. Erratic power supply has been reported as one of the major challenges faced by farmers in the rural areas in the use of ICT in addition to low network connectivity and lack of awareness of the benefits of ICTs (Syiem & Raj, 2015). About 25% of the farmers consider in adequate extension services to be a major problem while 18% think the problem comes from lack of formal education. Other problems identified are lack of electrical installations and bad network connections.

Table 7: Militating Problems against the Use of ICTs among the Farmers

Problems	Frequency	Percentage
Lack of formal education	18	18.0
Inadequate extension services	25	25.0
Lack of electrical installation	10	10.0
Erratic power supply	32	32.0
Bad network connections	15	15.0

Source: Survey data, 2017



CONCLUSION AND RECOMMENDATIONS

The result of the study revealed that ICTs are effective tools in dissemination of agricultural information in the study area. Mobile phone was found to be the most effective means of accessing agricultural information by the respondents due to its dual purpose. Delivering agricultural information in Gbagyi language is an efficient way of achieving maximum diffusion and adoption of advanced technologies in the study area since most of the farmers preferred information delivery in their native language. The major factors leading to ICTs effectiveness in extension delivery were mobile phone and television. Farmers consider mobile phones to be timelier and more relevant in accessing agricultural information. The study also concluded that erratic power supply and inadequate extension services are the major problems militating against the use of ICTs among farmers. The study recommended that:

1. Extension system programs should be designed in such a way that it involves the various types of ICTs to broaden and ensure equal access to information by all the farmers.
2. Since communication takes place effectively between people of the same language/cultural background, it is recommended that the predominant language of a locality should be used in dissemination of agricultural information.
3. ICT education should be built into the extension delivery package of extension agents to farmers particularly the use of the mobile phone since this can eliminate series of wasteful trips made by farmers to get at extension workers and vice versa.
4. Also, appropriate policies and programs that would strengthen and create proper awareness of ICTs should be formulated by the government to sensitize and educate farmers on the importance of ICTs in accessing agricultural information. This would increase farmers' awareness of the use of ICTs which may in turn lead to increased production efficiency.

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